Leveraging Emotion Classification for Enhanced Content Intelligence

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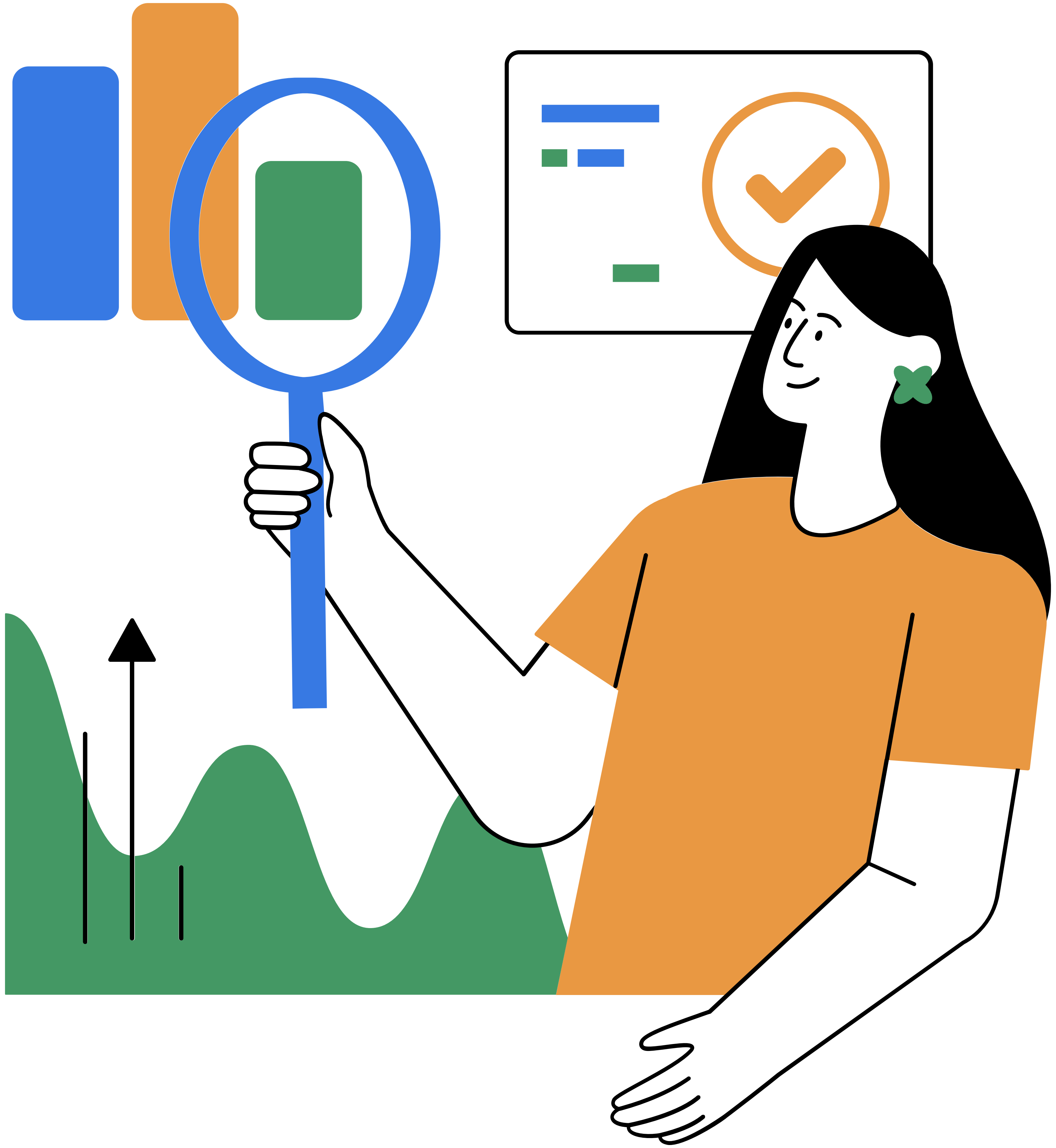
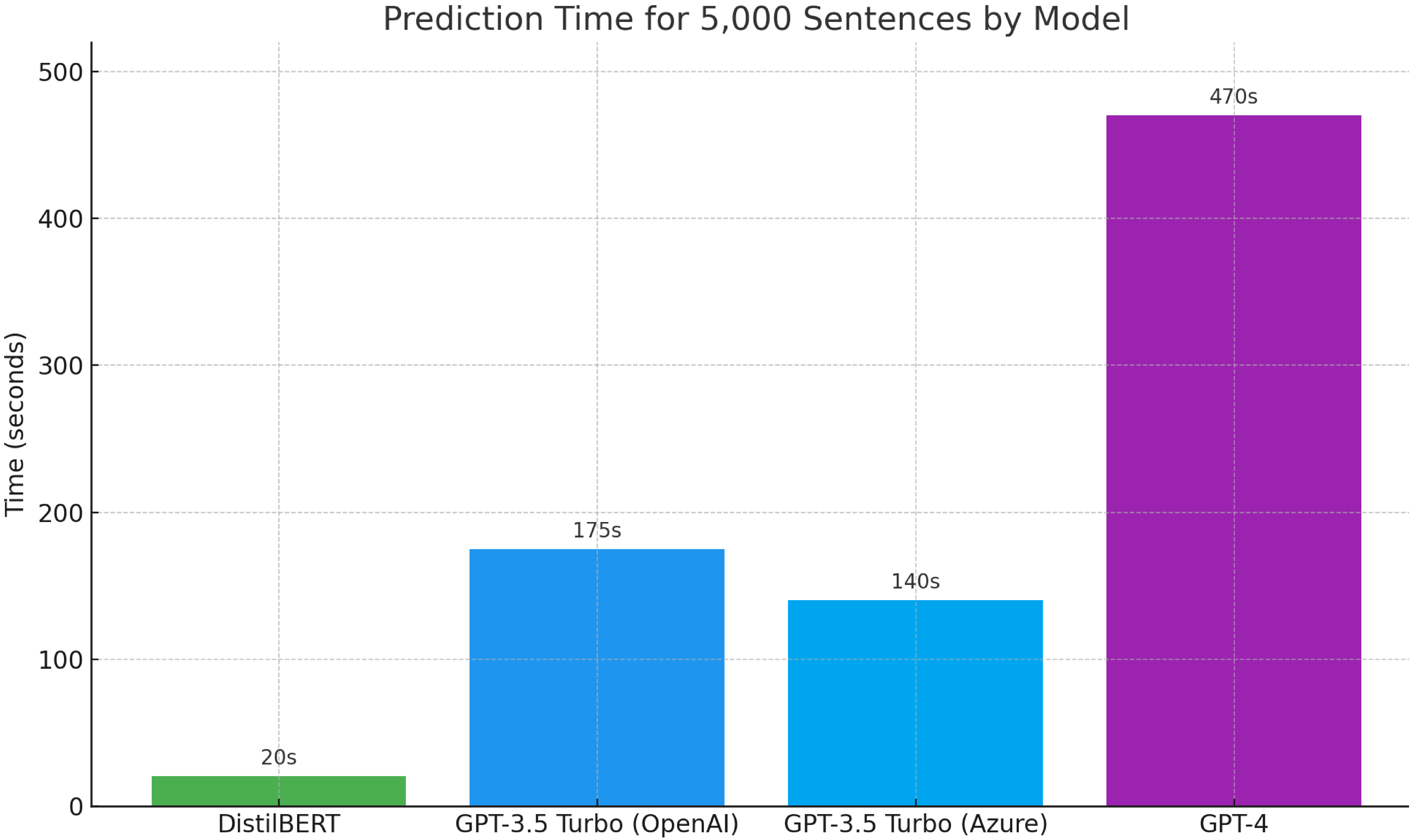


Topic

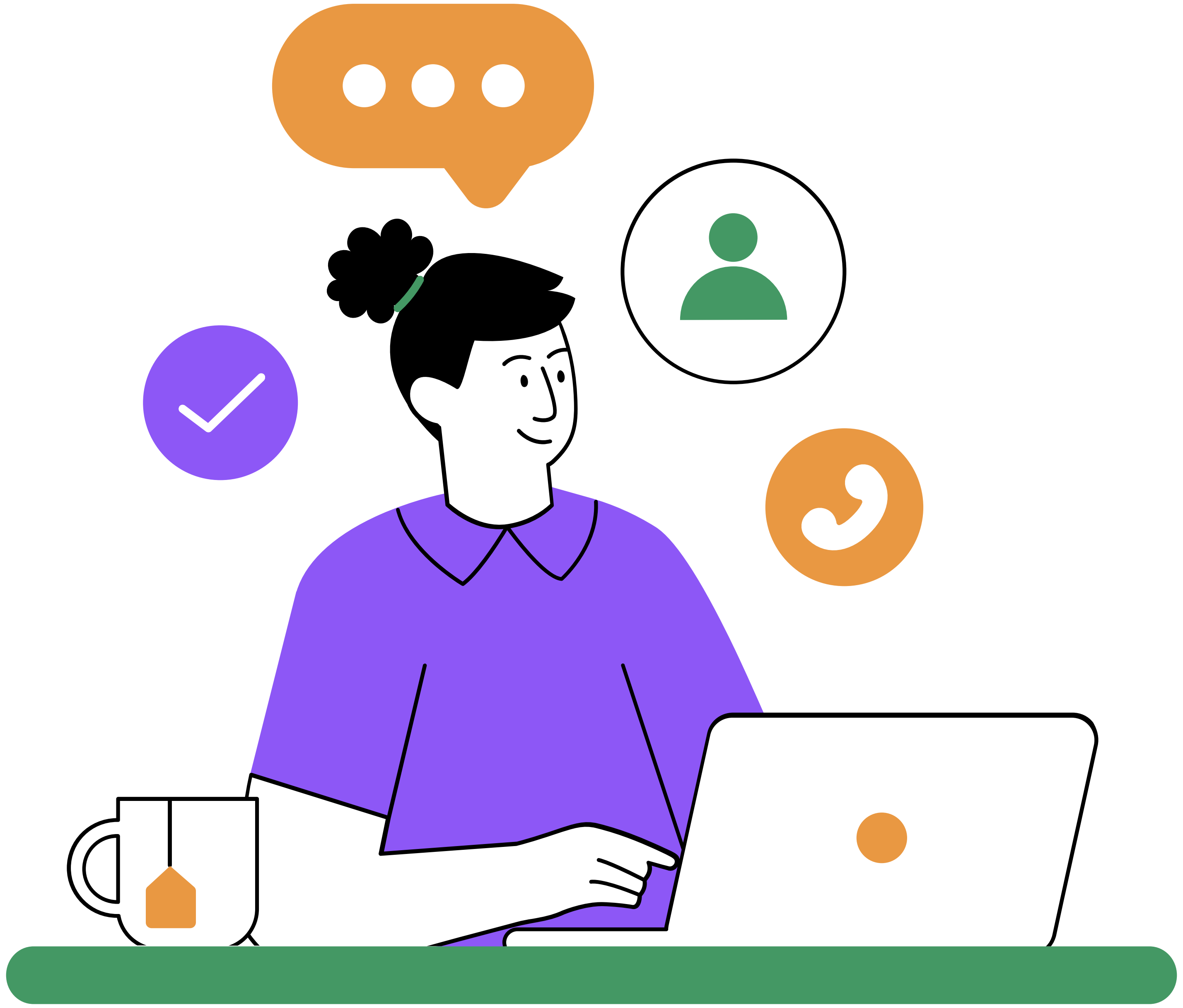
- ***Topic:*** *"The DNA of outstanding content"*
- ***Domain:*** Media and content analytics tool
- ***Use case:***
  - Predicting the emotion from an audio file for further analysis
- ***Benefits***
  - Privacy concerns
  - Faster predictions for the users

Business Value

- Greater security during unstable times
- Lower operational cost compared to commercial API’s
- Faster prediction times


Prediction Time for 5,000 Sentences by Model
Time (seconds)
0
100
200
300
400
500
20s
175s
140s
470s
DistilBERT
GPT-3.5 Turbo (OpenAI)
GPT-3.5 Turbo (Azure)
GPT-4

Data Characteristics



GoEmotions dataset:

- 58.000 sentences
- Reddit comments

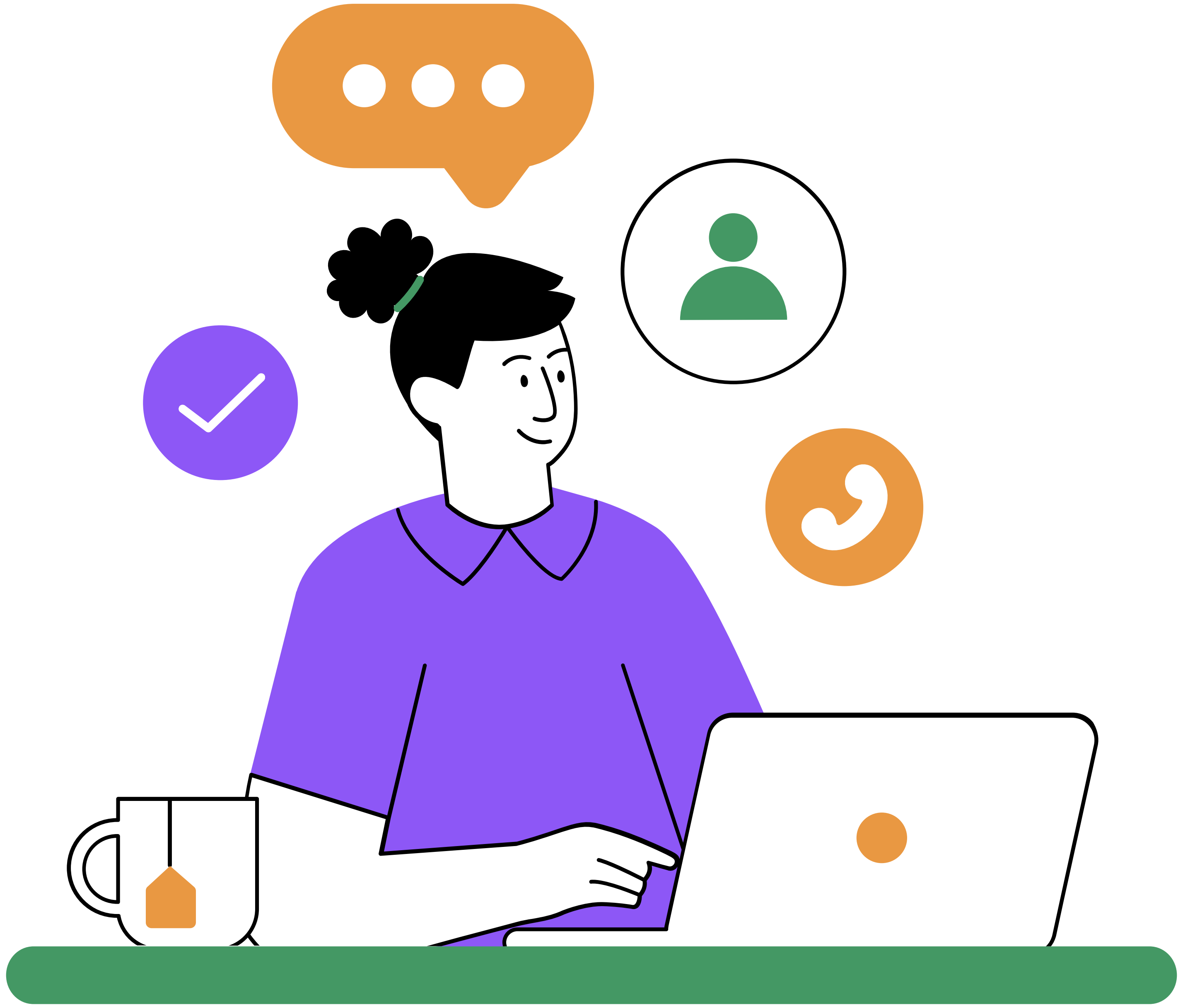
Apple ICloud IMessage dataset:

- 400.000 sentences
- Messages from Apple users

Test sets from other groups:

- 1.800 sentences (2 test sets)
- contextual diversity

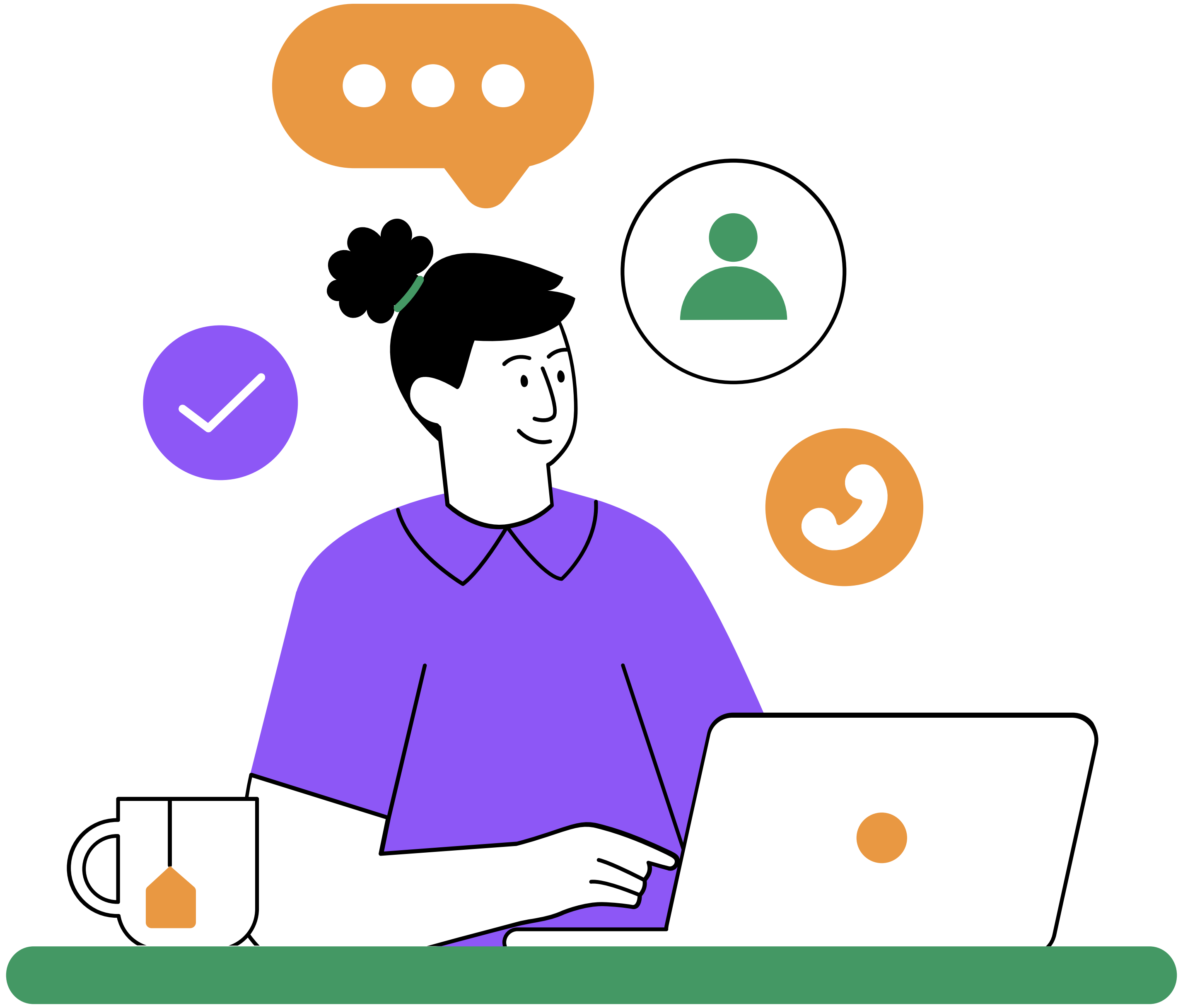
Data Characteristics



Preprocessing steps:

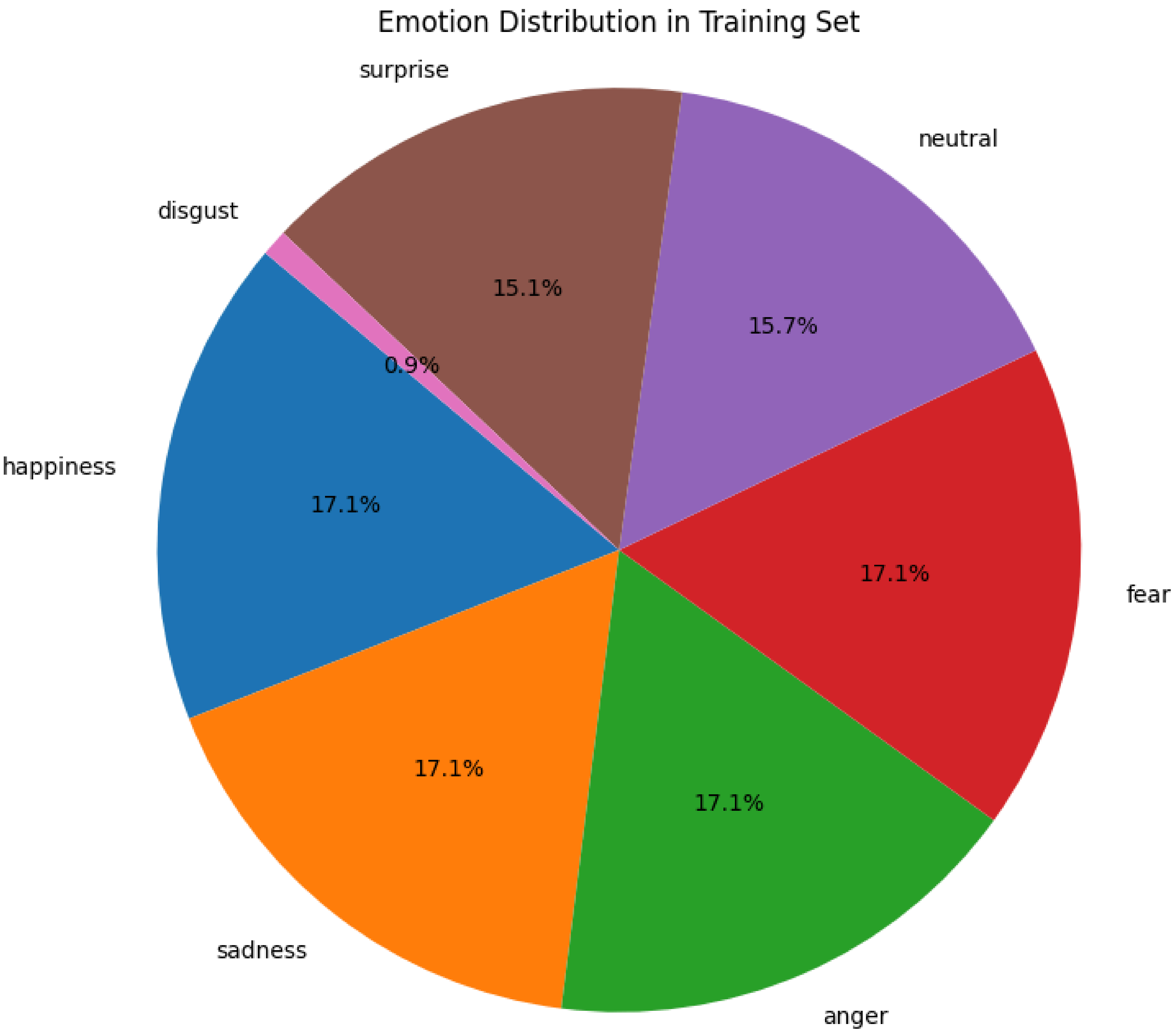
- mapping of the emotions into the 6 emotions + neutral
- handling missing values
- balancing the data distribution
- data augmentation targeting minority classes
  - synonym replacement
  - random word swap
  - random deletion

Data Limitations

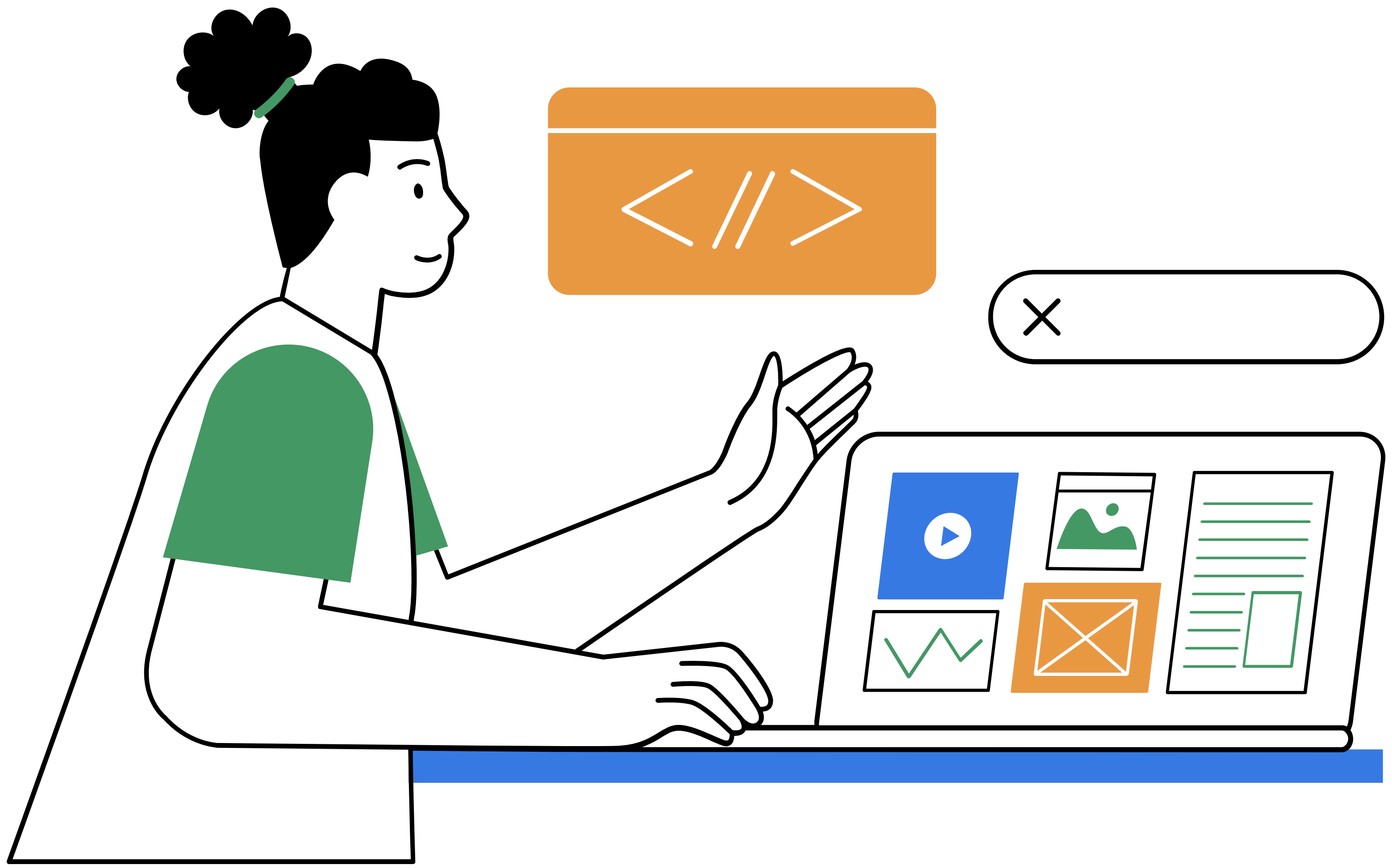


- Contextual gap between training and testing sets

- Underrepresentation of some emotions

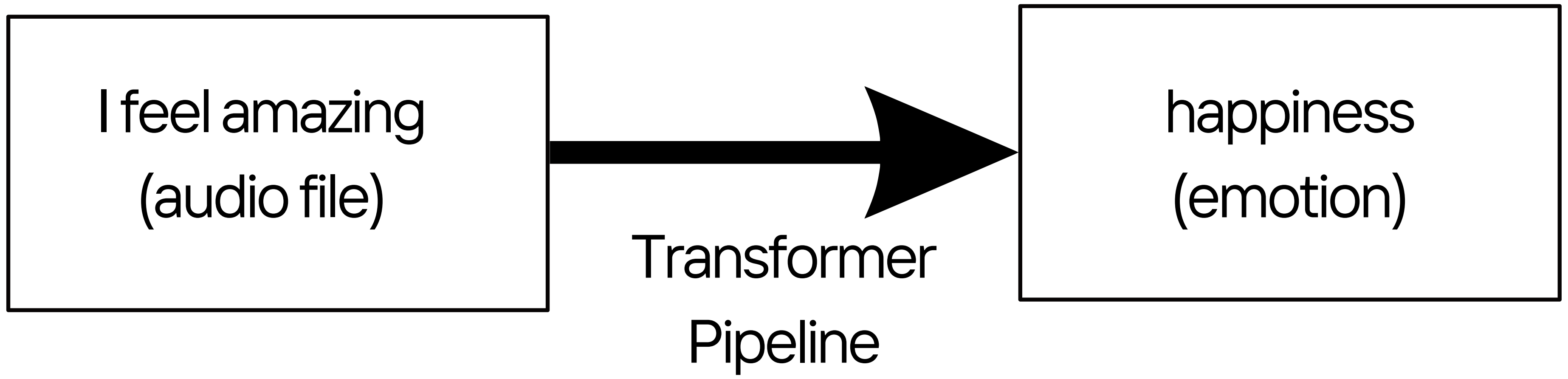

Emotion Distribution in Training Set
surprise
15.1%
neutral
15.7%
disgust
0.9%
happiness
17.1%
fear
17.1%
sadness
17.1%
anger
17.1%

Models



Models:

- ***DistilBERT (transformer)***
  - generally good
  - requires smaller training sets
  - faster version of BERT
  - retains 94% of the performance of BERT
- ***DistilROBERTA (transformer)***
  - better on informal speech
  - requires more data
  - slower than DistilBERT
  - better performance than DistilBERT



I feel amazing
(audio file)

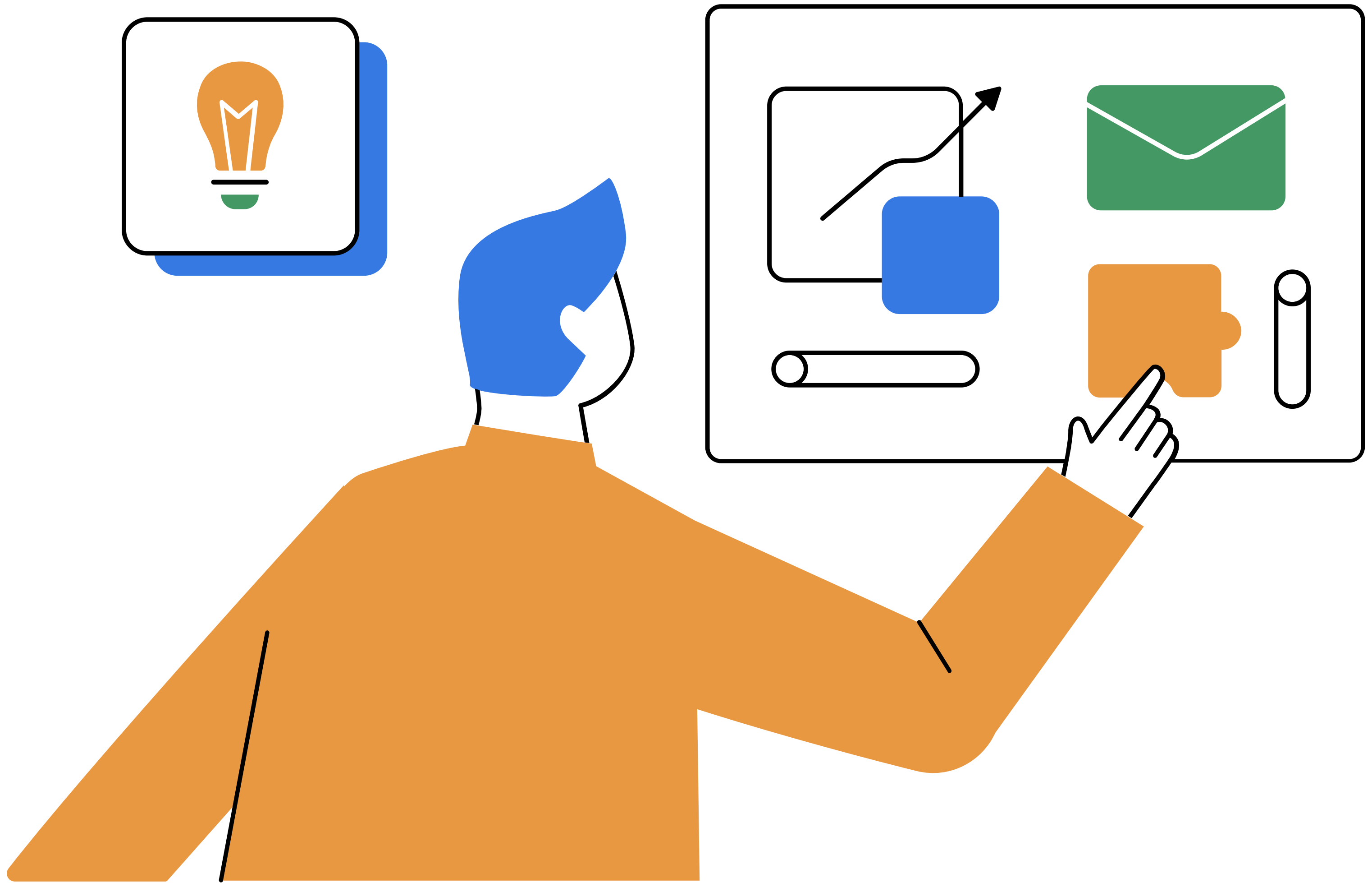
Transformer
Pipeline

happiness
(emotion)

Models Performance

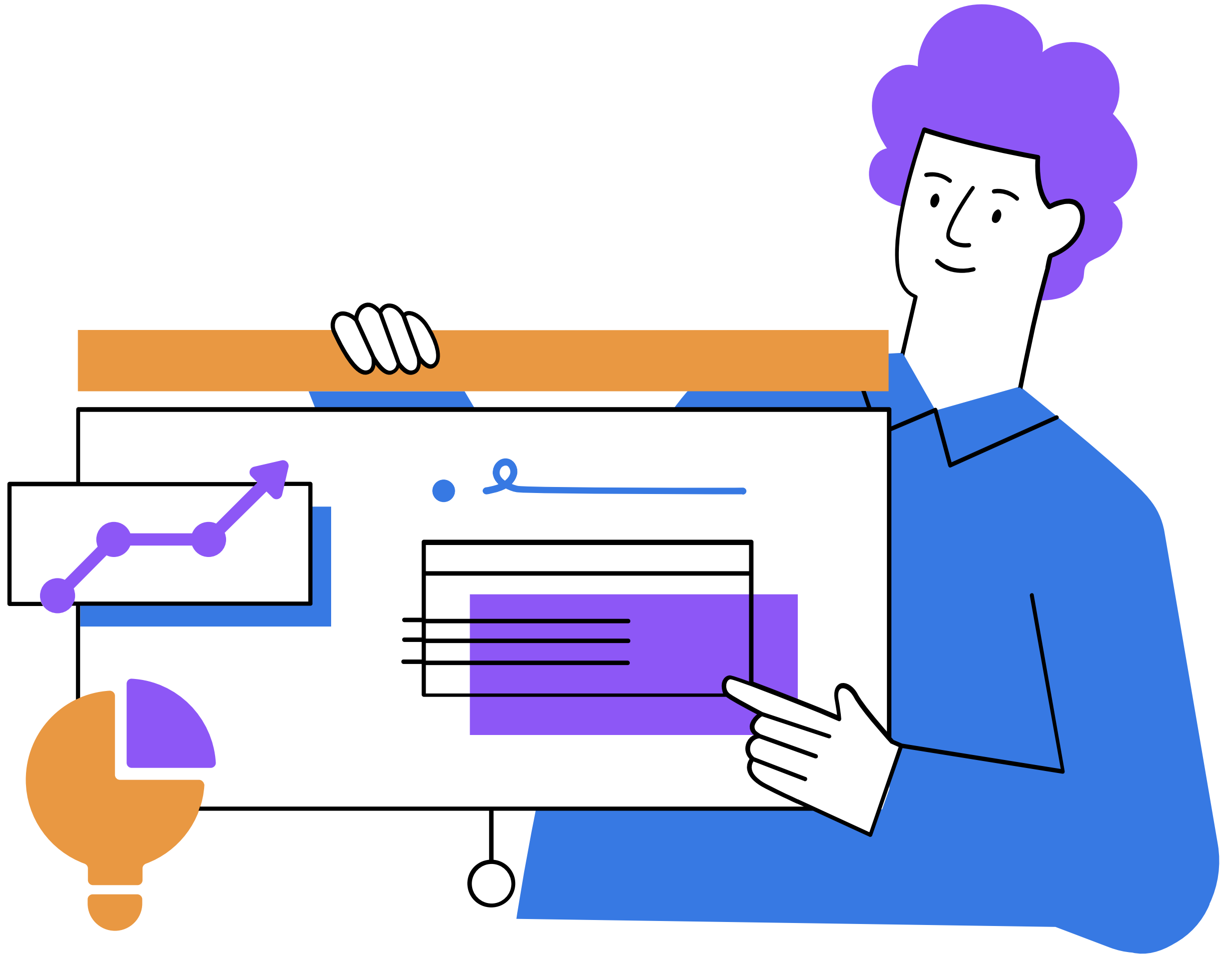
	DistilBERT	**DistilROBERTA**
Accuracy	0.73	0.48
F1 score	0.65	0.49
Precision	0.71	0.58
Recall	0.73	0.48

Ethical Considerations



- Different accents from different races
- Data Bias that might include
  - racism
  - xenophobia
  - sexism
  - demographics
  - Generational slang

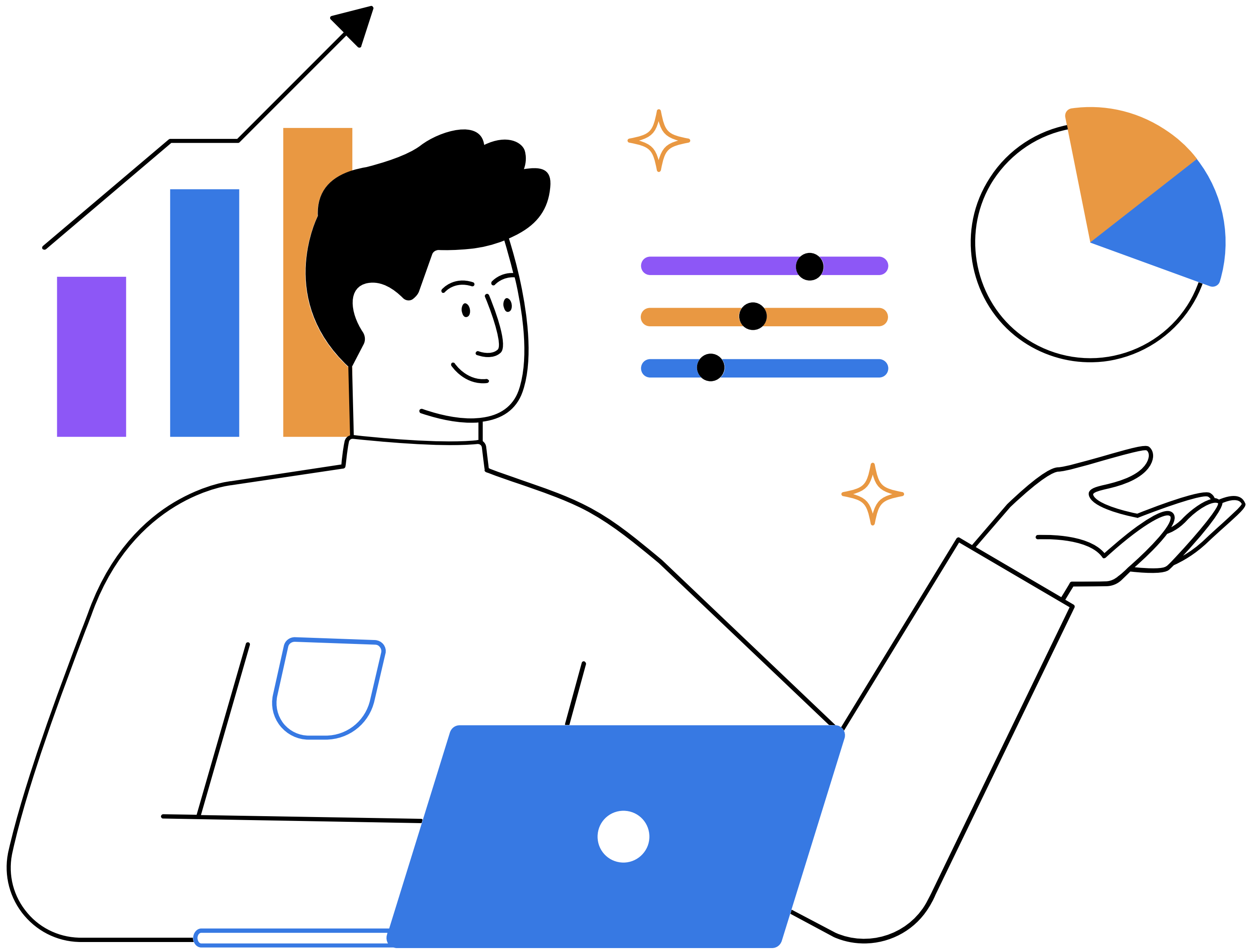
Limitations for Implementation



- Availability of data
- Quality of data
- Domain adaptation needed for media-specific texts
- Transcription issues
- Multilingual support not included
- Maximum file size limit: 5 GB

Next Steps

- Gathering more data
- Model optimization (reach ChatGPT API performance)
- Deployment in production



Thank You