**Image Captioning Project**

**Project Goal:**

Develop a deep learning model to generate accurate and meaningful textual descriptions for images.

**Methodology:**

1. **Dataset**

Used the MS COCO dataset for training.

1. **Model** **Architecture**

Combined a CNN (InceptionV3) for feature extraction and an LSTM for caption generation.

1. **Training**

Employed techniques like categorical cross-entropy loss, Adam optimizer, batching, and early stopping.

1. **Evaluation:**

Used metrics like BLEU, ROUGE, and CIDEr to assess model performance.

**Challenges:**

Computational resources, model accuracy, and data augmentation.

**Technologies:**

TensorFlow/Keras, InceptionV3, tokenization, word embeddings, Python libraries, Google Colab/Kaggle.

**Conclusion:**

The model successfully generated captions for images.

Future work could focus on improving generalization and exploring different architectures.