



Activity Overview

In this activity, you will showcase your ability to use Python to build classification models. You will also update team members and stakeholders through an executive summary, demonstrating your ability to organize and communicate key information.

For additional information on how to complete this activity, review the previous readings:

[End-of-course project introduction](#) and [Course 6 end-of-course portfolio project overview: Waze](#).

Be sure to complete this activity before moving on. The next course item will provide you with completed exemplars to compare to your own work. You will not be able to access the exemplars until you have completed this activity.

Scenario

Your team at Waze is close to completing their project for developing a machine learning model to predict user churn. Previously, you completed a project proposal, and used Python to explore and analyze Waze's user data, create data visualizations, and conduct a hypothesis test. Most recently, you built a binomial logistic regression model based on a variety of variables.

Leadership appreciates all your hard work. Now, they want your team to build and test different machine learning models to predict user churn. Your work will help leadership make informed business decisions to prevent user churn, improve user retention, and grow Waze's business.

At a meeting with project stakeholders, your team suggests building and testing the following machine learning models: random forest and XGBoost. At the end of the meeting, the Operations Manager says that he will share the suggestion with leadership.

A few days after the meeting, you receive an email from Emrick Larson, Waze's Finance and Administration Department Head. Emrick says that leadership likes the idea of building and testing the two models to predict user churn, and asks the team to share more details about the models. You also receive a follow-up email from Harriet Hadzic, the Director of Data Analysis. Harriet asks you to build the two models, and prepare an executive summary to share your results.

Note: Team member names used in this workplace scenario are fictional and are not representative of Waze.

Email from Emrick Larson, Finance and Administration Department Head

Subject: Approval of Algorithm

From: "Emrick Larson," Emrick@waze

Cc: "Harriet Hadzic," Harriet@waze; "Chidi Ga," Chidi@waze; "Sylvester Esperanza," Sylvester@Waze; "May Santner," May@waze; "Ursula Sayo," Ursula@waze

Hello Data Team,

Thank you for providing the details for the final phase of the prediction algorithm we have requested. I apologize for missing many of the weekly project meetings, but I've been keeping informed of your progress. We discussed in detail your proposal for building and testing the following models for prediction: random forest and XGBoost. We agree with this approach.

Please go ahead with the creation of the algorithm. It would be very helpful if you could share what data indicators the algorithm is based on, and describe the confidence your team has in the model performance. Thank you for your great work,

Emrick Larson

Finance and Administration Department Head

Waze

Email from Harriet Hadzic, Director of Data Analysis

Subject: RE: Approval of Algorithm

From: "Harriet Hadzic," Harriet@waze

Cc: "Chidi Ga," Chidi@waze

Hello data pros!

Great work so far. The results of your analysis will help us make data-driven business decisions.

Please build the models we discussed using the Waze user data. As you're aware, you've already cleaned and run this data through a binomial logistic regression model, but you always need to validate your variables and data. So, please revisit the dataset.

Once complete, please send a draft of your executive summary to May and myself. Be sure to include the key info that leadership requested: a summary of the variables used to make the prediction, and an indication of how we can test the accuracy of the model.

I look forward to seeing what you build!

Harriet Hadzic

Director of Data Analysis

Waze

Step-By-Step Instructions

Follow the instructions to complete the activity. Then, go to the next course item to compare your work to a completed exemplar.

Step 1: Access the templates

To use the templates for this course item, click each link below and select *Use Template*.


Link to templates:


[Course 6 PACE strategy document](#)

[Course 6 Executive summary](#)

OR

If you do not have a Google account, you can download the templates directly from the attachments below:

 [Activity Templates](#) [Executive summaries](#)
[PPTX File](#)

 [Activity Template](#) [Course 6 PACE strategy document](#)
[DOCX File](#)

> Step 2: Access and complete the end-of-course project lab

Note: The following lab is also the next course item. Once you complete and submit your end-of-course project activity, return to the lab instructions' page and click Next to continue on to the exemplar reading.

To access the end-of-course project lab, click the following link and select *Open Lab*.

[Course 6 Waze project lab](#)

Your Python notebook for this project includes a guided framework that will assist you with the required coding. Input the code and answer the questions in your Python notebook to build the following machine learning models: random forest and XGBoost. You'll find helpful reminders for tasks like:

Ethical considerations

Feature engineering

Model building and evaluation

You will also discover questions in this Python notebook designed to help you gather the relevant information you'll need to write an executive summary for your team.

Use your completed PACE strategy document and Python notebook to help you prepare your executive summary.

> Data Dictionary

This project uses a dataset called `waze_dataset.csv`. It contains synthetic data created for this project in partnership with Waze. Examine each data variable gathered.

The dataset contains:

14,999 rows – each row represents one unique user

12 columns

Column name	Type	Description
label	obj	Binary target variable (“retained” vs “churned”) for if a user has churned anytime during the course of the month
sessions	int	The number of occurrence of a user opening the app during the month
drives	int	An occurrence of driving at least 1 km during the month
device	obj	The type of device a user starts a session with
total_sessions	float	A model estimate of the total number of sessions since a user has onboarded
total_days_after_onboarding	int	The number of days since a user signed up for the app
total_navigations_fav1	int	Total navigations since onboarding to the user’s favorite place 1
total_navigations_fav2	int	Total navigations since onboarding to the user’s favorite place 2
driven_km_drives	float	Total kilometers driven during the month
duration_minutes_drives	float	Total duration driven in minutes during the month
activity_days	int	Number of days the user opens the app during the month
driving_days	int	Number of days the user drives (at least 1 km) during the month

> Step 3: Complete your PACE strategy document

The Course 6 PACE strategy document includes questions that will help guide you through the Course 6 Waze project. Answer the questions in your PACE strategy document to prepare for using Python to inspect and organize your data.

As a reminder, the PACE strategy document is designed to help you complete the contents for each of the templates provided. You may navigate back and forth between the PACE strategy document and the Python notebook. Make sure your PACE strategy document is complete before preparing your executive summary.

> Step 4: Prepare an executive summary

Your executive summary will keep your Waze teammates and stakeholders informed of your progress. The one-page format is designed to respect teammates and stakeholders who may not have time to read and understand an entire report.

First, select one of the executive summary design layouts from the provided template. Then, add the relevant information. Your executive summary should include the following:

A summary of the benefits and limitations of your ML models

The results of your analysis

Recommendations or insights based on your results

Complete your executive summary to effectively communicate your results to the Waze leadership team.

Pro Tip: Save the templates

Finally, be sure to save a blank copy of the templates you used to complete this activity. You can use them for further practice or in your professional projects. These templates will help you work through your thought processes and demonstrate your experience to potential employers.

What to Include in Your Response

Later, you will have the opportunity to assess your performance using the criteria listed below. Be sure to address the following elements in your completed activity.

Course 6 PACE strategy document:

Answer the questions in the PACE strategy document

Course 6 Python notebook:

Build classification models

Course 6 executive summary:

Clearly articulate the challenges presented in this data project

Identify the outcome of your work

Include recommendations for future work/next steps