Zero Shot Emoji Prediction using Multimodal Emoji Embeddings
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Introduction
- Emojis are an integral part of communication.
- Analyzing conversational data without emojis leads to loss of information.
- Not a lot of research focused on understanding the relationship of emojis and text.
- Further, analyzing downstream tasks like sentiment analysis with emojis could lead to a deeper understanding of sentiments.

Approach
Our approach proposes a multimodal model that takes emoji description and emoji image while predicting emojis.

Emoji Embedder: Vision model and language model that produce emoji embeddings
Tweet Embedder: Finetuned sentence BERT model that encodes the twitter texts (trained)
Prediction head: Returns the similarity score given a text embedding and emoji embedding.

Result: Zero-Shot Emoji Prediction
- Our model outperforms our baseline on the Twemoji zero-shot test set, with output restricted to emoji unseen in training only.

Result: General Emoji Prediction
- Our model significantly outperforms baseline accuracies on the full test set in terms of top-k accuracy.

Dataset
- Scraped data from emoipedia and hotemoji to get emoji description, images and metadata ~1700 emojis.
- Modified the Twemoji dataset from Cappallo et al. (2018) for our use case, with the following statistics:

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Sample Size</th>
<th># Emojis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train Set</td>
<td>11.3M</td>
<td>1122</td>
</tr>
<tr>
<td>Validation Set</td>
<td>0.9M</td>
<td>1068</td>
</tr>
<tr>
<td>General Test</td>
<td>1M</td>
<td>1064</td>
</tr>
<tr>
<td>Zero-shot Test</td>
<td>1.1M</td>
<td>99</td>
</tr>
</tbody>
</table>
- Created our own zero shot test set by scraping ~50K tweets from twitter containing only one of 279 emoji types absent in the training set.

Conclusion
- Our model outperforms Cappallo et al. however, it did not do as well in the case of a balanced dataset. Analyzing the dataset, we see that emojis are used in two ways:
  - Express sentiment: I won the championship 🏆
  - Words as emoji: Seals are like the dogs of the sea 🐳
- Our model performs well in sentiment emoji prediction, but a baseline focused on word matching performs better in word as emoji tasks.
- By combining models that are good at sentiment emoji-prediction and models that are good at word as emoji prediction we obtain EREC (Emoji Recommender), a model that gives practical yet versatile emoji prediction.