

TRUSTme

The truth is in the detail.

by: Miguel Benalcazar D11949001
Javier Atero D11949007



ABSTRACT

Product reviews have a significant impact on the decision to make a purchase. They provide valuable information to potential buyers, and give helpful feedback to manufacturers and sellers. Considering the widespread reliance on reviews as a purchasing guide, fake reviews are a genuine problem that needs to be addressed by implementing effective measures and strategies to prevent them.

INTRODUCTION

E-commerce platforms have become the primary method for consumers to purchase products as the Internet has grown. As a result, consumers increasingly prefer to buy goods online rather than in physical stores. Consequentially, consumers rely on online product reviews to obtain more information in their purchasing decisions because they do not have direct physical access to the goods

BUSINESS AND ANALYTICS GOALS

BUSINESS

- Ensure more trustworthy reviews
- Enhance shopping experience
- Fairer business practices

ANALYTICS

- Predict if reviews are fake/real (Binary Classification Problem)
- Take advantage of NLP approaches and the integration of multi modalities of data (Text, binary, and categories).

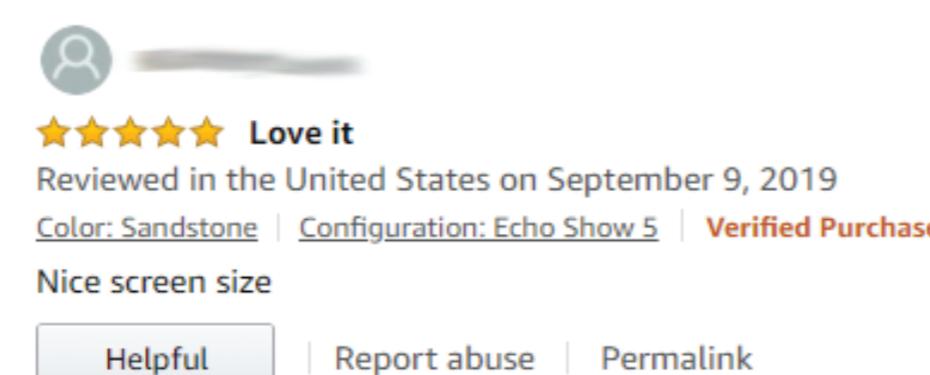
DATASET AND PREPROCESSING

- Labelled Amazon Reviews Dataset
- 21K products
- 50% of Fraud Rate

PREPROCESSING

- One-hot encoding
 - Ratings (5 starts)
 - Product Category (30 categories)
- Binary Encode
 - Verified Purchase (No: 0, Yes: 1)
 - Fake (Label Fake: 1, Real = 0)
- Tokenizer for Sentiment Analysis
 - Normalize Text (Lowercase)
 - Stop Words ("and", "the", "it", and "of")
 - Stemming and Lemmatization (reduce words to their root forms.)
- Tokenizer for BERT
 - Normalize Text (Lowercase)
 - Hugging-face tokenizer library

Customer Review



ARCHITECTURE AND DESIGN

- distilBERT based model: DistilBERT is a smaller, faster, cheaper and lighter version of the BERT model. Understand the context of each sentence.
- Sentiment Analysis Model: identify and categorize opinions expressed in a piece of text, to determine whether the user's attitude towards a particular product. (Positive, Negative, or Neutral.)
- FFNs (Feedforward Neural Network) reduce the space and extract better information after mapping the inputs.

MODEL PARAMETERS

Optimizer: Adam

Loss Function: Binary cross-entropy (BCE) loss

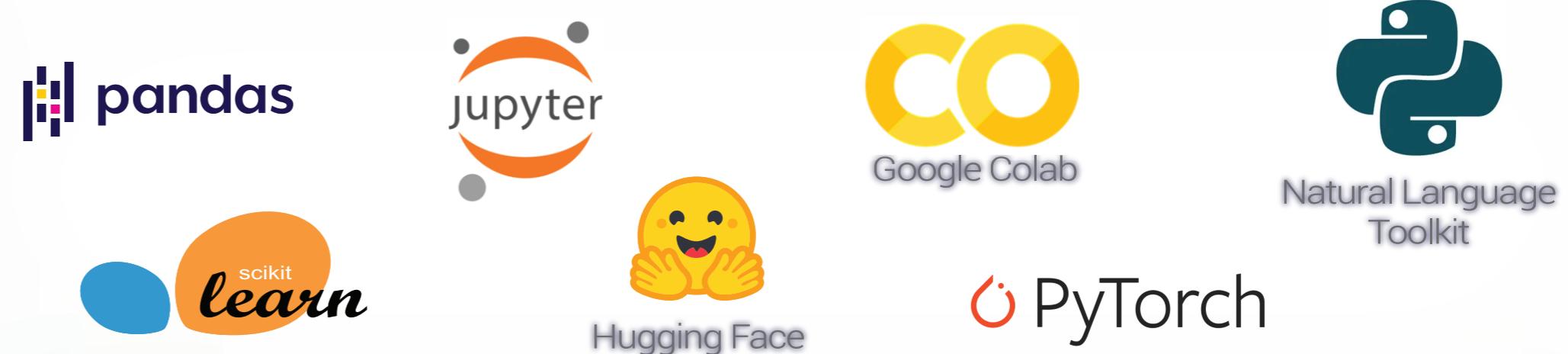
Epochs: 46

Batch: 6

From epoch 0-20 lr = 1e-6

From epoch 0-46 lr = 2.3e-6

TOOLS



MODEL ARCHITECTURE

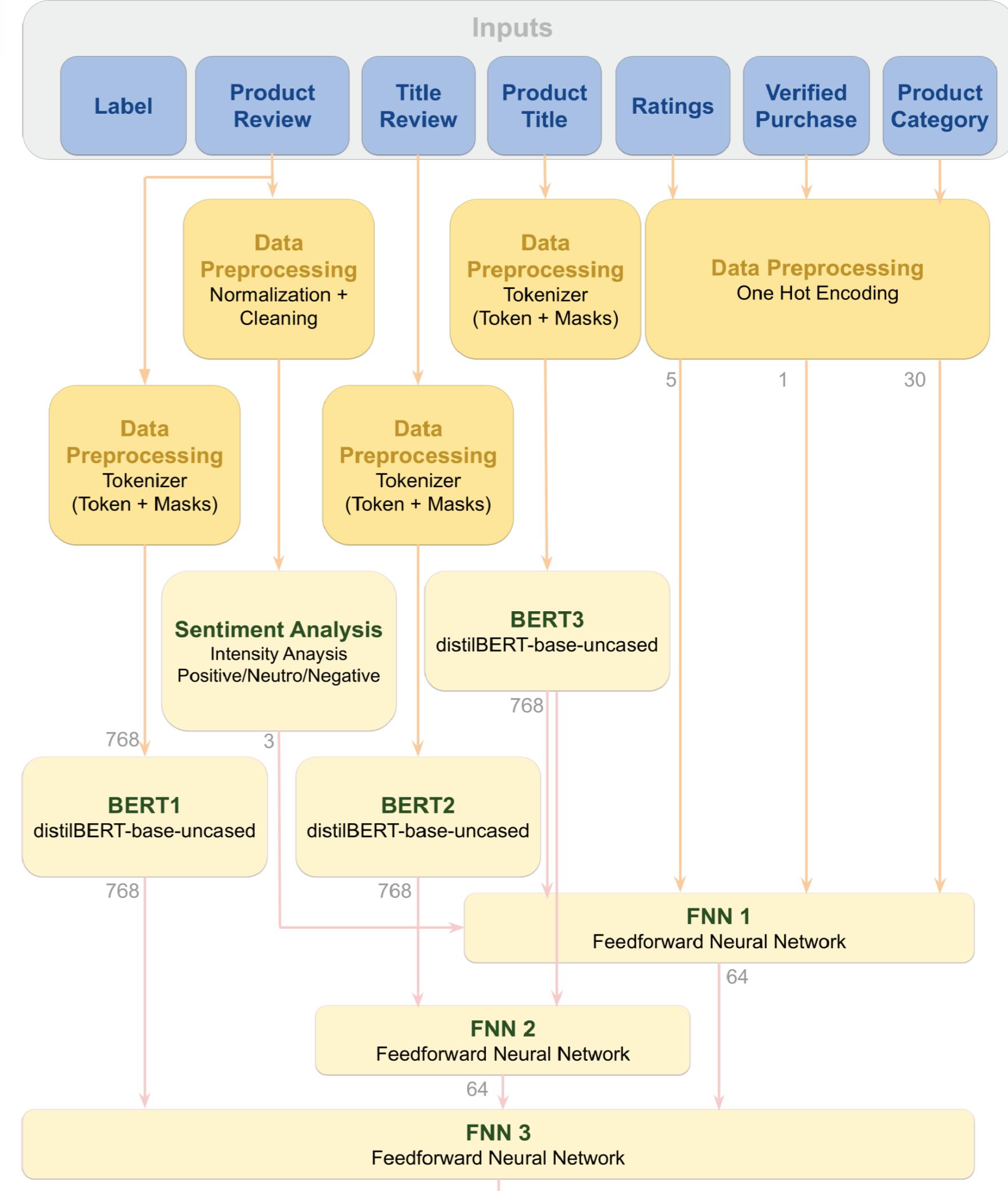


Figure 1. Berts-Based Fake Review Using Multimodal Data Arquitecture

RESULTS

AUROC	AUPRC	ACCURACY	PRECISION	RECALL	F1-SCORE
0.92	0.91	0.85	0.83	0.88	0.85

Table 1. Metrics from Model

CONCLUSION

- The results of this study show that a Deep Learning model can be used to effectively detect fake reviews.
- The addition of sentiment analysis helps to understand the feeling of the review (Positive, Negative , and Neutral), reinforcing the information from ratings.
- The model was able to achieve high accuracy, precision, and recall. This means that it was able to correctly identify a large number of fake reviews, while also avoiding false positives.

FUTURE WORK

- Use new NLP approaches to improve the detection of fake reviews.
- Enhance the sentiment analysis techniques to get better understanding of the sentiment of the user about the product.