Model Development Phase Template

Date	10 November 2024
Team ID	739889
Project Title	Image Caption Generator
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Initial Model Training Code (5 marks):

```python
def data_generator(data_keys, mapping, features, tokenizer, max_length, vocab_size, batch_size):
    X1, X2, y = list(), list(), list()
    n = 0

    while 1:
        for key in data_keys:
            n += 1
            captions = mapping[key]

            for caption in captions:
                # Encode the sequence
                seq = tokenizer.texts_to_sequences([caption])[0]

                for i in range(1, len(seq)):
                    in_seq, out_seq = seq[:i], seq[i]

                    # Pad input sequence
                    in_seq = pad_sequences([in_seq], maxlen=max_length)[0]

                    # Encode output sequence
                    out_seq = to_categorical([out_seq], num_classes=vocab_size)[0]

                    # Store the sequences
                    X1.append(features[key][0])
                    X2.append(in_seq)
                    y.append(out_seq)

            if n == batch_size:
                X1, X2, y = np.array(X1), np.array(X2), np.array(y)
                yield [X1, X2], y
                X1, X2, y = list(), list(), list()
                n = 0
```
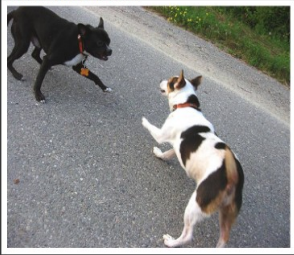
Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics
CNN		The image caption generator will be trained on a large dataset of images and their corresponding captions, learning to map visual features to textual descriptions through deep learning techniques.