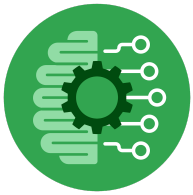
Course Six
The Nuts and Bolts of Machine Learning



Instructions

Use this PACE strategy document to record decisions and reflections as you work through the end-of-course project. As a reminder, this document is a resource that you can reference in the future and a guide to help consider responses and reflections posed at various points throughout projects.

Course Project Recap

Regardless of which track you have chosen to complete, your goals for this project are:

- [ ] Complete the questions in the Course 6 PACE strategy document
- [ ] Answer the questions in the Jupyter notebook project file
- [ ] Build a machine learning model
- [ ] Create an executive summary for team members and other stakeholders

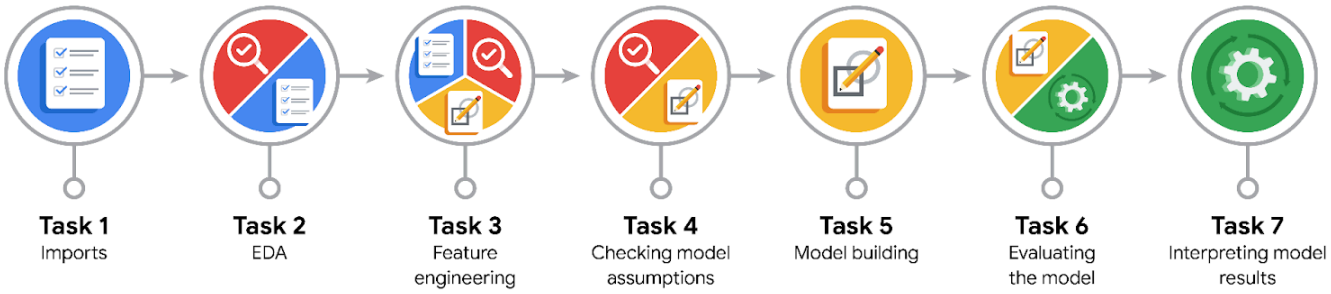
Relevant Interview Questions

Completing the end-of-course project will empower you to respond to the following interview topics:

- What kinds of business problems would be best addressed by supervised learning models?
- What requirements are needed to create effective supervised learning models?
- What does machine learning mean to you?
- How would you explain what machine learning algorithms do to a teammate who is new to the concept?
- How does gradient boosting work?

Reference Guide:

This project has seven tasks; the visual below identifies how the stages of PACE are incorporated across those tasks.



Data Project Questions & Considerations

PACE: Plan Stage

- What are you trying to solve or accomplish?

We are trying to create a machine learning model that will differentiate between real claims and opinions with a high recall score.

- Who are your external stakeholders that I will be presenting for this project?

The TikTok leadership team and other TikTok teams that will be affected by video classification.

- What resources do you find yourself using as you complete this stage?

Python for data exploration and parsing csv files.

- Do you have any ethical considerations at this stage?

The model needs to not be biased in any way and the initial data must not lead to a groups of videos being banned that do not break the terms and conditions or TikTok.

- Is my data reliable?

The data seems reliable and does not have any bias. It was obtained directly from the TikTok team so it should not have many issues, there is also not much missing data in the dataset meaning most data has been obtained correctly.

- What data do I need/would like to see in a perfect world to answer this question?

Any data of indication weather terms and conditions were broken via transcript of video text on video or actions performed in the video.

- What data do I have/can I get?

I have data from a large number of videos without the possibility of more data.

- What metric should I use to evaluate success of my business/organizational objective? Why?

Recall as we want a very low false negative rate to ensure all necessary videos are banned and the false positives can easily be brought back via user reports.

PACE: Analyze Stage

- Revisit “What am I trying to solve?”Does it still work? Does the plan need revising?

No the plan is still going ahead as initially stated.

- Does the data break the assumptions of the model? Is that ok, or unacceptable?

As we are planning to use tree based models for this task, there aren’t any assumptions that the data breaks, otherwise other models would have to be considered for this job.

- Why did you select the X variables you did?

We selected all variables given + transcript length as the decision trees will split on what is necessary. If this leads to overfitting, some variables can be removed.

- What are some purposes of EDA before constructing a model?

To ensure that data is ready to be modeled and to see if any extra data is needed.

- What has the EDA told you?

Most columns are floats or ints with a few text columns that can be dropped. Distributions are different for claim and opinion videos throughout.

- What resources do you find yourself using as you complete this stage?

Python libraries such as pandas, numpy and seaborn.

PACE: Construct Stage

- Do I notice anything odd? Is it a problem? Can it be fixed? If so, how?

Models have very high accuracy, precision and recall indicating overfitting. This can be solved by using less features or training with different parameters but validation set and test set will provide a clearer picture.

- Which independent variables did you choose for the model, and why?

All except #, video_id, claim_status and video_transcript_text as they all have different distributions for claim and opinion meaning they provide substantial information for the type of claim.

- How well does your model fit the data? What is my model's validation score?

99% accuracy on validation set with 100% recall.

- Can you improve it? Is there anything you would change about the model?

No as it currently performs as expected.

- What resources do you find yourself using as you complete this stage?

The Sklearn libraries for XGBoost and RandomForest Classifier.

PACE: Execute Stage

- What key insights emerged from your model(s)? Can you explain my model?

The model achieves very high accuracy, recall and precision but makes decision solely of engagement metrics making it unsuitable to use for real time data.

- What are the criteria for model selection?

Recall scores.

- Does my model make sense? Are my final results acceptable?

The models results are good however it does not make decision based on things that make sense as it only uses engagement metrics making the results unacceptable.

- Do you think your model could be improved? Why or why not? How?

Yes by using different features to ensure the model is not reliant on engagement stats as its sole decision maker.

- Were there any features that were not important at all? What if you take them out?

Taking out most features will keep model performance the same as they have little impact on the models weights.

- What business/organizational recommendations do you propose based on the models built?

Provide more data to build another model that is less reliant on engagement metrics for its decisions.

- What resources do you find yourself using as you complete this stage?

Various python libraries and analytical skills.

- Is my model ethical?

No as it discriminates against popular videos, marking them all as claims due to the dataset distributions.

- When my model makes a mistake, what is happening? How does that translate to my use case?

  When it predicts a false negative, it means the video stays up longer meaning more people will be subject to content that breaks TikTok's T&C's and could potentially be harmful or offensive. For false positives, the user will have their video taken down but they can always appeal to have it manually reviewed and relisted.