THE MACHINE LEARNING CANVAS

Designed for: | Designed by: Team : *Lord of the Rings* | Date:

Iteration: 1 .

PREDICTION TASK

Type of task? Entity on which predictions are made? Possible outcomes? Wait time before observation?

Type of task : Classification (Sentiment Analysis) ***Entity on which predictions are made*** **:** Movie Reviews ***Possible Outcomes:*** Positive, Negative ***Wait time before observation :*** Instantaneous. Sentiment analysis happens on the provided review text itself, so no additional waiting period is involved**.**

DECISIONS

How are predictions turned into proposed values for the end-user? Mention parameters of the process / application that does that.***Value:*** For movie owners, a sentiment analysis provides an understanding of how viewers are reacting to the movie and identify trends for improvement. ***Process:*** Using text-vectorization techniques (n-gram, NF-IDF, Bag of Words) to dissect the sentiment behind the movie's reviews.

VALUE PROPOSITION

Who is the end-user? What are their objectives? How will they benefit from the ML system? Mention workflow/interfaces.

End User: The end users are movie producers who would like to understand the sentiment behind the movies. ***Benefit:*** By understanding the sentiments behind the movie, the producers can tailor their existing/future productions according to audience feedback.***Workflow-*** Data cleaning and preprocessing, applying text vectorization algorithms (Bag of Words, TF-IDF, n-Grams), training and evaluating binary classification models (Logistic Regression, SVM, Random Forest), and analyzing and comparing their performance.

DATA COLLECTION

Strategy for initial train set & continuous update. Mention collection rate, holdout on production entities, cost/constraints to observe outcomes.

Strategy: Use the 50,000 IMDB Kaggle reviews for the initial train set, with weekly updates from IMDB. Maintain a holdout set for evaluation and manage costs and data privacy for continuous updates and outcome monitoring.

DATA SOURCES

Where can we get (raw) information on entities and observed outcomes? Mention database tables, API methods, websites to scrape, etc.

Raw Info Sources: Obtain raw data from IMDB, Rotten Tomatoes, and Metacritic via web scraping or APIs, and store it in database tables such as reviews, users, and sentiments for analysis.

IMPACT SIMULATION

Can models be deployed? Which test data to assess performance? Cost/gain values for (in)correct decisions? Fairness constraint?

Deploy models on AWS SageMaker or Google AI Platform, using a holdout set from the IMDB dataset for performance assessment. Evaluate the costs of misclassification (e.g., incorrect sentiment affecting user recommendations) and ensure ***fairness*** by avoiding bias across different movie genres and user demographics.

MAKING PREDICTIONS

When do we make real-time / batch pred.? Time available for this + featurization + post-processing? Compute target?

Real-Time Predictions: Make real-time predictions for immediate feedback, allowing a few milliseconds to seconds for processing.
Batch Predictions: Make batch predictions for periodic analysis with several minutes to hours available for processing.

Time for Featurization & Post-Processing: Real-time predictions require minimal, optimized featurization and post-processing; batch predictions can include comprehensive feature engineering and validation.
Compute Target: Use high-performance, low-latency servers for real-time predictions, and cloud-based distributed computing solutions like AWS Batch for batch predictions.

BUILDING MODELS

How many prod models are needed? When would we update? Time available for this (including featurization and analysis)?

Number of Production Models: One primary production model, with possible additional models for A/B testing or specific review types.
When to Update: Update monthly or when significant data pattern changes are detected.

Time Available for Update: Allow several hours to a full day for updating, including featurization and analysis.

FEATURES

Input representations available at prediction time, extracted from raw data sources.

Input Representations Available at Prediction Time: Text of the movie reviews, user ratings, and timestamps.
Extracted from Raw Data Sources: Extract features from IMDB review text, user rating data, and review submission timestamps.

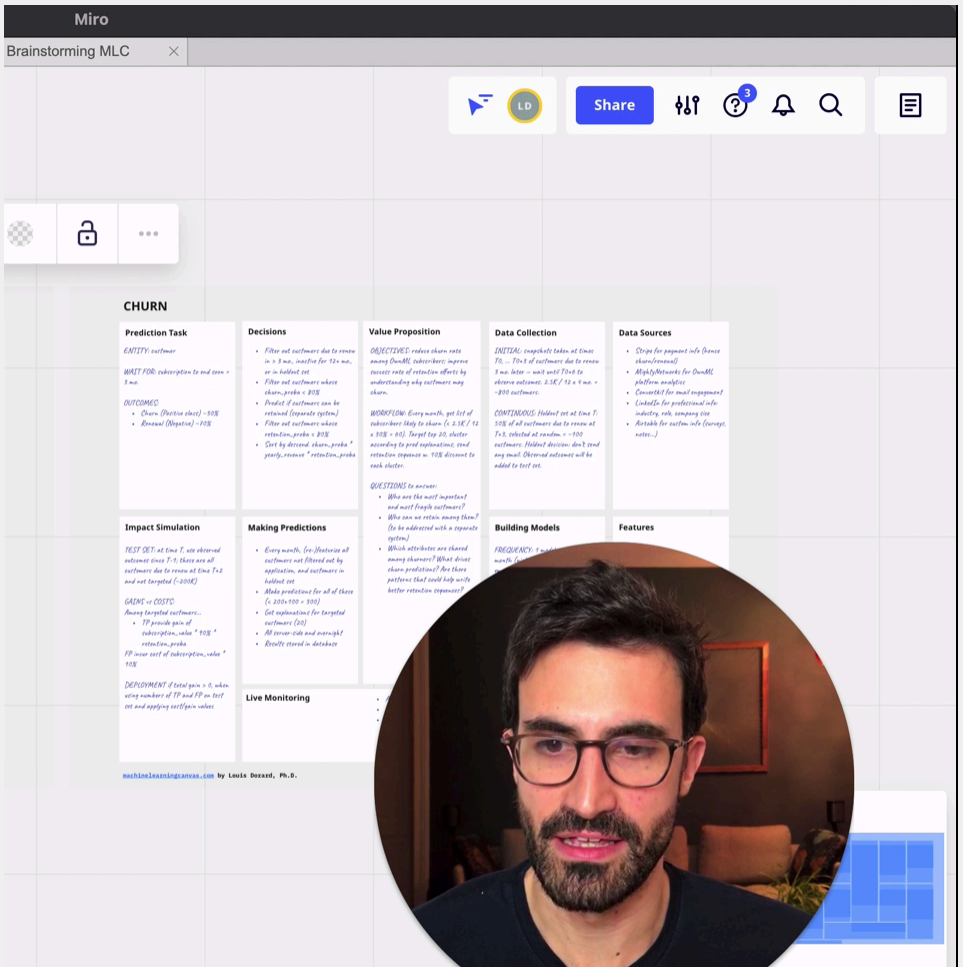
MONITORING

Metrics to quantify value creation and measure the ML system's impact in production (on end-users and business)?

Metrics to Quantify Value Creation: Monitor the accuracy of sentiment predictions on IMDB reviews and the impact on user recommendations.
Measure the ML System's Impact on End-Users: Track user engagement metrics like click-through rates on recommended movies based on sentiment analysis.
Measure the ML System's Impact on Business: Assess the increase in user retention and subscription rates linked to enhanced recommendation quality from sentiment analysis.

ONLINE COURSE

Master the Machine Learning Canvas



Learn a step-by-step process to get to a complete and detailed Machine Learning Canvas. This will help you...

- Validate the feasibility of your ML use case ideas.
- Boost collaboration within your team.
- Anticipate issues that would otherwise come up during implementation or in production.

More details at **ownml.co/plan**