Machine Learning in SAP Cloud for Customer
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Overview

Machine learning analyzes past data, discovers patterns, and creates statistical models to make predictions about the future.

Currently, the machine learning predictive setups offered in SAP Cloud for Customer are:

- **Deal Intelligence (Opportunity Scoring)**
- **Lead Intelligence**
- **Service Intelligence**

**Continuous ensemble machine learning delivers immediate business value**

What is Deal Intelligence (Opportunity Intelligence)?

With machine learning in opportunities, you can predict if an opportunity (in status – open or in process), can be won or lost. Deal intelligence uses the machine learning model trained on past sales data to predict the probability of winning a deal.

Sales managers can use opportunity scoring to focus on opportunities with the highest probability of closing and de-prioritize high-risk opportunities. With sophisticated machine learning algorithms, opportunity scoring helps you track the probability of an opportunity closing through an activity score, activity summary, and key risks.

What is Lead Intelligence?
Lead intelligence uses the machine learning model trained on past data to predict the probability of a lead getting converted into an opportunity. A higher score means a higher chance of the lead converting to an opportunity. Lead intelligence helps sales and marketing teams prioritize the leads that are most likely to get converted into successful opportunities.

**What is Service Intelligence?**

Service intelligence categorizes your tickets, routes them to the best agent, and improves accuracy and time to close tickets. Service intelligence predicts the category and recommends similar tickets that can provide you with potential answers for the customer issue. The solution can predict time to completion, scan the ticket text to identify products and sentiment, and recommend the most appropriate email template for your initial response. Meanwhile, the model constantly captures feedback to be retrained for improved accuracy over time.
2 Scope and Configuration Machine Learning in Cloud for Customer

You must be assigned the Prediction Services workcenter for you to add machine learning models.

To assign yourself to the Prediction Services workcenter, perform the following steps:

1. Navigate to Administrator > General Settings > Users > Business Users.
2. Search for the administrator user you want to assign the Prediction Services work center and then select this user.
3. Click Edit and then select Access Rights.
4. In the Work Center and View Assignment tab, click Find, enter the search term Prediction Services, and then click Locate.
5. Select the Assigned to User checkbox and click Save.
3  Machine Learning Scenarios in Cloud for Sales

Machine learning in sales is currently available for opportunities and leads.

Challenges

Customers are no longer making decisions they way they used to. The selling experience has become complex and the buyers are more sophisticated and smarter. Customers get frustrated – but don’t necessarily say anything about it to the sales rep. Do you know if your customers are experiencing these thoughts after exchanges with your sales reps?

- I know everything this sales rep is telling me.
- I’ve been waiting a week for product information.
- I don’t think the representative knows their own product.
- I just want a quote already, why does it take so long?

When you get into such situations, your sales reps fail your customers and open the door to your competitors. At the end of the day, it comes down to the sales reps not having the knowledge and tools they need to be effective in front of your customers. A bad sales rep experience means a bad customer experience.

At the same time, sales managers have their internal challenges such as:

- There’s high churn of sales team.
- Products keep evolving and there’s no time for training.
- The market is volatile and the priorities keep changing.
- Competition is growing fast and even the smaller players are taking large customers.

All the content is already available online and customers are more informed than ever. The customers expect sales team to be smarter than them.
Solution

With machine learning, you can understand the patterns in data and sell smarter. You can spend more time selling, increasing forecast accuracy, and improving relationships. You create and train a model to make predictions, and identify patterns and trends to act on.

Delivering a better experience with SAP Intelligent Sales Execution

- **Spend more time selling**: Implement quickly and keep sales focused on the right contacts, accounts, and opportunities.
- **Increase forecast accuracy**: Real-time forecasting with the health of each individual deal improves accuracy and planning across departments.
- **Improve relationships**: Track engagement with customers, partners, and prospects. Discover referrals and warm introductions.
- **Sales Development**: Turn interrogation and forecasting sessions into coaching opportunities that win more deals.
How to Activate Machine Learning?

Machine learning is available only for the SAP Cloud for Customer Enterprise version. For more details about machine learning, to activate it in your landscape, and for any issues, contact SAP with the following template:

SAP Support.

Activate machine learning in the following tenant: (Provide tenant detail & type - test or production) for the following scenarios (Place an X next to the scenarios):

- [ ] Deal Intelligence
- [ ] Lead Intelligence
- [ ] Business Text Intelligence

Deal Intelligence (Opportunity Scoring) [page 10]
Use machine learning to predict if an opportunity (in status – open or in process) can be won or lost.

Leads Intelligence [page 23]
With machine learning in leads, you can identify open leads that have a high potential of conversion into an Opportunity or Account.

Business Text Intelligence [page 35]
Use Natural Language Understanding (NLU) to get actionable insights such as visit and appointment recommendations from text analysis using business text intelligence.

(Beta) Opportunity Closing Date Prediction [page 39]
You can use machine learning to predict the expected close date of an opportunity that is open or in process.

3.1 Deal Intelligence (Opportunity Scoring)

Use machine learning to predict if an opportunity (in status – open or in process) can be won or lost.

Challenges

Many businesses face the following business problems related to opportunity management:

- Sales managers are going into at-risk opportunities blind because of missing information.
- Only 40% of forecasted opportunities are closed.
- A high volume of low-propensity opportunities leading to an inflated pipeline.

Benefits

When your sales representatives work with opportunities, they feel empowered to close deals as fast as possible while ensuring an increased win rate. Deal intelligence helps to determine which deals can close, which
won’t, and which could go either way. Each opportunity gets a unique win score that can be used for sales pipeline management and to focus teams on the opportunities that are most likely to close.

Opportunity scoring uses the machine learning model trained on past sales data to predict the probability of winning a deal. Opportunity scoring helps your sales representatives prioritize their deals based on the winning probabilities.

A side pane is available to display details on the opportunity score and other relevant information for the selected opportunity. The score is determined based on the topmost influential factors of the opportunity and the additional info in the side pane is updated once a day based on the changing opportunities in the system. An influential factor is the parameter of the opportunity that was considered to determine the score. After the model training, the topmost influential factors are ranked.

The ranking helps to:

- Close deals faster
- Increase win rates
- Improve the pipeline

By

- Better prioritization of high propensity opportunities
- Better backfill and planning for at risk opportunities
- Sales acceleration and predictable revenue or deal flow

**How Does It Work?**

Historical data taken from the existing opportunities, is used to train the machine learning model. As a result, you get a customer-specific predictive model that is applied to provide users a scoring of opportunities. The higher the score, the better the chance of winning the opportunity.

List of some major data points considered for building opportunity scoring model:

- Sales attributes like sales area, priority, status, sales cycle etc.
- Sales reps performance
- Sales phase upgrade dynamic tracking
- Deal lifecycle
- Close date changes dynamic tracking
- Deal size/amount upgrade/downgrade dynamic tracking

**i Note**

You can train the lead scoring models on custom data points along with these standard data points. For more information about this restricted feature, refer to Enhancement in Deal Intelligence.
Sell Better with Deal Intelligence

**Identify trends.** Sales reps can understand which deals are more likely to close based on recent activity. Focus on hot deals.

**Better prioritization** of high propensity opportunities to close deals faster and more successful.

**Better backfill and planning** of at-risk opportunities. Increased sales efficiency and effectiveness.

**Prerequisites**

To ensure accurate opportunity scoring prediction with machine learning you require:

- SAP Cloud for Customer Enterprise license
- Minimum data volume for machine learning activation - A minimum of 1000 opportunities won, and a minimum 1000 opportunities lost.
- Change history of the opportunity for the last one year.

**Steps**

1. **Check Opportunity Scoring Readiness Report [page 13]**
   - Check your opportunity data to determine if the data set yields good prediction results.

2. **Add Extension Fields in Opportunity Scoring [page 14]**
   - In addition to the standard SAP fields, custom fields can also be added to machine learning scenarios to train the machine learning models created for these scenarios. Extension fields can be of Key User Tool or SAP Cloud Applications Studio type.

3. **Add Opportunity Scoring Model [page 15]**
   - Add the model for the opportunity (deal) scoring scenario.

4. **Train Opportunity Scoring Model [page 15]**
   - Train your deal scoring model with past opportunity data.

5. **Check Opportunity Scoring Performance Report [page 16]**
   - Check the model performance report when the model is active.

6. **Activate Opportunity Scoring [page 17]**
   - After the model is trained, activate the model to show predictions on the user interface.
3.1.1 Check Opportunity Scoring Readiness Report

Check your opportunity data to determine if the data set yields good prediction results.

Use the readiness report to analyze your opportunity data to determine if you can get useful predictions for deal scoring.

You can find the readiness report by performing the following steps:

1. Navigate to [Administrator] > [Prediction Services] > [Machine Learning Models] > [Model Setup].
2. Select the Opportunity Scoring scenario in the top table, then select Run Readiness at the top right.
3. When the check is complete, select View Report to see the details.

Remember
You must be assigned the Prediction Services workcenter.

The report returns an overall status of the data in your system.
- Ready to use machine learning
- Data improvements required
- Requirements not fulfilled

Each readiness factor shows you the minimum required value, the recommended value, and the actual value in your system. Each check factor must meet the recommended value to ensure reliable prediction results. If the check factor value falls between the minimum value and the recommended value, the report shows a caution icon. If the value is less than the minimum value, the report shows an error icon.

Remember
- Check with the sales representatives whether they’re recording all opportunities in the system with regular status update or not. For example, all the lost opportunities. If not, opportunity status update must be made mandatory as it’s critical for the model training data. Migrating opportunity data without changing history impacts the model training. If the sales representatives aren’t doing recording the data as a practice, they must be encouraged to do so. With the right recording, over a while, the system has good data points, and it helps build a useful predictive model that can help the business.
- In general readiness check is a soft check. You can still go ahead and train the model even if the check is failing. However, some factors like 12 months volume and history changes are critical. More accurate data you provide, the more meaningful the prediction is.
3.1.2 Add Extension Fields in Opportunity Scoring

In addition to the standard SAP fields, custom fields can also be added to machine learning scenarios to train the machine learning models created for these scenarios. Extension fields can be of Key User Tool or SAP Cloud Applications Studio type.

Limitation

- Extension fields of only code type are available.

Prerequisite

- Add one or more extension fields to the opportunity header.
- Add one or more extension fields to the ODATA (V2 API).

Steps to Add Custom Fields

1. Go to `Administrator ➔ Prediction Services ➔ Model Setup`.
2. Select `Opportunity Scoring` scenario and click `Manage Extension`.
3. Select the object for the machine learning scenario. The dropdown lists the allowed entity types for this ML scenario. For Opportunity Scoring, extension fields from Opportunity Collection can be added.
4. To add the fields, click `Add Fields`. It opens a popup that lists all the allowed code-type extension fields.
5. Select the allowed fields and click `Save` and `Close`. The allowed fields are not available for selection in the `Add Field` popup once they added.

Note

- Do not remove the already added extension fields from ODATA.
- Do not delete the already added extension fields.

Removing or deleting the extension fields causes the model training or the inference to fail.

Parent topic: Deal Intelligence (Opportunity Scoring) [page 10]

Previous: Check Opportunity Scoring Readiness Report [page 13]

Next task: Add Opportunity Scoring Model [page 15]
3.1.3 Add Opportunity Scoring Model

Add the model for the opportunity (deal) scoring scenario.

Prerequisites

- You must be assigned the Prediction Services workcenter.
- You have run the readiness report and the results show that your opportunity data is ready to use machine learning.

Procedure

1. As an administrator, go to the Prediction Services work center/view under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Under Prediction Services, click the Model Setup link to configure and activate the training model.
3. Select Opportunity Scoring under prediction service and then select Add Model.
4. Enter a name and select OK to create the model.

Task overview: Deal Intelligence (Opportunity Scoring) [page 10]

Previous: Add Extension Fields in Opportunity Scoring [page 14]

Next task: Train Opportunity Scoring Model [page 15]

3.1.4 Train Opportunity Scoring Model

Train your deal scoring model with past opportunity data.

Procedure

1. Select Train to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.
2. Select Get Status to get the status of the training model.
   - The different statuses that a model goes through are as follows:
     - Created
     - Training in Progress
→ Remember
Training in progress status can take some time based on the data volume. Click Get Status to check the change in status from training in progress to completed.

- Training Completed/Training Failed (depending on the outcome of the training)
- Active/Inactive (depending on the model’s active status)

Note
There can be only one model active at a time.

Task overview: Deal Intelligence (Opportunity Scoring) [page 10]

Previous task: Add Opportunity Scoring Model [page 15]

Next: Check Opportunity Scoring Performance Report [page 16]

3.1.5 Check Opportunity Scoring Performance Report

Check the model performance report when the model is active.

The administrator can check the key feature contributions for each model by clicking View under the Performance column. You also find the following model performance metrics based on model training – predictive power and predictive confidence.

Predictive power helps assess how robust your predictive model is in explaining won and lost opportunities.

Predictive confidence helps assess how well your predictive model performs with new data that has similar characteristics to the data used to create the model.
Remember

- Performance column is enabled only when the training is complete.
- Predictive power is available in opportunities.
- Feature contribution is based on overall training population and shows up for top 10 features.

**Feature Contribution**

1. Set the model status to *Active* using the *Activate* action.

**Note**

- Prediction confidence must be greater than or equal to 95 and predictive power must be greater than or equal to 60 in the production tenant.
- Once training is complete, the opportunity scoring shows the predictive power and predictive confidence based on the algorithm prediction.

**Parent topic:** Deal Intelligence (Opportunity Scoring) [page 10]

**Previous task:** Train Opportunity Scoring Model [page 15]

**Next:** Activate Opportunity Scoring [page 17]
Keep only one model in the active state.

2. You can deactivate a model by selecting the **Deactivate** button.

**Parent topic:** Deal Intelligence (Opportunity Scoring) [page 10]

**Previous:** Check Opportunity Scoring Performance Report [page 16]

**Next:** View Deal Scoring Predictions [page 18]

### 3.1.7 View Deal Scoring Predictions

View deal scoring prediction results in opportunities.

> **Remember**

Opportunity score is updated on a daily basis. And, newly added opportunities don’t have a score immediately.

The user gets a new side pane in the opportunity workcenter (enabled by the administrator) that provides an overview on the status of each opportunity. A score column that shows the score for each opportunity in the opportunity list is available. The score field can also be used as filter to select certain opportunities. With opportunity score, there’s better prioritization of high-end propensity opportunities, better backfill and planning for at risk opportunities, sales acceleration, and predictable revenue or deal flow.

The score and the additional info in the side pane is updated once a day based on the changes made to all opportunities in the system. This update is triggered at midnight (based on the time zone of your datacenter).

> **Tip**

The administrator can personalize and move score column to show as second or third column and publish it for all the users. So, the user doesn’t have to scroll down to view the score column.

Opportunity scoring uses the machine learning model trained on past sales data to predict the probability of a deal. Opportunity scoring prioritizes deals based on the propensity to win.

> **Remember**

- By creating a business role, you can restrict the display of the side pane to selected set of users. Share the created business role created with SAP support via incident (lod-crm-ml-sls component). Support registers the business role created by you in the tenant. You can use this process while piloting the feature in production.
- Once model is in the active state, the side pane is displayed. But score doesn’t show up until initial scoring process is completed.
- Side pane display reflects the data based on state before the opportunity was closed.
- Side pane display is updated daily with the opportunity scores.
- The insights are available in the side pane after the completion of initial scoring run, depending on the data volume.
Understanding Opportunity Scoring Prediction

Opportunity Score is calculated based on the topmost influential factors. It's a relative score that predicts the chance to win the opportunity. The higher the score, the better the chance of winning the opportunity. For example, an Opportunity Score of 93 has a better chance of winning than an Opportunity Score of 82.

The opportunity score returned from machine learning service ranges from 0 to 99 and is categorized as:

- 75–99 - Very Likely (with the number displayed in green)
- 51–75 - Likely (with the number displayed in yellow)
- 0–50 - Less Likely (with the number displayed in red)

A high score means higher chance of opportunity being won. Sales reps use these scores to prioritize the opportunities they work on. You can see the opportunity score and details about the key factors that contributed to a score.

Key factors data is displayed based on the topmost influential factors. For example, in the screenshot, the top two and bottom two are represented, out of the ranked list.

- **Close Date** indicates the timeline for the opportunity to close.
- **Sales Owner Win Rate** looks at the win rate of each individual sales representative. Win rate is calculated as Number of Won Opportunities/Total Number of Opportunities.
- **Days in Current Phase** indicate the number of days the opportunity has been in the current sales phase.
- **Days Since Last Update** indicates the number of days since this opportunity has been changed.

Activity engagement is a cumulative list of activities per opportunities. Activity engagement provides an overall summary of the activities that have happened or planned for an opportunity. There’s no intelligence behind this data.

Insights shown are derived from the topmost influential factors. For example, the number of times the close date has changed per quarter.

**Limitations**

- Currently, only code-type extension fields can be part of the influential factors.
- You cannot customize the Opportunity side pane.

**Details of Opportunity Score**

Learn how to read each factor in side pane for an opportunity score.
The following table displays the information displayed in the side pane of an opportunity score:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key factors</td>
<td>Indicates the top attributes that influence the score. It shows 4 top influencing factors. The visualization is easy to understand and train users, and provides more focused insights.</td>
</tr>
<tr>
<td>Activity Engagement</td>
<td>Shows the level of activities across channels- email, phone call, tasks, and calendar.</td>
</tr>
<tr>
<td>Days to Close are X/ Days Past Due Date is X</td>
<td>It’s the difference between the close date and current date, and shows the number of days left before close date. After the expiry of this time, you see the key factor change to Days Past Due Date as the factor.</td>
</tr>
<tr>
<td>Time Closing Date Pushed is X</td>
<td>It’s calculated by counting the number of updates made to the Close Date field. You see the average number of times close date has been updated for all historical won opportunities and how that specific opportunity compares to the average.</td>
</tr>
<tr>
<td>Days in an Opportunity Status are X</td>
<td>It’s calculated by counting the number of days that opportunity has been a part of a given stage. And, how it compares to average of all other deals.</td>
</tr>
<tr>
<td>Amount Changed</td>
<td>Shows most recent change to the deal amount-whether it increased or decreased.</td>
</tr>
<tr>
<td>Status</td>
<td>Shows most recent change to the opportunity status. Custom status shows depending on what is set.</td>
</tr>
<tr>
<td>Times Deal Slipped</td>
<td>Shows how many times the deal moved from one-quarter pipeline to another.</td>
</tr>
</tbody>
</table>

Parent topic: Deal Intelligence (Opportunity Scoring) [page 10]

Previous: Activate Opportunity Scoring [page 17]

Next: FAQs for Opportunity Scoring [page 20]

### 3.1.8 FAQs for Opportunity Scoring

Here are some frequently asked questions (FAQs) and corresponding answers about machine learning in deal intelligence.

**Do I qualify for using machine learning in the solution?**
The following requirements must be met to use machine learning in the solution:

- You must have SAP Cloud for Customer Enterprise License.
- At least 5000 records each for Opportunity.
  - At least a few fields must be used in these 5000 records.
  - Data must be evenly distributed. For example, there must be a good balance of Won and Lost opportunities.
- At least 1 year of historical data with change history.
  - Historical data is extracted automatically.

**How do we activate machine learning?**

You can create an incident in the tenant to request activation once the qualification criteria is met.

**When/Why would I create a new model?**

A retraining of the model could be necessary if your opportunity data's history changes over the course of time for example:

- After uploading new opportunities caused by a data migration
- Enrolling new processes for handling opportunities in your company
- Different user behavior and so on.

**Does the activation of a new model deactivate the old one?**

Only one model can be active at one point in time. You’ve to explicitly deactivate the old model.

**Can I reactivate an older model?**

Yes.

**Is there an impact on the system performance as the data is cached?**

There’s no impact on system performance daily as the data is cached & stored in the solution. All compute-intensive operations such as training the model happens outside of SAP Cloud for Customer tenant, simultaneously in the SAP Leonardo platform.

**How many models are active at any time?**

Only one model can be active in production. However, you can create multiple models, but it isn’t recommended.

**Where can we test the machine learning functionality?**

It’s important to have the right set of data to test machine learning scenarios. Thus, it’s recommended that you test on the copy of production tenant so that you can test on production like data. If not, then you can test in production system directly with limited set of users. Note that generally, a model with accuracy below 50 isn’t good enough to have a satisfying prediction result.

**Do we need to retrain the model?**

Yes, you need to retrain the model as your data is going to change over time, and you need to update the model for accurate predictions. It’s recommended to retrain the model every 6–10 months.

**Are there extension fields to the model?**

Extension fields aren’t available right now, but it’s planned and in the road map.

**How can I assess the quality of the model?**
For every trained model, the quality of the model is based on historical training data.

**How often are scores updated?**

Scores are updated once daily.

**Does updating the scores for lead and opportunity impact working with that lead and opportunity?**

If users are working on an opportunity, the daily update of the opportunities does not produce any side effects (such as locked objects and dumps.)

**Why are scores not visible though I activated the machine learning feature?**

For initial setup, the scoring is applied in a batch mode and updates are performed on a daily basis. Scoring is triggered immediately after the model is activated. The insights are available in the side pane after the completion of initial scoring run, depending on the data volume. Also, ensure that the score is sorted in descending order.

**Can there be selected business group users assigned to machine learning features?**

Yes, the administrator can create specific roles (you must share this business role for registration with SAP support via incident - lod-crm-ml-sls component), and only those customer roles are assigned machine learning features.

**Which opportunities get a score after the first activation of a model?**

All open and in progress opportunities are scored. Opportunities created after the activation are scored with the next update at midnight.

**Which information shown in the side pane is predicted or calculated by the machine learning feature?**

Only the opportunity score is predicted. All other information in the side pane is data collected based on the opportunity and shown in addition for a quick overview.

**Can I activate deal scoring for a pilot set of users?**

No, there are role-based restrictions to view the side pans.

**Can I customize the model?**

Yes, currently, only code filed extension fields are supported.
3.2 Leads Intelligence

With machine learning in leads, you can identify open leads that have a high potential of conversion into an Opportunity or Account.

Challenges

Generating high-quality leads is one of the biggest challenges for sales representatives as there are various leads to focus on. And, lot of leads also never convert into sales because of lack of nurturing. There’s a need to prioritize the leads to focus on the right ones. Sales managers also need timely and accurate information to guide the sales team.

Benefits

Lead intelligence captures as much data as possible on your leads to shorten the sales cycle. The more data your sales team has, the more likely they’re to win the business. Lead intelligence also helps build great relationship with the sales team and helps them connect smartly and close more deals.
**Lead Scoring**

**Benefits**

- Intelligent score helps Sales and Marketing team to focus on the right lead
- Key indicators and activity engagement details help Sales Manager coach reps
- Increased marketing effectiveness and tighter sale alignment

**How Does It Work?**

Historical data taken from the existing leads, is used to train the machine learning model. As a result, you get a customer-specific predictive model that is applied to provide users a scoring of leads. The higher the score, the better the chance of converting into an opportunity.

List of some major data points considered for building lead scoring model:
- Lead open date/quarter
- Lead priority
- Lead region/channel/org/unit related attributes
- Lead origin source
- Lead account
- Lead sales/marketing activities
- Lead owner history performance

**i Note**

You can train the lead scoring models on custom data points along with the standard data points. For more information about this restricted feature, refer to Enhancement in Lead Intelligence.

The lead score indicates the likelihood of conversion of lead to opportunity. Using lead scoring, you can focus on the tailored list of prospects, with highest propensity of becoming customers.
Prerequisites

To ensure accurate lead scoring prediction with machine learning you require:

- SAP Cloud for Customer Enterprise license
- Data volume - The more, the better. A minimum of 1000 leads converted into opportunity and a minimum of 1000 declined leads.

Steps

1. **Check Lead Scoring Readiness Report [page 25]**
   Check your lead data to determine if the data set yields good prediction results.

2. **Add Extension Fields in Lead Scoring [page 27]**
   In addition to the standard SAP fields, custom fields can also be added to machine learning scenarios to train the machine learning models created for these scenarios. Extension fields can be of Key User Tool or SAP Cloud Applications Studio type.

3. **Add Lead Scoring Model [page 28]**
   Add the model for the lead scoring scenario.

4. **Train Lead Scoring Model [page 29]**
   Train your lead scoring model with past leads data.

5. **Check Lead Scoring Performance Report [page 30]**
   Check model performance report when the model is active.

6. **Activate Lead Scoring [page 31]**
   Activate the model to show predictions on the user interface.

7. **View Lead Scoring Predictions [page 31]**
   View lead scoring prediction results in leads.

8. **FAQs for Lead Scoring [page 33]**
   Here are some frequently asked questions (FAQs) and corresponding answers about machine learning in leads.

### 3.2.1 Check Lead Scoring Readiness Report

Check your lead data to determine if the data set yields good prediction results.

Use the readiness report to analyze your leads data to determine if you can get useful predictions for lead scoring.

You can find the readiness report by performing the following steps:

1. Navigate to **Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup ➤**
2. Select the Lead Scoring scenario in the top table, then select **Run Readiness** at the top right.
3. When the check is complete, select **View Report** to see the details.
Remember

You must be assigned the **Prediction Services** workcenter to view the readiness report.

The report returns an overall status of the data in your system.

- Ready to use machine learning
- Data improvements required
- Requirements not fulfilled

Each readiness factor shows you the minimum required value, the recommended value, and the actual value in your system. Each check factor must meet the recommended value to ensure reliable prediction results. If the check factor value falls between the minimum value and the recommended value, the report shows a caution icon. If the value is less than the minimum value, the report shows an error icon.

Remember

- Check with the sales representatives whether they’re recording all the leads in the system with regular status update or not. For example, all the leads converted into opportunities. If not, it must be made mandatory to update the status of the lead as it’s critical for the model training data. Migrating the leads data without changing history impacts the model training.
- In general readiness check is a soft check. You can still go ahead and train the model even if the check is failing. However, some factors like 12 months volume and history changes are critical. More accurate data you provide, the more meaningful the prediction is.
### 3.2.2 Add Extension Fields in Lead Scoring

In addition to the standard SAP fields, custom fields can also be added to machine learning scenarios to train the machine learning models created for these scenarios. Extension fields can be of Key User Tool or SAP Cloud Applications Studio type.

#### Note

Extension fields of only code type are allowed.

#### Prerequisite

- Add one or more extension fields to the lead header.
- Add one or more extension fields to the OData (V2 API).

#### Steps to Add Custom Fields

1. Go to **Administrator** ➤ **Prediction Services** ➤ **Model Setup**.
2. Select **Lead Scoring** scenario and click **Manage Extension**.
3. Select the object for the machine learning scenario. The dropdown lists the allowed entity types for this machine learning scenario. For Lead Scoring, extension fields from Lead Collection can be added.
4. To add the fields, click **Add Fields**. It opens a popup that lists all the allowed code-type extension fields.
5. Select the allowed fields and click **Save** and **Close**. The allowed fields are not available for selection in the **Add Field** popup once they are added.

#### Note

- Do not remove the already added extension fields from OData.
- Do not delete the already added extension fields. Removing or deleting the extension fields causes the model training or the inference to fail.

#### Parent topic: Leads Intelligence [page 23]

#### Previous: Check Lead Scoring Readiness Report [page 25]

#### Next task: Add Lead Scoring Model [page 28]
3.2.3 Add Lead Scoring Model

Add the model for the lead scoring scenario.

Prerequisites

- You must be assigned the Prediction Services work center.
- You have run the readiness report and the results show that your leads data is ready to use machine learning.

Procedure

1. As an administrator, go to the Prediction Services work center/view under Administrator > Prediction Services > Machine Learning Models > Model Setup.
2. Under Prediction Services, click the Model Setup link to configure and activate the training model.
3. Select Lead Scoring under prediction service and then select Add Model.
4. Enter a name and select the additional Conversion Target (Account).
5. Click OK to create the model.

Task overview: Leads Intelligence [page 23]

Previous: Add Extension Fields in Lead Scoring [page 27]

Next task: Train Lead Scoring Model [page 29]
3.2.4 Train Lead Scoring Model

Train your lead scoring model with past leads data.

Procedure

1. Select **Train** to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.

2. Select **Get Status** to get the status of the training model.

   The different statuses that a model goes through are as follows:
   - **Created**
   - **Training in Progress**
     - **Remember**: Training in progress status can take some time based on the data volume. Click **Get Status** to check the change in status from training in progress to completed.
   - **Training Completed/Training Failed** (depending on the outcome of the training)
   - **Active/Inactive** (depending on the model's active status)

3. Select the model and go to **Settings** by clicking the three dots menu to see the **Conversion Target** selected by you.

![Lead Scoring Model - Settings](image-url)
3.2.5 Check Lead Scoring Performance Report

Check model performance report when the model is active.

The administrator can see the key feature contributions for each model by clicking View under the Performance column. You also find the following model performance metrics based on model training – predictive power and predictive confidence.

Predictive power helps assess how robust your predictive model is in explaining lead prediction target.

Predictive confidence helps assess how well your predictive model performs with new data that has similar characteristics to the data used to create the model.

→ Tip

Tip

→ Remember

- Performance column is enabled only when the training is complete and the model is active.
- Predictive power is available in leads.
- Feature contribution is based on overall training population and shows up for top 10 features.
3.2.6 Activate Lead Scoring

Activate the model to show predictions on the user interface.

Steps to activate lead scoring:

1. After the training is complete, set the model status to Active using the Activate action.

   **Note**
   - Prediction confidence must be greater than or equal to 95 and predictive power must be greater than or equal to 60 in the production tenant.
   - Once training is complete, the lead scoring shows the predictive power and predictive confidence based on the algorithm prediction.
   - Keep only one model in active state.

2. You can deactivate a model by selecting the Deactivate button.

3.2.7 View Lead Scoring Predictions

View lead scoring prediction results in leads.

When lead score is enabled for a lead by the administrator, a side pane is displayed with insightful and relevant information. Higher the lead score means higher the chances of getting converted to opportunity. With lead score, there’s better prioritization of high-end propensity leads to be converted into an opportunity. It helps sales and marketing teams predict and prioritize leads that are likely to get converted into successful opportunities compared to the opportunities that are unlikely to get converted.

You can calculate the probability of success for each sales lead in the sales pipeline with lead score. Lead Scoring uses the machine learning model trained on past sales data to predict the probability of a deal. Lead scoring prioritizes leads based on the propensity to win.

→ Remember

- By creating a business role, you can restrict the display of the side pane to selected set of users. Share the created business role created with SAP support via incident (lod-crm-ml-sls component). Support
The lead score indicates the likelihood of conversion of lead to opportunity. Sorting the leads in descending order for the score, the leads could be ranked in the order of likeliness of conversion. Such leads can be pursued proactively by the sales team for further processing. Thus, lead intelligence supports the sales team in improving the lead conversion key figures.

Higher lead score means higher chance of getting converted into an opportunity.

Lead Type shows the categorization into lead buckets – A, B, C.

- **Type A**: lead score range is 75–99
- **Type B**: Lead score range is 51–75
- **Type C**: Lead score range is 0–50

Learn how to read each factor in the side pane for a lead score. The following table displays the information displayed in the side pane of a lead score:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key factors</td>
<td>Indicates the top attributes that influence the lead score. It shows 4 top influencing factors. The visualization is easy to understand and train users, and provides more focused insights.</td>
</tr>
<tr>
<td>Activity Engagement</td>
<td>Shows level of activities across channels- e-mail, phone call, tasks, and calendar.</td>
</tr>
</tbody>
</table>
3.2.8 FAQs for Lead Scoring

Here are some frequently asked questions (FAQs) and corresponding answers about machine learning in leads.

**Do I qualify for using machine learning in the solution?**

The following requirements must be met to use machine learning in the solution:

1. You must have SAP Cloud for Customer Enterprise License.
2. Data volume - The more, the better. A minimum of 1000 leads converted into opportunity and a minimum of 1000 declined leads.
   - At least a few fields must be used in these 1000 records.
   - Data must be evenly distributed. For example, there must be a good balance of the leads converted into opportunities and declined leads.
3. At least 6 months to 1 year of historical data.

**Note**

See the high-level feature categories in Leads Intelligence [page 23]. The fields are linked to those feature categories.
Historical data is extracted automatically.

How do we activate Machine Learning?

You can create an incident in the tenant to request activation once the qualification criteria is met.

Is there an impact on the system performance as the data is cached?

There’s no impact on system performance daily as the data is cached & stored in the solution. All compute-intensive operations such as training the model happens outside of SAP Cloud for Customer tenant, simultaneously by side in the SAP Leonardo platform.

How many models are active at any time?

Only one model can be active in production. However, you can create multiple models. From business perspective, multiple models aren’t recommended.

How can I assess the quality of the model?

For every trained model, the quality of the model is based on predictive power and predictive confidence.

Where can we test the machine learning functionality?

It’s important to have the right set of data to test machine learning scenarios. Thus, it’s recommended that you test on the copy of production tenant so that you can test on production like data. If not, you can test in production system directly with limited set of users. Note that generally, a model with accuracy below 50 isn’t good enough to have a satisfying prediction result.

Do we need to retrain the model?

Yes, you need to retrain the model as your data is going to change over time, and you need to update the model for accurate predictions. It’s recommended to retrain the model every 6–10 months.

Are there extension fields to the model?

Extension fields aren’t available right now, but it’s planned and in the road map.

How often are scores updated?

Scores are updated once daily.

Does updating the scores for lead impact working with that lead?

If users are working on a lead, the daily update of the leads does not cause any side effects (such as locked objects and dumps.)

Why are scores not visible though I activated the machine learning feature?

For initial setup, the scoring is applied in a batch mode and updates are performed on a daily basis. Scoring is triggered immediately after the model is activated. The insights are available in the side pane after the completion of initial scoring run, depending on the data volume. Also, ensure that the score is sorted in descending order.

Can there be selected business group users assigned to machine learning features?

Yes, the administrator can create specific roles (which must be shared with SAP), and only those customer roles are assigned machine learning features.

Parent topic: Leads Intelligence [page 23]
3.3 Business Text Intelligence

Use Natural Language Understanding (NLU) to get actionable insights such as visit and appointment recommendations from text analysis using business text intelligence.

Prerequisites

To use natural language processing for business text intelligence with machine learning, you require an SAP Sales Cloud enterprise license.

Overview

- **i Note**
  Business text intelligence has been tested for the following language texts:
  - English
  - (Beta) German
  - (Beta) Spanish
  - (Beta) French

Steps

1.  Add Business Text Intelligence Model [page 36]
   Add a model to the business text intelligence scenario.
2.  Train Business Text Intelligence [page 36]
    Train your new business text intelligence model in preparation for activation.
3.  Activate and Adjust Business Text Intelligence [page 37]
    Activate the business text intelligence model after the training is complete.
4.  View Business Text Intelligence [page 37]
    View the business text intelligence for Sales Quotes, Opportunities, and Leads.
3.3.1 Add Business Text Intelligence Model

Add a model to the business text intelligence scenario.

Prerequisites

You must be assigned the Prediction Services workcenter to add a model to the business text intelligence scenario.

Procedure

1. Navigate to the Prediction work center under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Select Business Text Intelligence under prediction service and then select Add Model.
3. Enter a name you wish to include in the model and select OK to create the model.

Task overview: Business Text Intelligence [page 35]

Next task: Train Business Text Intelligence [page 36]

3.3.2 Train Business Text Intelligence

Train your new business text intelligence model in preparation for activation.

Procedure

1. Select your new business text intelligence model and then select Train to start the required model preparation.
2. Click Get Status to update the training status of the model. You can also use Get Status to refresh the status of the model.
   The different statuses that a model goes through are as follows:
   - Created
   - Training in Preparation
   - Training in Progress
   - Training Completed/Training Failed (depending on the outcome of the training)
   - Active/Inactive (depending on the model’s active status)
3.3.3 Activate and Adjust Business Text Intelligence

Activate the business text intelligence model after the training is complete.

**Procedure**

Click **Activate** to set the status of the model to **Active**.

**i Note**

You can deactivate a model by selecting the **Deactivate** button.

3.3.4 View Business Text Intelligence

View the business text intelligence for **Sales Quotes**, **Opportunities**, and **Leads**.

**Procedure**

1. Log into your solution and go to any of the following:
   - **Sales Quotes**
   - **Opportunities**
   - **Leads**
2. Go to **Activities** under the object detail view and check the recommended activities under **Recommendations**.
You see the appointment recommendations based on the notes text.

Note based recommendation in **Sales Quotes**:

![Sale Quote Note Based Recommendation](image1)

Note based recommendation in **Opportunities**:

![Opportunity Note Based Recommendation](image2)

Note based visit recommendation:

![Visit Note Based Recommendation](image3)
Note based recommendation in *Leads*:

![Image of Leads](image)

**Task overview:** Business Text Intelligence [page 35]

**Previous task:** Activate and Adjust Business Text Intelligence [page 37]

### 3.4 (Beta) Opportunity Closing Date Prediction

You can use machine learning to predict the expected close date of an opportunity that is open or in process.

⚠️ **Caution**

This feature is available as a beta version for test use only. It has not been released for productive use. If you activate this feature, you understand and agree to the following conditions:

- Feature is not covered by SAP support agreements or warranty obligations
- Any data loss or damage that may result from use of this feature is not the responsibility of SAP or its representatives
- You will not use this feature to process any personal data of end users
- SAP may change or remove this function at any time, and it may never appear in the generally available version of the Service

### Challenges

Businesses face the following challenges in opportunity management:

- Sales managers have incomplete information regarding at-risk opportunities
- Only 40% of forecasted opportunities are closed
A high volume of low-propensity opportunities leads to an inflated pipeline

Benefits

When sales representatives work with opportunities, they feel empowered to close deals as fast as possible while ensuring an increased win rate. Predictive opportunity close date helps to determine when deals can be closed. Each opportunity gets a predictive close date that helps to focus on opportunities that have approaching close date as they have high potential of being won faster.

Also, the opportunity close date brings more transparency and additional insights to the opportunity score. Predictive close date uses the machine learning model trained on past sales data to predict the probability of winning a deal.

How Does It Work?

Historical data from the existing opportunities is used to train the machine learning model. As a result, you get a customer-specific predictive model that is applied to provide end users a predictive opportunity closing date. The nearer predictive closing date indicates the better chance of winning the opportunity.

The following data points are considered for building an opportunity close date scoring model:
- Sales attributes such as sales area, priority, status, and sales cycle
- Sales representatives’ performance
- Dynamically tracked sales phase upgrade
- Deal lifecycle
- Dynamically tracked closing date changes
- Dynamically tracked deal size or amount upgrade/downgrade

Prerequisites

To use opportunity closing date prediction with machine learning, you require an SAP Sales Cloud enterprise license.
3.4.1 Add Opportunity Closing Date Prediction Model

You can add a model for the opportunity closing date prediction scenario.

Prerequisites

You must be assigned the Prediction Services workcenter. To assign yourself to the Prediction Services workcenter, perform the following steps:

1. Navigate to Administrator General Settings Users Business Users.
2. Search for the administrator user you want to assign the Prediction Services work center and then select this user.
3. Click Edit and then select Access Rights.
4. In the Work Center and View Assignment tab, click Find, enter the search term Prediction Services, and then click Locate.
5. Select the Assigned to User checkbox and click Save.

Procedure

1. As an administrator, go to the Prediction work center under Administrator Prediction Services Machine Learning Models Model Setup.
2. Select (Beta) Opportunity Closing Date Prediction under prediction service and then select Add Model.
3. Enter a name you wish to include in the model and select OK to create the model.

3.4.2 Train Opportunity Closing Date Prediction

You must train your new opportunity closing date prediction model before activating it.

Procedure

1. Select your new opportunity closing date prediction model and then select Train to start the required model preparation.
2. Select Get Status to update the training status of the model. You can select Get Status to refresh the model status at any time.

The different statuses that a model goes through are as follows:
- Created
- Training in Preparation
3.4.3 Activate and Adjust Opportunity Closing Date Prediction

You must activate the model to show opportunity closing date prediction.

Procedure

After the training is complete, set the model status to Active by clicking the Activate button.

Note
You can deactivate a model by selecting the Deactivate button.

3.4.4 View Opportunity Closing Date Prediction

You can view the opportunity closing date prediction either from the Opportunities object work list (OWL) or the Trend Analytics feature available in Intelligent Sales Execution.

Prerequisites

You must have an active Deal Intelligence (Opportunity Scoring) model to view the Insights side panel. For more information, see Deal Intelligence (Opportunity Scoring).

Procedure

1. Navigate to Sales > Opportunities
2. Search for the Opportunity ID and select the opportunity.
   - You can see the Expected Close Date in the Insights side panel.
### Machine Learning Scenarios in Cloud for Sales

![Opportunities](image)

**Opportunities**

<table>
<thead>
<tr>
<th>Name</th>
<th>Close Date</th>
<th>Sales Phase</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML_OPPR_EXT_SCORE_0003</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0004</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0005</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0006</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0007</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0008</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0009</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0010</td>
<td>12.11.2020</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0011</td>
<td>29.01.2021</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
<tr>
<td>ML_OPPR_EXT_SCORE_0012</td>
<td>21.07.2021</td>
<td>Identify opportunity</td>
<td>ML Sales Representative</td>
</tr>
</tbody>
</table>

**Insights**

95 Opportunity Score

**Key Factors**

- Priority & Urgency
- Category: Prospect for Consulting
- Deal Type: 2i08 C3: Contract Extension
- Buying Capacity: C3 100k-150k Dollars

**Activity Engagement**

Received: 0
4 Machine Learning Scenarios in Cloud for Service

Use ticket data to create and train machine learning models to recognize similar tickets; predict ticket categories and completion time; extract ticket language, sentiment, and product ID; and recommend response templates.

Service intelligence categorizes your tickets, routes them to the best agent, and improves accuracy and time to close tickets. Service intelligence predicts the ticket category and priority, and recommends similar tickets that can provide you with potential answers for the customer issue. The solution can predict time to completion, scan the ticket text to identify products and sentiment, translate ticket text, and recommend the most appropriate e-mail template for your initial response. The model constantly captures feedback to be retrained for improved accuracy over time.

i Note

Machine learning is available only for the SAP Cloud for Customer Enterprise edition.

For more details about machine learning, to activate it in your landscape, and for any issues, contact SAP with the following template-

SAP Support,

Please activate machine learning in the following tenant: (Provide tenant detail & type - test or production) for the following scenarios (Place an X next to the scenarios):

- [ ] Ticket Categorization and Priority Prediction
- [ ] Similar Ticket Recommendation
- [ ] NLP Classification (product ID and sales order ID entity extraction, language detection, sentiment detection) for ticket language
- [ ] Ticket Time to Completion
- [ ] E-Mail Template Recommendation
- [ ] Machine Translation
- [ ] (Beta) Ticket Text Summarization

Ticket Categorization and Priority Prediction [page 45]
Use machine learning to automate the ticket categorization and prioritization processes.

Similar Ticket Recommendation [page 63]
Find similar past tickets you can check for solutions that can apply to the current ticket.

Ticket NLP Classification [page 68]
Natural language processing (NLP) can identify ticket language, sentiment, and can extract a product identification.

Ticket Time to Completion [page 78]
View a prediction for the time to complete the current ticket, based on closed ticket completion times.

E-Mail Template Recommendation [page 83]
The machine learning model recommends the most suitable response templates for a ticket.
4.1 Ticket Categorization and Priority Prediction

Use machine learning to automate the ticket categorization and prioritization processes.

Save agents time by automatically prioritizing tickets and categorizing tickets for your most commonly used ticket categories. Machine learning analyzes your past tickets and category catalog to learn how tickets are categorized in your organization. Priority prediction is also part of the categorization model. Once you train and activate the model, SAP Leonardo Machine Learning proposes the priority and category, and if the confidence thresholds are met, automatically populates these proposals into the ticket category and priority fields.

Ticket categorization increases agent productivity, provides better prioritization of incoming tickets and automatic classification based on model accuracy.

Prerequisites

To ensure accurate ticket category and priority prediction with machine learning you require:

- SAP Cloud for Customer Enterprise license
- Data volume - the more, the better (minimum 1000 categorized tickets)
- Data quality - tickets should include subject, description, proper category, and priority

Ticket categorization and prioritization are currently supported in these languages:

- Chinese
- English
- French
- German
- Japanese
- Portuguese
- Russian
- Spanish
Steps

1. **Ticket Intelligence Readiness Report [page 46]**
   Check your ticket data to determine if the data set yields good prediction results.

2. **Add Ticket Categorization Model [page 48]**
   Add the model for the ticket categorization scenario.

3. **Train Ticket Categorization Model [page 49]**
   Train your new ticket categorization model with past ticket data.

4. **Testing and Performance Reports [page 55]**
   Check model performance during testing and when the model is active. Use the test console to verify that the model is functioning correctly.

5. **Activate and Adjust Settings [page 59]**
   Activate the model to show predictions on the UI. Adjust settings as required.

6. **View Ticket Categorization Prediction [page 61]**
   Find category prediction results in tickets.

7. **Custom Ticket Data Extraction Filter with SDK [page 62]**
   Extract custom ticket data for machine learning model training.

### 4.1.1 Ticket Intelligence Readiness Report

Check your ticket data to determine if the data set yields good prediction results.

Use the readiness report to analyze your ticket data to determine if you can get useful predictions for ticket categorization.

Find the readiness report under [Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup]. Select the Ticket Categorization scenario in the top table, then select Run Readiness at the top right. When the check is complete, select View Report to see the details.

The report returns an overall status of the data in your system.

- Ready to use machine learning
- Data improvements required
- Requirements not fulfilled

Each readiness factor shows you the minimum required value, the recommended value, and the actual value in your system. You can adjust the data in your system to meet the minimum and recommended thresholds and run the readiness check again. Each check factor should meet the recommended value to ensure reliable prediction results. If the check factor value falls between the minimum value and the recommended value, the report shows a caution icon. If the value is less than the minimum value, the report shows an error icon.

Selecting any of these four readiness check factors opens the Details tab, containing additional information.

- Percentage of Service Categories Used
- Percentage of Incident Categories Used
- Percentage of Object Categories Used
- Percentage of Cause Categories Used
Note

The data volume, or total number of objects (tickets) shown is an approximate number of ticket records from the previous 12 months that could potentially be used to train the machine learning model.

Example

Let’s look at a simplified example for ticket categorization readiness.

Suppose you have 10 categories in your service category catalog. The readiness report shows that only 33% (3) of these categories are assigned to enough tickets to meet the qualification threshold. The percentage is below the recommended minimum threshold. However, 80% of your qualifying tickets are assigned to these three categories. If you train a model based on this data you can potentially automate up to 80% of your incoming tickets, despite using only 33% of your category catalog. In this case, machine learning could still yield significant agent productivity gains.

Parent topic: Ticket Categorization and Priority Prediction [page 45]

Next task: Add Ticket Categorization Model [page 48]

Related Information
4.1.2 Add Ticket Categorization Model

Add the model for the ticket categorization scenario.

**Prerequisites**

- You must be assigned the *Prediction Services* workcenter.
- You have run the readiness report and the results show that your ticket data is ready to use machine learning.

If you do not see the Prediction Services workcenter, go to *Administrator ➔ General Settings ➔ Users ➔ Business Users ➔ Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to *Edit* and select *Access Rights*. In the *Edit Access Rights* screen, go to the tab: *Work Center and View Assignment*. Click *Find* and enter the search term *Prediction Services*, and then click *Locate*. To assign Prediction Services, select the checkbox, *Assigned to User*, and click *Save*.

**Procedure**

1. As an administrator, go to the *Prediction* work center under *Administrator ➔ Prediction Services ➔ Machine Learning Models ➔ Model Setup*.
2. Under Prediction Services, click the *Model Setup* link to configure and activate the training model.
3. Select *Ticket Categorization* under prediction service and then select *Add Model*.
4. Enter a name and select the ticket category levels you wish to include in the model and select OK to create the model.
4.1.3 Train Ticket Categorization Model

Train your new ticket categorization model with past ticket data.

Procedure

1. Select **Train** to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.

2. Select **Get Status** to update the status of the training model. You can select **Get Status** to refresh the model status at any time.

   The different statuses that a model goes through are as follows:
   - **Created**
   - **Training in Preparation**
   - **Data Extraction is Pending**
   - **Data Extraction is in Progress**
4.1.3.1 Custom Ticket Data Extraction Filter with SDK

Extract custom ticket data for machine learning model training.

To define custom criteria for data extraction for model training, invoke the Ticket OData API with the Cloud Applications Studio. Custom ticket data example: use one specific ticket type for model training.

By default, ticket categorization filters ticket data on the following criteria:

- ticket date is within the last 12 months.
- The ticket category must be defined

Using the SDK, you can specify custom filter criteria for ticket data. To create the enhancement implementation, you require the following parameters:

**BAdI Parameters for Ticket Categorization Data Filter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namespace</td>
<td><a href="http://sap.com/xi/AP/CRM/MachineLearning">http://sap.com/xi/AP/CRM/MachineLearning</a></td>
</tr>
<tr>
<td>Enhancement Option</td>
<td>CustomMLDataSelectionWrite</td>
</tr>
<tr>
<td>MachineLearningScenarioCode</td>
<td>001 (Ticket Categorization)</td>
</tr>
<tr>
<td></td>
<td>002 (Similar Tickets)</td>
</tr>
</tbody>
</table>

Sample code for selecting categories CA_1, CA_2, CA_3:

```java
import AP.CRM.MachineLearning;
var result : BadiSelectionFilterOutput;
if ( InputData.MachineLearningScenarioCode == "001" ){
    result.FilterClause = "ETag ge datetimeoffset'2017-10-16T00:00:00.000Z' and (ServiceIssueCategoryID eq 'CA_1' or ServiceIssueCategoryID eq 'CA_2' or ServiceIssueCategoryID eq 'CA_3' or ServiceIssueCategoryID eq 'CA_4')";
}```
4.1.3.2 Ticket Catalog Impact on Prediction

How ticket category catalog structure impacts automatic ticket categorization.

Before you set up ticket category prediction with machine learning, you should examine your ticket category catalog structure. By default, your solution includes four types of categories from which you can build your category catalog.

1. Process
2. Incident
3. Object
4. Cause

Your catalog may be a flat list, with all categories appearing on one level, or your catalog may be structured as a hierarchy.

>Note
If your catalog has a hierarchical structure, only the lowest category level is predicted with machine learning. The levels above are derived from the catalog hierarchy.

Since only the lowest level in the catalog hierarchy is predicted, the hierarchical structure of your category catalog impacts which category types you choose to include when setting up ticket categorization.

- If all category types exist in your catalog on one level, then you can select all types when setting up your model.
- If category types are used consistently at the same level throughout your catalog, then you can simply select the category type at the lowest level of the hierarchy.
- If the same category types appear at different levels in different parts of your catalog hierarchy, then the category levels above cannot be derived. Carefully consider which category types to select for prediction.

Related Information

More information on category catalog structure impact on ticket categorization setup

```csharp
} else {
    result.FilterClause = "ETag ge datetimeoffset'2018-10-16T00:00:00.00Z' and ServiceIssueCategoryID eq 'CA_1';
}
return result;
```
4.1.3.3 Service Category Mapping

If you update your service category catalog you must re-train your model. You do this by mapping new category IDs to existing categories and re-training your machine learning model.

You can download the category list from your existing model as a spreadsheet file and edit the category mapping info as required. Once you enter the new categories, upload the file and retrain the model.

4.1.3.3.1 Update Service Category Catalog

Update the service category catalog for machine learning.

Context

To ensure accurate ticket category prediction, update your category mapping for machine learning whenever you change your category catalog. You must accumulate enough tickets with the updated categories to fulfill the data volume requirements before updating the catalog mapping.

Procedure

1. Log on as an administrator and navigate to: Administrator ➤ Prediction Services ➤ Model Setup.
2. Create a model for the ticket categorization scenario specifically for category mapping. Set the type as Auto Extraction.
3. Select the category types to export. Export category types that you have changed in your catalog. Note that the hierarchy levels are shown as a flat list.

4. Select the icon: Download category mapper file.

5. Select the service category output template file (Category_Mapper_Output.csv) and download. This outputs the system generated mapping file to your local drive.
The file saved on your local system is named `Category_Mapper.csv` by default. You can change the file name as desired.

**Restriction**

Your category mapper file name cannot include `_output`. This suffix is reserved for internal system use. Also, double check that the file format is comma separated value (.CSV) and that the encoding is UTF-8.

6. Open the spreadsheet file, and edit the **Mapped Category ID** column with the updated categories, and save your changes.

The spreadsheet file consists of four columns. The first three are the current category values - the system uses these values to identify the service categories on upload. Leave these values as-is. Only edit the **Mapped Category ID** column to specify the new category ID.

<table>
<thead>
<tr>
<th>Category ID</th>
<th>Type Code</th>
<th>Reason</th>
<th>Mapped Category ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA_53</td>
<td>Process</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
<tr>
<td>G001</td>
<td>Process</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
<tr>
<td>V17_L1_01</td>
<td>Process</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
</tbody>
</table>

7. Return to the **Machine Learning Scenarios** screen, and select the **Upload category mapper file** icon for your category-mapping model to open the **Upload Data** screen and upload your edited file. Save your changes.

8. Select **Train** to train the model with the updated categories.
4.1.3.3.2 Multiple Category Catalogs

You can use multiple category catalogs for ticket categorization.

SAP Service Cloud supports multiple active ticket category catalogs, one per ticket type. Depending on how your solution is configured you may have one or more types of tickets. For example you may have a catalog for internal HR type tickets, one for customer service tickets, and a different catalog for internal IT tickets.

Specify to which catalog the category belongs using the Type code and Catalog fields in the category mapper file. Use the category mapper file to set up the catalog and category structure in your initial configuration as well as update existing models with new category catalogs.

Category Mapping Spreadsheet Columns

<table>
<thead>
<tr>
<th>Category ID</th>
<th>Type Code</th>
<th>Catalog</th>
<th>Reason</th>
<th>Mapped Category ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA_53</td>
<td>Process</td>
<td>CS1</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
<tr>
<td>G001</td>
<td>Process</td>
<td>CS1</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
<tr>
<td>V17_L1_01</td>
<td>Process</td>
<td>CS1</td>
<td>Category ID is not available in Active Service Category Catalog</td>
<td></td>
</tr>
</tbody>
</table>

4.1.4 Testing and Performance Reports

Check model performance during testing and when the model is active. Use the test console to verify that the model is functioning correctly.

Parent topic: Ticket Categorization and Priority Prediction [page 45]

Previous task: Train Ticket Categorization Model [page 49]

Next task: Activate and Adjust Settings [page 59]

4.1.4.1 Model Performance Reports

Reports show machine learning model performance with standard classification metrics.

You can review reports for training results and for prediction accuracy.
- The training report shows the F<sub>1</sub> score and confusion matrix for ticket categorization models. The training report is enabled once the model status is training completed. The solution reserves a small percentage of records to validate the model.
- The prediction report is available after the model is set to active, and is updated weekly using data accumulated after the model activation date.

For the training report, the count is the number of records in the validation sample predicted to match the category. The F<sub>1</sub> score considers both model precision and recall. Precision is defined as the ratio of correct predictions to total predictions (both correct and incorrect). Recall is the ratio of correct predictions to all records that should have been predicted correctly. The F<sub>1</sub> score is the harmonic mean, or weighted average, of the precision and recall scores. The range for F<sub>1</sub> is zero to one, where values approaching one indicate a more accurate prediction model.

<table>
<thead>
<tr>
<th>Category ID</th>
<th>Category Name</th>
<th>Count</th>
<th>Precision</th>
<th>Recall</th>
<th>F1 Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA_1</td>
<td>AA Hardware</td>
<td>8</td>
<td>0.5</td>
<td>0.25</td>
<td>0.333333</td>
</tr>
<tr>
<td>CA_2</td>
<td>AA Software</td>
<td>29</td>
<td>0.862069</td>
<td>0.862069</td>
<td>0.862069</td>
</tr>
<tr>
<td>CA_3</td>
<td>AA Customer Help</td>
<td>8</td>
<td>0.666667</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total Average</td>
<td></td>
<td>15</td>
<td>0.76296</td>
<td>0.77778</td>
<td>0.75704</td>
</tr>
</tbody>
</table>

The prediction report shows a graph of the percentage of tickets where the category was automatically populated. The chart shows a separate colored line for each category. The confidence distribution chart shows the number of tickets as a bar, with the color indicating the confidence score. To view details more clearly, expand either chart to full screen with the button at top right.
Both training and prediction reports show a confusion matrix. The confusion matrix shows the model performance in a table layout. The predicted value appears on the x-axis, and the true value appears on the y-axis. The darker the color, the better the rate of the prediction matching the true value. This visualization makes it easy for you to see if the model is confusing one category for another. To see the matrix better when you have many categories in your catalog, you can expand the confusion matrix to full screen view.

Correct predictions appear along the diagonal of the table, making it easy for you to see any inaccurate predictions.

### 4.1.4.2 Model Test Console

Use sample data to test your ticket categorization model in real time.

The test console invokes the prediction model API using sample ticket data you provide. Test with a single sample record, or upload a file containing up to 100 records for testing.

> **Tip**
- The model considers the content of both the ticket *Subject* and *Description* fields. To test, combine text from both fields in the input box, or into one cell in the spreadsheet file. For testing purposes, a single entry has a limit of 1000 characters. In actual use, the model analyzes all text in the subject and description. Entries in the upload file don’t have a maximum character limit.
- You can test the model quality from the test console by activating the model, but set the automation *Enabled* toggle to *No* in the model settings. With automation disabled, the activated model doesn’t
Start categorizing tickets in your productive system, but can be tested in the console. Testing with automation disabled can be useful if you have data quality issues with your test tenant, but good quality data in your production system.

Upload up to 100 data samples to test using a comma-separated value (.CSV) format spreadsheet file. Format the file following the example in the table. The first row is header information and is ignored for test purposes. To ensure that the system can properly process your sample data, save the spreadsheet file with UTF-8 encoding.

**Ticket Categorization Test File Example**

<table>
<thead>
<tr>
<th>Ticket ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12341</td>
<td>Are boxes allowed as checked luggage?</td>
</tr>
<tr>
<td>12342</td>
<td>Pump is making a loud noise when activated</td>
</tr>
<tr>
<td>12343</td>
<td>Coffee maker is making cold coffee!</td>
</tr>
</tbody>
</table>

Select **Multiple Input**, then select **Add** to upload your test data file.
4.1.5 Activate and Adjust Settings

Activate the model to show predictions on the UI. Adjust settings as required.

**Procedure**

1. After the training is complete, set the model status to *Active* using the *Activate* action.
   
   Once training is complete, the *Accuracy* column shows the percentage of accuracy of the trained model based on the algorithm prediction.

   ![i Note]
   
   You can deactivate a model by selecting the *Deactivate* button.

2. Define the following settings for ticket prediction with the *Settings* button:
   
   ○ Turn on and off automated recommendation.

   ![i Note]
   
   When the *Enable* box is selected, the service category proposal is copied to actual based on confidence level threshold setting. Machine learning category proposal supports all category levels: *Process Category, Incident Category, Object Category*, and *Cause Category*.

   ○ Adjust the confidence level for automated prediction. The default value of the confidence level slider is 60 in the solution.
Task overview: Ticket Categorization and Priority Prediction [page 45]

Previous: Testing and Performance Reports [page 55]

Next task: View Ticket Categorization Prediction [page 61]
4.1.6 View Ticket Categorization Prediction

Find category prediction results in tickets.

Prerequisites

To view prediction results, the Solution Center tab must be visible in your solution. Go to the user menu and select Start Personalization. Select the pencil icon under the tabs area and select the eye icon to make Solution Center tab visible.

Procedure

1. Log into the Fiori client and go to Tickets.
2. Create a new ticket, and enter the subject and description fields.
   
   Ticket categorization prediction works for all ticket creation channels: manual, e-mail, social media, chat, messaging, and so forth. The main usage for ticket category prediction is for tickets generated from incoming e-mail messages. Prediction happens at ticket creation, so you’ll only see predictions for tickets created after the model is set to active status.
3. Select Save.
   
   A call is made to the machine learning server and the value is populated in the Solution Center tab under Service Category Proposed field. The solution also supports category prediction for Incident Category, Object Category, and Cause Category.
   
   If the confidence level is above the required threshold, the predicted category is also copied into the Category field in the ticket overview.
   
   A green ring to the right of a field indicates a prediction pre-populated by machine learning. To show prediction details, click the indicator. Confidence score and keyword matching details appear in a pop-up window.
Task overview: Ticket Categorization and Priority Prediction [page 45]

Previous task: Activate and Adjust Settings [page 59]

Next: Custom Ticket Data Extraction Filter with SDK [page 62]

4.1.7 Custom Ticket Data Extraction Filter with SDK

Extract custom ticket data for machine learning model training.

To define custom criteria for data extraction for model training, invoke the Ticket OData API with the Cloud Applications Studio. Custom ticket data example: use one specific ticket type for model training.

By default, ticket categorization filters ticket data on the following criteria:
• ticket date is within the last 12 months.
• The ticket category must be defined

Using the SDK, you can specify custom filter criteria for ticket data. To create the enhancement implementation, you require the following parameters:

**BAdI Parameters for Ticket Categorization Data Filter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namespace</td>
<td><a href="http://sap.com/xi/AP/CRM/MachineLearning">http://sap.com/xi/AP/CRM/MachineLearning</a></td>
</tr>
<tr>
<td>Enhancement Option</td>
<td>CustomMLDataSelectionWrite</td>
</tr>
<tr>
<td>MachineLearningScenarioCode</td>
<td>001 (Ticket Categorization)</td>
</tr>
<tr>
<td></td>
<td>002 (Similar Tickets)</td>
</tr>
</tbody>
</table>

Sample code for selecting categories CA_1, CA_2, CA_3:

```java
import AP.CRM.MachineLearning;
var result : BadiSelectionFilterOutput;
if ( InputData.MachineLearningScenarioCode == "001" ){
result.FilterClause = "ETag ge datetimeoffset'2017-10-16T00:00:00.00Z' and
(ServiceIssueCategoryID eq 'CA_4' or ServiceIssueCategoryID eq 'CA_2' or
ServiceIssueCategoryID eq 'CA_14' or ServiceIssueCategoryID eq 'CA_3' or
ServiceIssueCategoryID eq 'CA_27' )";
}
else {
result.FilterClause = "ETag ge datetimeoffset'2018-10-16T00:00:00.00Z' and
ServiceIssueCategoryID eq 'CA_1'";
}
return result;
```

**Parent topic:** Ticket Categorization and Priority Prediction [page 45]

**Previous task:** View Ticket Categorization Prediction [page 61]

### 4.2 Similar Ticket Recommendation

Find similar past tickets you can check for solutions that can apply to the current ticket.

**Prerequisites**

To ensure accurate similar ticket recommendation with machine learning you require:

• SAP Cloud for Customer Enterprise license
• Data volume - at least one year worth of tickets with change history data we (recommend 22,000 completed tickets)
Overview

The machine learning algorithm scans the subject and description of categorized tickets from the past 12 months and returns the top three tickets most similar to the current ticket. The model learns the semantic relationship of words in the description and subject text and uses this context to find tickets similar to the current ticket. This semantic, sentence-level representation of ticket text yields more accurate results than a simple keyword search. You can check similar tickets for possible solutions to the current ticket.

Similar ticket recommendation is currently supported in these languages:

- Dutch
- English
- Finnish
- French
- German
- Greek
- Italian
- Polish
- Slovak
- Spanish

**i Note**
The readiness report is not available for similar ticket recommendation.

Steps

1. **Add Similar Ticket Recommendation** [page 65]
   Add the model for the Similar Ticket Recommendation scenario.
2. **Train Similar Ticket Recommendation** [page 65]
   Train your new similar ticket recommendation model with past ticket data.
3. **Test Similar Ticket Recommendation** [page 66]
   Restrict access to a group of pilot users to test your similar ticket recommendation model with productive data in real time.
4. **View Similar Ticket Recommendation** [page 67]
   View similar ticket recommendations in tickets.
4.2.1 Add Similar Ticket Recommendation

Add the model for the Similar Ticket Recommendation scenario.

Prerequisites

- You must be assigned the Prediction Services workcenter.

If you do not see the Prediction Services workcenter, go to Administrator > General Settings > Users > Business Users. Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to Edit and select Access Rights. In the Edit Access Rights screen, go to the tab: Work Center and View Assignment. Click Find and enter the search term Prediction Services, and then click Locate. To assign Prediction Services, select the checkbox, Assigned to User, and click Save.

Procedure

1. As an administrator, go to the Prediction work center under Administrator > Prediction Services > Machine Learning Models > Model Setup.
2. Select Similar Ticket Recommendation under prediction service and then select Add Model.
3. Enter a name and select OK to create the model.

Task overview: Similar Ticket Recommendation [page 63]

Next task: Train Similar Ticket Recommendation [page 65]

4.2.2 Train Similar Ticket Recommendation

Train your new similar ticket recommendation model with past ticket data.

Procedure

1. Select your new similar ticket recommendation model and then select Train to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.
2. Select Get Status to update the status of the training model. You can select Get Status to refresh the model status at any time.
The different statuses that a model goes through are as follows:

- **Created**
- **Training in Preparation**
- **Data Extraction is Pending**
- **Data Extraction is in Progress**
- **Data Extraction Failed** (only if data extraction fails, training process stops)
- **Data Preprocessing is Pending**
- **Data Preprocessing is in Progress**
- **Training Triggered**
- **Training is Pending**
- **Training in Progress**
- **Training Completed/Training Failed** (depending on the outcome of the training)
- **Active/Inactive** (depending on the model’s active status)

**Task overview:** Similar Ticket Recommendation [page 63]

**Previous task:** Add Similar Ticket Recommendation [page 65]

**Next:** Test Similar Ticket Recommendation [page 66]

### 4.2.3 Test Similar Ticket Recommendation

Restrict access to a group of pilot users to test your similar ticket recommendation model with productive data in real time.

Assessing the model accuracy and data set volume and quality require you to test the model with productive data.

Enable the side pane under **Company Settings**. Now, use adaptation on the ticket detail view to limit the visibility of the **Recommendations** pane to a select group of users to test and review the model recommendations.

**Parent topic:** Similar Ticket Recommendation [page 63]

**Previous task:** Train Similar Ticket Recommendation [page 65]

**Next task:** View Similar Ticket Recommendation [page 67]
4.2.4 View Similar Ticket Recommendation

View similar ticket recommendations in tickets.

Prerequisites

Enable the side pane under Company Settings in the Fiori client.

Context

Procedure

1. Log into the Fiori client and go to Tickets.
2. Create a new ticket, and enter the subject and description fields.
   Similar ticket recommendation happens at ticket creation, so you'll only see predictions for tickets created after the model is set to active status.
3. Select Save.
   Find similar tickets in the Recommendations tab in the side pane. A confidence score of 0–100 shows the level of accuracy of the match.
4.2.4.1 Similar Tickets - Show More

View all similar tickets to check for more solutions that may apply to your current ticket.

To view more similar tickets, select Show More at the top right of the Recommendations side pane. The Solution Center opens and displays up to ten similar tickets in the top table.

4.3 Ticket NLP Classification

Natural language processing (NLP) can identify ticket language, sentiment, and can extract a product identification.

Prerequisites

To use ticket natural language processing with machine learning you require an SAP Service Cloud enterprise license.
Overview

The Ticket Natural Language Processing Classification scenario includes the following entities:

- **Ticket language** - identifies the language used in the ticket subject and description
- **Sentiment** - determines if the vocabulary used in the ticket is positive or negative, and to what degree
- **Product ID** - extracts a product ID number from the text and fills in the `Product` and `Product ID` fields
- **Serial ID** - extracts a product serial number from the text and fills in the `Serial ID` field.
- **Sales Order ID** - extracts a sales order number from the ticket subject and description text and fills in the `Sales Order ID` field.

**Restriction**

Ticket sentiment analysis only identifies sentiment for tickets created from e-mail channels.

Model training requires active products in your tenant for data extraction.

Sales orders need to exist in your system tenant for proper training, and for auto fill of the ticket field to work correctly.

**Language detection** and **product identification** for tickets currently support the following languages:

- Arabic
- Catalan
- Chinese
- Danish
- Dutch
- English
- Finnish
- French
- German
- Hindi
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Portuguese
- Russian
- Spanish
- Swedish

**Sentiment detection** for tickets currently supports the following languages:

- Chinese (Simplified and Traditional)
- English
- French
- German
- Italian
- Japanese
Steps

1. **Add Ticket NLP Classification [page 70]**
   Add the model for the ticket NLP Classification scenario.

2. **Train NLP Classification [page 72]**
   Train your new NLP model in preparation for activation.

3. **Test NLP Classification [page 72]**
   Use sample data to test your natural language processing classification model in real time.

4. **Activate and Adjust NLP Settings [page 73]**
   Activate the model to show predictions on the UI. Adjust settings as required.

5. **View Ticket NLP Classification [page 75]**
   Find classification results in tickets.

6. **Preprocess Ticket Text for NLP [page 77]**
   Preprocess ticket text data for better detection results from natural language processing.

### 4.3.1 Add Ticket NLP Classification

Add the model for the ticket NLP Classification scenario.

**Prerequisites**

- You must be assigned the *Prediction Services* work center.
- (Product Identification Only) You have active product data in your solution tenant.

If you don’t see the Prediction Services work center, go to **Administrator ➤ General Settings ➤ Users ➤ Business Users**. Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to **Edit** and select **Access Rights**. In the **Edit Access Rights** screen, go to the tab: **Work Center and View Assignment**. Click **Find** and enter the search term **Prediction Services**, and then click **Locate**. To assign Prediction Services, select the checkbox, **Assigned to User**, and click **Save**.
Procedure

1. As an administrator, go to the Prediction work center under **Administrator** > **Prediction Services** > **Machine Learning Models** > **Model Setup**.

2. Select **Ticket NLP Classification** under prediction service and then select **Add Model**.

3. Enter a name and select the entity types you wish to include in the model and select OK to create the model.

   **Note**

   Product ID and Serial ID are mutually exclusive. If you select one, you can’t add the other to the same model.

Task overview: Ticket NLP Classification [page 68]

Next task: Train NLP Classification [page 72]
### 4.3.2 Train NLP Classification

Train your new NLP model in preparation for activation.

**Procedure**

1. Select your new NLP classification model and then select *Train* to start the required model preparation.
2. Select *Get Status* to update the training status of the model. You can select *Get Status* to refresh the model status at any time.

   The different statuses that a model goes through are as follows:
   - *Created*
   - *Training in Preparation*
   - *Training in Progress*
   - *Training Completed/Training Failed* (depending on the outcome of the training)
   - *Active/Inactive* (depending on the model’s active status)

**Task overview:** Ticket NLP Classification [page 68]

**Previous task:** Add Ticket NLP Classification [page 70]

**Next:** Test NLP Classification [page 72]

### 4.3.3 Test NLP Classification

Use sample data to test your natural language processing classification model in real time.

The test console invokes the prediction model API using sample ticket data you provide.

Find the test console under: under [Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup] ➤ Select the Ticket NLP Classification scenario in the top table, then select the desired model in the Models table and select *Test* at the top right of the table.

Enter ticket subject and description text in the *Input* field and select *Submit*. The model returns the detected results (language, sentiment, product ID, serial ID) with confidence scores.

For initial testing purposes, you can activate the model without enabling the model in settings (see next topic). You can then test the model in the test console. Once you verify that the model is working correctly, you can enable the model in settings with the correct threshold.

**Parent topic:** Ticket NLP Classification [page 68]

**Previous task:** Train NLP Classification [page 72]
Next task: Activate and Adjust NLP Settings [page 73]

4.3.4 Activate and Adjust NLP Settings

Activate the model to show predictions on the UI. Adjust settings as required.

Procedure

1. After the training is complete, set the model status to *Active* using the *Activate* action.
   
   Once training is complete, the *Accuracy* column shows the percentage of accuracy of the trained model based on the algorithm prediction.

   - **Note**
     - You can deactivate a model by selecting the *Deactivate* button.

2. Define the following settings for ticket NLP Classification with the *Settings* button:
   - Turn on and off automated classification.
   - **Note**
     - When *Enable* is set to *Yes*, the classification proposal is copied to actual based on confidence level threshold setting.
   - Adjust the confidence level for automated classification. The default value of the confidence level slider is 60 in the solution.
You cannot add new classification entities from the settings dialog. You can only deselect, or select the entities you included during model creation.
4.3.5 View Ticket NLP Classification

Find classification results in tickets.

Procedure

1. Log into the Fiori client and go to Tickets.
2. Create a new ticket, and enter the subject and description fields.
   
   Ticket NLP classification works for all ticket creation channels: manual, e-mail, social media, chat, messaging, and so forth. The main usage for ticket NLP classification is for tickets generated from incoming e-mail messages. Prediction happens at ticket creation, so you’ll only see predictions for tickets created after the model is set to active status.

3. Select Save.
   
   If the confidence level is above the required threshold, the classification result is copied into the ticket details.

   **Note**
   
   The Document Language field appears in the Overview tab, in the Additional Details section, and is hidden by default. To view the ticket language, adapt or personalize the screen to show this field.

A green ring to the right of a field indicates a prediction prepopulated by machine learning. To show prediction details, click the indicator. Confidence score and keyword matching details appear in a pop-up window.
i Note
For NLP product identification, if more than one product is identified, only the product with the highest confidence score appears in the product field.

NLP sentiment classification returns the following possible values:
○ Not Available
○ Strong Positive
○ Weak Positive
○ Neutral
○ Weak Negative
○ Strong Negative

The ticket’s sentiment value indicates the overall emotion of an incoming ticket. The magnitude of a ticket’s sentiment indicates how much emotional content is present within the ticket, and is often proportional to the length of the text.

The natural language algorithm differentiates between positive and negative emotion in a ticket, but doesn’t identify specific positive and negative emotions. For example, angry and sad are both negative emotions. However, the sentiment classification only indicates that the text is negative, not sad, or angry.

A ticket with a neutral value can indicate a low-emotion ticket, or ticket text expressing mixed emotions; containing both high positive and high negative values that cancel out each other.

Task overview: Ticket NLP Classification [page 68]
4.3.6 Preprocess Ticket Text for NLP

Preprocess ticket text data for better detection results from natural language processing.

You can use a BAdI exit and the Cloud Applications Studio SDK to preprocess ticket text for better results from your NLP models.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namespace</td>
<td><a href="http://sap.com/xi/ap/CRM/MachineLearning">http://sap.com/xi/ap/CRM/MachineLearning</a></td>
</tr>
<tr>
<td>Enhancement Option</td>
<td>MachineLearningInputDataPreProcessing</td>
</tr>
<tr>
<td>InputData.MachineLearningScenarioCode</td>
<td>004 (Ticket NLP Classification)</td>
</tr>
<tr>
<td>InputData.Text</td>
<td>Input Text</td>
</tr>
<tr>
<td>Result.ProcessedText</td>
<td>(Assign processed text to this variable)</td>
</tr>
</tbody>
</table>

Create a new Enhancement Implementation with the namespace and enhancement option shown in the previous table.

The following code sample removes \n<br> from the input text. You can use any kind of preprocessing logic required by your specific scenario.

```
import AP.CRM.MachineLearning;
var result : BadiTextDataPreProcessorOutput;
if (InputData.MachineLearningScenarioCode == "004")
{
  if (InputData.Text.Contains("\n<br>"))
  {
    result.ProcessedText = InputData.Text.Replace("\n<br>", "");
  }
  else
  {
    result.ProcessedText = InputData.Text;
  }
}
else
{
  result.ProcessedText = InputData.Text;
}
return result;
```

Parent topic: Ticket NLP Classification [page 68]

Previous task: View Ticket NLP Classification [page 75]
4.4 Ticket Time to Completion

View a prediction for the time to complete the current ticket, based on closed ticket completion times.

As a manager you can use the estimated time to completion to allocate resources and prioritize tickets. As an agent, you can use the time to completion to respond to customers requests for an estimated time to resolve the issue.

Once you add, train and activate a model for ticket time to completion, you can view the *Time to Completion* estimate in the *Details* side pane for a ticket.

**Prerequisites**

To ensure accurate ticket time to completion prediction with machine learning you require:

- SAP Cloud for Customer Enterprise license
- Data volume - at least one year worth of tickets with change history data we (recommend 22,000 completed tickets)

**Steps**

1. Time to Completion Readiness Report [page 79]
   Check your ticket data to determine if the data set yields good time to completion prediction results.
2. Add Ticket Time to Completion [page 79]
   Add the model for the Ticket Time to Completion scenario.
3. Train Ticket Time to Completion [page 80]
   Train your new similar ticket recommendation model with past ticket data.
4. Test Ticket Time to Completion [page 81]
   Restrict access to a group of pilot users to test your ticket time to completion model with productive data in real time.
5. Activate Ticket Time to Completion [page 81]
   Activate the model to show predictions on the UI. Adjust settings as required.
6. View Ticket Time to Completion [page 82]
   View the predicted time to complete the current ticket, based on closed ticket completion times.
4.4.1 Time to Completion Readiness Report

Check your ticket data to determine if the data set yields good time to completion prediction results.

Find the readiness report under [Administrator] [Prediction Services] [Machine Learning Models] [Model Setup] Select the Ticket Time to Completion scenario in the top table, then select Run Readiness at the top right. When the check is complete, select View Report to see the details.

The report returns an overall status of the data in your system.

- Ready to use machine learning
- Data improvements required
- Requirements not fulfilled

Each readiness factor shows you the minimum required value, the recommended value, and the actual value in your system. Each check factor must meet the recommended value to ensure reliable prediction results. If the check factor value falls between the minimum value and the recommended value, the report shows a caution icon. If the value is less than the minimum value, the report shows an error icon. If the report shows your data set isn’t ready, you can wait for your solution to produce enough data to meet the minimum and recommended thresholds, then run the readiness check again.

Parent topic: Ticket Time to Completion [page 78]

Next task: Add Ticket Time to Completion [page 79]

4.4.2 Add Ticket Time to Completion

Add the model for the Ticket Time to Completion scenario.

Prerequisites

- You must be assigned the Prediction Services workcenter.

If you do not see the Prediction Services workcenter, go to [Administrator] [General Settings] [Users] [Business Users] Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to Edit and select Access Rights. In the Edit Access Rights screen, go to the tab: Work Center and View Assignment. Click Find and enter the search term Prediction Services, and then click Locate. To assign Prediction Services, select the checkbox, Assigned to User, and click Save.
Procedure

1. As an administrator, go to the Prediction work center under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Select Ticket time to Completion under Machine Learning Scenarios and then select Add Model.
3. Enter a name and select OK to create the model.

Task overview: Ticket Time to Completion [page 78]

Previous: Time to Completion Readiness Report [page 79]

Next task: Train Ticket Time to Completion [page 80]

4.4.3 Train Ticket Time to Completion

Train your new similar ticket recommendation model with past ticket data.

Procedure

1. Select your new ticket time to completion model and then select Train to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.
2. Select Get Status to update the status of the training model. You can select Get Status to refresh the model status at any time.

   The different statuses that a model goes through are as follows:
   - Created
   - Training in Preparation
   - Training in Progress
   - Training Completed/Training Failed (depending on the outcome of the training)
   - Active/Inactive (depending on the model’s active status)

Task overview: Ticket Time to Completion [page 78]

Previous task: Add Ticket Time to Completion [page 79]

Next: Test Ticket Time to Completion [page 81]
4.4.4 Test Ticket Time to Completion

Restrict access to a group of pilot users to test your ticket time to completion model with productive data in real time.

Assessing the model accuracy, data set volume, and quality require you to test the model with productive data.

In ticket detail view you can adapt the Details sidepane to show the Time to Completion field to a select group of users to test and review the model recommendations.

Parent topic: Ticket Time to Completion [page 78]

Previous task: Train Ticket Time to Completion [page 80]

Next task: Activate Ticket Time to Completion [page 81]

4.4.5 Activate Ticket Time to Completion

Activate the model to show predictions on the UI. Adjust settings as required.

Procedure

After the training is complete, set the model status to Active using the Activate action.

Once training is complete, the Accuracy column shows the percentage of accuracy of the trained model based on the algorithm prediction.

i Note

You can deactivate a model by selecting the Deactivate button.

Task overview: Ticket Time to Completion [page 78]

Previous: Test Ticket Time to Completion [page 81]

Next task: View Ticket Time to Completion [page 82]
4.4.6 View Ticket Time to Completion

View the predicted time to complete the current ticket, based on closed ticket completion times.

Context

View the Time to Completion estimate in the Details side pane for a ticket. The time to completion is calculated at ticket creation, and remains at the same value throughout the ticket life cycle. The Time to Completion field appears in the Details side pane, and is hidden by default.

Procedure

1. Adapt the Details sidepane to show the Time to Completion field.
2. Open the Details sidepane to view the time to completion prediction.

You, as an administrator, can control which users can view the Time to Completion field with adaptation.

A green ring to the right of a field indicates a prediction pre-populated by machine learning.

Task overview: Ticket Time to Completion [page 78]

Previous task: Activate Ticket Time to Completion [page 81]
4.5 E-Mail Template Recommendation

The machine learning model recommends the most suitable response templates for a ticket.
For initial response to a service ticket using an e-mail channel, the machine learning model proposes the three most appropriate response templates and provides a confidence score for each.
Response template recommendation is supported for tickets in German and English.

Prerequisites

To ensure accurate template recommendation with machine learning you require:

- SAP Cloud for Customer Enterprise license
- Data requirement - ticket data (description), templates, and template usage data.

**Note**

Each template must be used at least 500 times for an initial ticket response to be considered an eligible candidate.

Steps

1. **Template Recommendation Readiness Report** [page 84]
   Check your ticket data to determine if the data set yields good response template recommendations.
2. **Add E-Mail Template Recommendation Model** [page 84]
   Add the model for the E-Mail Template Recommendation scenario.
3. **Train E-Mail Template Recommendation** [page 85]
   Train your new e-mail template recommendation model with past ticket data.
4. **Test Template Recommendation** [page 86]
   Use sample data to test your e-mail response template recommendation model in real time.
5. **Activate E-Mail Template Recommendation** [page 86]
   Activate the model to show predictions on the UI. Adjust settings as required.
6. **View E-Mail Template Recommendation** [page 87]
   View the recommended e-mail response templates for a ticket, based on closed ticket template usage.
4.5.1 Template Recommendation Readiness Report

Check your ticket data to determine if the data set yields good response template recommendations.

Find the readiness report under Administrator ➔ Prediction Services ➔ Machine Learning Models ➔ Model Setup. Select the Email Template Recommendation scenario in the top table, then select Run Readiness at the top right. When the check is complete, select View Report to see the details.

The report returns an overall status of the data in your system.

- Ready to use machine learning
- Data improvements required
- Requirements not fulfilled

Each readiness factor shows you the minimum required value, the recommended value, and the actual value in your system. Each check factor must meet the recommended value to ensure reliable prediction results. If the check factor value falls between the minimum value and the recommended value, the report shows a caution icon. If the value is less than the minimum value, the report shows an error icon. If the report shows your data set isn’t ready, you can wait for your solution to produce enough data to meet the minimum and recommended thresholds, then run the readiness check again.

Parent topic: E-Mail Template Recommendation [page 83]

Next task: Add E-Mail Template Recommendation Model [page 84]

4.5.2 Add E-Mail Template Recommendation Model

Add the model for the E-Mail Template Recommendation scenario.

Prerequisites

- You must be assigned the Prediction Services workcenter.

If you do not see the Prediction Services workcenter, go to Administrator ➔ General Settings ➔ Users ➔ Business Users. Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to Edit and select Access Rights. In the Edit Access Rights screen, go to the tab: Work Center and View Assignment. Click Find and enter the search term Prediction Services, and then click Locate. To assign Prediction Services, select the checkbox, Assigned to User, and click Save.
Procedure

1. As an administrator, go to the Prediction work center under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Select E-Mail Template Recommendation under Machine Learning Scenarios and then select Add Model.
3. Enter a name and select OK to create the model.

Task overview: E-Mail Template Recommendation [page 83]

Previous: Template Recommendation Readiness Report [page 84]

Next task: Train E-Mail Template Recommendation [page 85]

4.5.3 Train E-Mail Template Recommendation

Train your new e-mail template recommendation model with past ticket data.

Procedure

1. Select your new ticket time to completion model and then select Train to start the training in the machine learning server. Depending on the volume of historical data in the system, it can take time to complete the training steps.
2. Select Get Status to update the status of the training model. You can select Get Status to refresh the model status at any time.

   The different statuses that a model goes through are as follows:
   - Created
   - Training in Preparation
   - Training in Progress
   - Training Completed/Training Failed (depending on the outcome of the training)
   - Active/Inactive (depending on the model’s active status)

Task overview: E-Mail Template Recommendation [page 83]

Previous task: Add E-Mail Template Recommendation Model [page 84]

Next: Test Template Recommendation [page 86]
4.5.4 Test Template Recommendation

Use sample data to test your e-mail response template recommendation model in real time. The test console invokes the prediction model API using sample ticket data you provide.

Find the test console under: under [Administrator] > [Prediction Services] > [Machine Learning Models] > [Model Setup]. Select the Email Template Recommendation scenario in the top table, then select the desired model in the Models table and select Test at the top right of the table.

Enter ticket subject and description text in the Input field and select Simulate. The solution returns the recommended templates with confidence scores.

Parent topic: E-Mail Template Recommendation [page 83]

Previous task: Train E-Mail Template Recommendation [page 85]

Next task: Activate E-Mail Template Recommendation [page 86]

4.5.5 Activate E-Mail Template Recommendation

Activate the model to show predictions on the UI. Adjust settings as required.

Procedure

After the training is complete, set the model status to Active using the Activate action.

Once training is complete, the Accuracy column shows the percentage of accuracy of the trained model based on the algorithm prediction.

i Note
You can deactivate a model by selecting the Deactivate button.

Task overview: E-Mail Template Recommendation [page 83]

Previous: Test Template Recommendation [page 86]

Next task: View E-Mail Template Recommendation [page 87]
4.5.6 View E-Mail Template Recommendation

View the recommended e-mail response templates for a ticket, based on closed ticket template usage.

Context

The model recommends (with confidence scores) the three most suitable templates for the initial e-mail response to a ticket. View the recommendations when you select a response template.

Procedure

1. Open the ticket to which you wish to respond.
2. Navigate to the Timeline view and select Reply to the initial e-mail interaction.
3. Select the Templates icon.
   
   Recommended Templates appear in the table at the top of the Select a Template window. Each template shows a confidence score as well as any predefined attachments.
4. Select the desired template, compose the response, and send the reply.

   After you send the reply, the formatted response interaction appears in the Timeline.

Task overview: E-Mail Template Recommendation [page 83]

Previous task: Activate E-Mail Template Recommendation [page 86]

4.6 Machine Translation

Translate ticket text with a pretrained machine learning model.

Prerequisites

Ticket machine translation requires an SAP Cloud for Customer Enterprise license.

Overview

Use machine translation to translate the ticket description.
## i Note

The readiness report is not available for machine translation.

Machine translation is available for the languages in the following table.

### Machine Translation Supported Languages

<table>
<thead>
<tr>
<th>Source Language</th>
<th>Code</th>
<th>Target Language</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic</td>
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<td>English (United States)</td>
<td>en</td>
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<tr>
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</table>
### Steps

1. **Add Machine Translation Model** [page 90]
   - Add the model for the Machine Translation scenario.

2. **Train Machine Translation** [page 91]
   - Train your new machine translation model in preparation for activation.

3. **Activate Machine Translation** [page 92]
   - Activate the model to show translations on the UI.

4. **Test Machine Translation** [page 92]
   - Use sample data to test the machine translation model in real time.

5. **View Machine Translated Text** [page 93]
   - View the translated description for the ticket in the user logon language.

### 4.6.1 Add Machine Translation Model

Add the model for the Machine Translation scenario.

### Prerequisites

- You must be assigned the *Prediction Services* workcenter.

If you don’t see the Prediction Services workcenter, go to [Administrator] ➤ [General Settings] ➤ [Users] ➤ *Business Users*. Search for the administrator user you want to assign the Prediction Services workcenter and then select this user. In the screen that opens, go to *Edit* and select *Access Rights*. In the *Edit Access Rights* screen, go to the tab: *Work Center and View Assignment*. Click *Find* and enter the search term *Prediction Services*, and then click *Locate*. To assign Prediction Services, select the checkbox, *Assigned to User*, and click *Save*. 

<table>
<thead>
<tr>
<th>Source Language</th>
<th>Code</th>
<th>Target Language</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korean</td>
<td>ko</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Norwegian</td>
<td>no</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Portuguese (Brazil)</td>
<td>pt</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Romanian</td>
<td>ro</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Russian</td>
<td>ru</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Spanish (Spain)</td>
<td>es</td>
<td>English</td>
<td>en</td>
</tr>
<tr>
<td>Swedish</td>
<td>sv</td>
<td>English</td>
<td>en</td>
</tr>
</tbody>
</table>
Procedure

1. As an administrator, go to the Prediction work center under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Select Machine Translation under Machine Learning Scenarios and then select Add Model.
3. Enter a name and select OK to create the model.

Task overview: Machine Translation [page 87]

Next task: Train Machine Translation [page 91]

4.6.2 Train Machine Translation

Train your new machine translation model in preparation for activation.

Procedure

1. Select your new machine translation model and then select Train to start the required model preparation.
2. Select Get Status to update the training status of the model. You can select Get Status to refresh the model status at any time.

   The different statuses that a model goes through are as follows:
   ○ Created
   ○ Training in Preparation
   ○ Training in Progress
   ○ Training Completed/Training Failed (depending on the outcome of the training)
   ○ Active/Inactive (depending on the model's active status)

Task overview: Machine Translation [page 87]

Previous task: Add Machine Translation Model [page 90]

Next task: Activate Machine Translation [page 92]
4.6.3 Activate Machine Translation

Activate the model to show translations on the UI.

Procedure

Set the model status to *Active* using the *Activate* action.

**i Note**

You can deactivate a model by selecting the *Deactivate* button.

Once activated, you can use the test console to enter a sample text for testing the translation model.

Task overview: Machine Translation [page 87]

Previous task: Train Machine Translation [page 91]

Next task: Test Machine Translation [page 92]

4.6.4 Test Machine Translation

Use sample data to test the machine translation model in real time.

**Context**

The test console invokes the translation model API using sample text you provide.

**Procedure**

1. Navigate to *Administrator > Prediction Services > Machine Learning Models > Model Setup*.
2. Select the *Machine Translation* scenario in the top table.
3. Select the desired model in the *Models* table and select *Test* at the top right of the table.
4. Enter sample description text in the *Input* field and select *Simulate*.
   
   The solution returns the translated text.

Task overview: Machine Translation [page 87]
4.6.5 View Machine Translated Text

View the translated description for the ticket in the user logon language.

**Procedure**

Open the ticket **Overview** tab, and select **Actions > Translate**.

The machine-translated text appears in the description below the original text.

**Task overview:** Machine Translation [page 87]

Previous task: Test Machine Translation [page 92]

4.7 (Beta) Text Summarization

Use Natural Language Processing (NLP) to summarize text in the ticket subject field and ticket interactions.

⚠️ Caution

This feature is available as a beta version for test use only. It has not been released for productive use. If you activate this feature, you understand and agree to the following conditions:

- Feature is not covered by SAP support agreements or warranty obligations
- Any data loss or damage that may result from use of this feature is not the responsibility of SAP or its representatives
- You will not use this feature to process any personal data of end users
- SAP may change or remove this function at any time, and it may never appear in the generally available version of the Service

Prerequisites

To use natural language processing text summarization with machine learning you require an SAP Service Cloud enterprise license.
Overview

Text summarization currently has the following restrictions:

**Restrictions**
- Text summarization is tested only for English language texts.
- Text summarization is applicable only for e-mail based interactions between a customer and a service agent.
- Text summarization is available only for e-mail interactions generated from Outlook and Gmail.
- For existing tickets, summary is generated only when a new interaction is added (after model activation).
- There’s a delay between sending or receiving an interaction and summary updates. Text summarization takes place asynchronously from the e-mail communication. The length of the delay depends on the number of interactions in the queue, and the number and size of the interactions in the ticket.

Steps

1. **Add Text Summarization Model [page 94]**  
   Add a model for the ticket text summarization scenario.
2. **Train Text Summarization [page 95]**  
   Train your new text summarization model in preparation for activation.
3. **Test Text Summarization [page 96]**  
   Use sample data to test your text summarization model in real time.
4. **Activate and Adjust Text Summarization [page 97]**  
   Activate the model to show text summaries.
5. **View Text Summarization [page 97]**  
   View the text summary results.
6. **Preprocess Text Summarization [page 98]**  
   You can preprocess text summarization data for better results.

4.7.1 Add Text Summarization Model

Add a model for the ticket text summarization scenario.

Prerequisites

You must be assigned the *Prediction Services* work center.
If you don’t see the Prediction Services work center, go to Administrator ➤ General Settings ➤ Users ➤ Business Users. Search for the administrator user you want to assign the Prediction Services work center and then select this user. In the screen that opens, go to Edit and select Access Rights. In the Edit Access Rights screen, go to the tab: Work Center and View Assignment. Click Find and enter the search term Prediction Services, and then click Locate. To assign Prediction Services, select the checkbox, Assigned to User, and click Save.

Procedure

1. Go to the Prediction work center under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup ➤
2. Select (Beta) Text Summarization under prediction service and then select Add Model.
3. Enter a name and select the usage types you wish to include in the model and select OK to create the model.

Select one or both the usage types:
- Subject Setting (summarizes ticket subject)
- Ticket Interactions Summarization (summarizes ticket interactions)

Task overview: (Beta) Text Summarization [page 93]

Next task: Train Text Summarization [page 95]

4.7.2 Train Text Summarization

Train your new text summarization model in preparation for activation.

Procedure

1. Select your new text summarization model and then select Train to start the required model preparation.
2. Select Get Status to update the training status of the model. You can select Get Status to refresh the model status at any time.

The different statuses that a model goes through are as follows:
- Created
- Training in Preparation
- Training in Progress
- Training Completed/Training Failed (depending on the outcome of the training)
- Active/Inactive (depending on the model’s active status)
Task overview: (Beta) Text Summarization [page 93]

Previous task: Add Text Summarization Model [page 94]

Next task: Test Text Summarization [page 96]

4.7.3 Test Text Summarization

Use sample data to test your text summarization model in real time.

Context

The test console invokes the prediction model API using sample ticket data you provide.

Procedure

1. Find the test console under: under Administrator ➤ Prediction Services ➤ Machine Learning Models ➤ Model Setup.
2. Select (Beta) Text Summarization scenario in the top table, then select the desired model in the Models table and select Test at the top right of the table.
3. Select the Usage Context.
   - Subject Setting
   - Ticket Interactions
4. Enter a sample ticket subject, or a ticket ID number in the Input field (depending on which usage context you selected in the previous step) and select Submit.

The model returns the text summary.

! Restriction

There’s an upper limit on the number of interactions summarized for test purposes, so you may not see all interactions in the summary.

Task overview: (Beta) Text Summarization [page 93]

Previous task: Train Text Summarization [page 95]

Next task: Activate and Adjust Text Summarization [page 97]
4.7.4 Activate and Adjust Text Summarization

Activate the model to show text summaries.

Procedure

After the training is complete, set the model status to Active using the Activate action.

Note

You can deactivate a model by selecting the Deactivate button.

Task overview: (Beta) Text Summarization [page 93]

Previous task: Test Text Summarization [page 96]

Next task: View Text Summarization [page 97]

4.7.5 View Text Summarization

View the text summary results.

Procedure

1. Log into your solution and go to Tickets.
2. Go to Overview and click Summary on the Interactions Timeline to view the summary of each interaction.
   
   You can see an overall summary, a summary of agent-generated interactions, and a summary of customer interactions.

Task overview: (Beta) Text Summarization [page 93]

Previous task: Activate and Adjust Text Summarization [page 97]

Next: Preprocess Text Summarization [page 98]
4.7.6 Preprocess Text Summarization

You can preprocess text summarization data for better results.

You can use a BAdI exit and the Cloud Applications Studio SDK to preprocess ticket text for better results from your NLP models.

Every email interaction should pass through the BAdi. Trail mails should be ignored in the input text provided for BAdi. This has a limitation for 3000 characters for each email interaction.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namespace</td>
<td><a href="http://sap.com/xi/ap/CRM/MachineLearning">http://sap.com/xi/ap/CRM/MachineLearning</a></td>
</tr>
<tr>
<td>Enhancement Option</td>
<td>MachineLearningInputDataPreProcessing</td>
</tr>
<tr>
<td>InputData.MachineLearningScenarioCode</td>
<td>007 (Text Summarization)</td>
</tr>
<tr>
<td>InputData.Text</td>
<td>Input Text</td>
</tr>
<tr>
<td>Result.ProcessedText</td>
<td>(Assign processed text to this variable)</td>
</tr>
</tbody>
</table>

Create a new Enhancement Implementation with the namespace and enhancement option shown in the previous table.

The following code sample removes \n<br> from the input text. You can use any kind of preprocessing logic required by your specific scenario.

```
import AP.CRM.MachineLearning;
var result : BadiTextDataPreProcessorOutput;
if (InputData.MachineLearningScenarioCode == "007")
{
  if (InputData.Text.Contains("\n<br]='")
  {
    result.ProcessedText = InputData.Text.Replace("\n<br>"," ");
  }
  else
  {
    result.ProcessedText = InputData.Text;
  }
}
else
{
  result.ProcessedText = InputData.Text;
}
return result;
```

Parent topic: (Beta) Text Summarization [page 93]

Previous task: View Text Summarization [page 97]
4.8 FAQs for Machine Learning in Tickets

Here are some frequently asked questions (FAQs) and corresponding answers about Machine Learning in Tickets.

Do I qualify for using machine learning in the solution?

The following requirements must be met to use machine learning in the solution:

1. You must have SAP Cloud for Customer Enterprise License.
2. At least 6 months to 1 year of historical data.
   ○ Historical data is extracted automatically.

What is Service Intelligence?

Service intelligence is a name for the collection of machine learning models and scenarios embedded in SAP Cloud for Customer. Service intelligence isn’t a separate product, so you don’t require any additional licensing, deployment, or upgrades, and you can manage everything through the SAP Cloud for Customer administrator interface.

I don’t see a readiness report for all scenarios. Does this mean I can’t use some scenarios?

Currently only these scenarios provide a readiness report: Opportunity Scoring, Ticket Categorization, Lead Scoring, Ticket Time to Completion, and E-Mail Template Recommendation. You can create models for the other scenarios as long as your data meets the prerequisites listed in this guide.

How do we activate Machine Learning?

Go to [Administration] [Prediction Services] [Model Setup]. Then run a readiness report to verify that your data meets the requirements for machine learning scenarios. If your data is appropriate for machine learning, then you can add and train a model for your desired scenario. You can find detailed instructions for setting up and activating Sales and Service scenarios in this guide.

Is there any impact on the system performance as the data is cached?

There’s no impact on day-to-day system performance as the data is cached and stored in the solution. All compute-intensive operations, such as training the model, happen outside of your SAP Cloud for Customer tenant, side by side in the SAP Leonardo platform. In order to utilize resources on the SAP Leonardo platform more efficiently, you should train your models one at a time to avoid running parallel model training.

How many models are active at any time?

Only one model can be active in production. However, you can create multiple models.

How can I assess the quality of the model?

For every trained model, there’s a column named Accuracy that captures the quality of the model based on historical training data. However, this information isn’t available for Similar Tickets. For Ticket Categorization, you can also view the performance report to assess the quality of the model during Training and Prediction.

Are there extension fields to the model?

Extension fields aren’t available right now, but it’s planned and in the roadmap.

How many category levels does Ticket Categorization support?

As of February 2019, all category levels are supported: 1 · Process, 2 · Incident, 3 · Object, 4 · Cause.
Related Information

Service Ticket Intelligence (for ticket categorization) on the SAP help portal
5 Need Help?

For more details about machine learning, to activate it in your landscape, and for any issues, contact SAP or raise an incident in the component LOD-CRM-ML.

Access this documentation anytime from the help link at the top right of the Machine Learning Scenarios screen. Go to Administrator ➔ Prediction Services ➔ Machine Learning Models ➔ Model Setup.

**Note**

Machine learning is available only for the SAP Cloud for Customer Enterprise version. For more details about machine learning, to activate it in your landscape, and for any issues, contact SAP with the following template-

Dear SAP Support,

Please activate machine learning in the following tenant (Provide tenant detail & type - test or production) for the following scenarios (Place an X next to the scenarios):

- [ ] Deal Intelligence
- [ ] Lead Intelligence
- [ ] Ticket Categorization and Priority Prediction
- [ ] Similar Ticket Recommendation
- [ ] NLP Classification (entity extraction, language detection, sentiment detection) for ticket language
- [ ] Ticket Time to Completion
- [ ] E-Mail Template Recommendation
- [ ] Machine Translation

Find the blogs in related links on ticket categorization, lead scoring, deal intelligence and opportunity side pane.

**Related Information**

- Ticket Categorization
- Lessons learned from real-world ticket data sets
- Lead Scoring
- Deal Intelligence for Opportunity
- Opportunity Side Pane Deep Dive
Important Disclaimers and Legal Information

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