GROUP 24

Social Media Mood Analyser

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Problem Statement

Social media platforms are key **outlets** for expressing thoughts, emotions, and **opinions**.

However, traditional sentiment analysis tools reduce **human** emotion to "**positive**" or "**negative**", leaving no **depth** nor complexity to analyse.
Additionally, emotion classifiers can offer a more nuanced understanding, but:

- Existing models are trained on **formal datasets**, instead of **casual**, slang-heavy text
- Have poor **performance** on tweets with **abbreviations**, emojis, and hashtags

Real-world relevance:

1. **Mental health monitoring**
2. **Public mood tracking**
3. **Toxicity detection and content moderation**

Solution Design

Start with the base Hartmann (2022) *Emotion English DistilRoBERTa-base* model

Data preprocessing of Faraggi (2022)'s *Emotion Tweet intensity* dataset to match format of base model

Data preprocessing of Elgiriyewithana (2024)'s *Emotions* dataset to match format of base model

Initial base **model training** using the combined dataset of *Emotion Tweet intensity* and *Emotions*

Hyperparameter tuning to find best parameters for optimal performance, and **retraining of model** using best parameters

Defining functions to tokenize input text, pass tokens into model, and outputting mood based on prediction scores

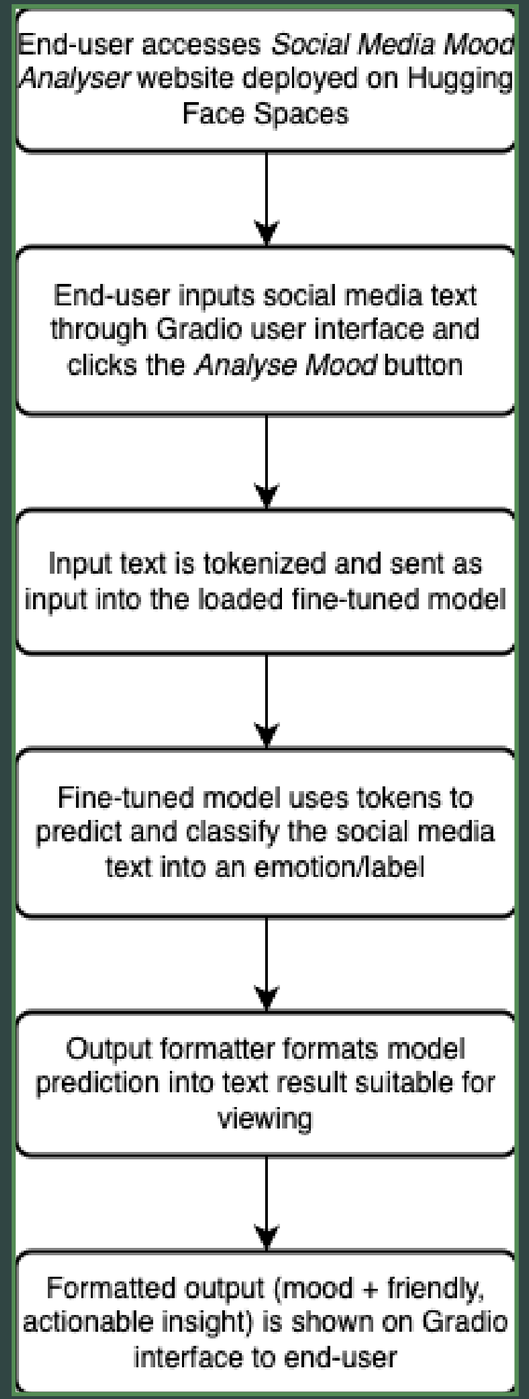
Packaging of fine-tuned model into a **Gradio-based** web application, passing the model, tokenizer, input function, and output function

System Architecture Details

The Social Media Mood Analyser uses a Transformers, Gradio, and Hugging Face pipeline to process text, predict emotions, and display results through a user-friendly web application interface.

Key Components:

- **Hugging Face Spaces:** Model is deployed onto a website easily accessible by end-users
- **Gradio UI:** web interface for users to input social media text
- **Tokenizer:** Converts text into tokens for the model to understand
- **Fine-Tuned Model:** Classifies emotion using model fine-tuned for social media-type texts
- **Output Formatter:** Maps model predictions to emotion labels
- **Output:** Displays the final predicted emotion to end-users



Model Details

We used Jochen Hartmann (2022)'s ***Emotion English DistilRoBERTa-base*** model from Hugging Face as our base model

Classifies 6 **Ekman's emotion labels** and neutral: anger, disgust, fear, joy, neutral, sadness, and surprise

Model outputs **probability scores** for each label from the input text; the label with the **highest score** is the **predicted mood**

Implementation Details

Data Preprocessing

- ***Emotion Tweet intensity:*** Regex text cleaning, label remapping, and tokenization
- ***Emotions:*** Remove love-labelled texts, label remapping, and tokenization
- Combine the two datasets, limit to **10,000 texts**, and split into training/testing 80/20 with **equal distribution** of labels

Model Training

- Base model trained using the split, combined dataset
- Trained with **end-of-epoch** evaluation strategy, 16 **train and evaluation batch size**, 2e-5 **learning rate**, and 0.01 **weight decay**, for 3 epochs
- Best parameters provide **minimum label confusions**

Pipeline & Front-End

- Takes raw text as input, processes it through the model and returns mood
- Model setup with easy-deploy **Gradio interface**
- Gradio interface deployed permanently on **Hugging Face Spaces** for end-users to access anywhere at any time

Demonstration

Hosted on Hugging Face Spaces

The mood analyser is available to anyone interested in analysing social media texts through an online platform, permanently.

Accessible through 👇

https://huggingface.co/spaces/siswa2548/socialmediamoodanalyser

Paste your social media text, click, and go!

Final Results & Observations

Anger

Input Text

Don't make me look at her ! Or else someone's face will be getting a bruise today fr 😤💢

Predicted Mood

The text in this social media post most probably conveys a mood of anger! 😡 Whoever wrote this may need something to calm down their nerves! 😌

Fear

Input Text

I really couldn't handle being in there anymore omggg, i just knew i had to get outta there asap !!! #hauntedhouse 👻😨

Predicted Mood

The text in this social media post most probably conveys a mood of fear! 😱 The author of this may want to run from whatever is making them so scared! 😨

Joy

Input Text

Yesss im walking on sunshine today, hny everybody! 😍

Predicted Mood

The text in this social media post most probably conveys a mood of joy! 😄 Perhaps you should ask whoever wrote this about why they seem to be very happy? 😊

Sadness

Input Text

guys i didnt get the marks i needed to not flop my exam, plsssss im going to fail the year.....😢😨

Predicted Mood

The text in this social media post most probably conveys a mood of sadness... 😭 You should definitely ask the author what's wrong, at least, to give them a supporting hand. 🥺

Surprise

Input Text

Guyssss omfg my dad wanted to get me a new phone ????? 😯

Predicted Mood

The text in this social media post most probably conveys a mood of surprise! 😲 The author has probably caught themselves in something they least expected. 🤔

Difficulty of untuned emotions

Since the **fine-tuning** only occurred for five emotions out of seven, missing out **disgust** and **neutral**, it has been difficult to place suitable text that will match a prediction of those two moods.

Punctuations as predictors

It has been observed that some punctuation markers can **differentiate** between some emotions, given the same words.

Usually,

(**!**): anger, (**?**): surprise, (**...**): sadness

Vastly increased accuracy

After fine-tuning, calling **trainer.evaluate()** reveals that the evaluation accuracy has risen to **~93% evaluation accuracy**, F1 score, precision, and recall, about **~27% more** than the **base model**'s evaluation accuracy!

Thank you!