



# DATA SCIENCE PROJECT

IMAGE CAPTIONING  
AND  
SEGMENTATION



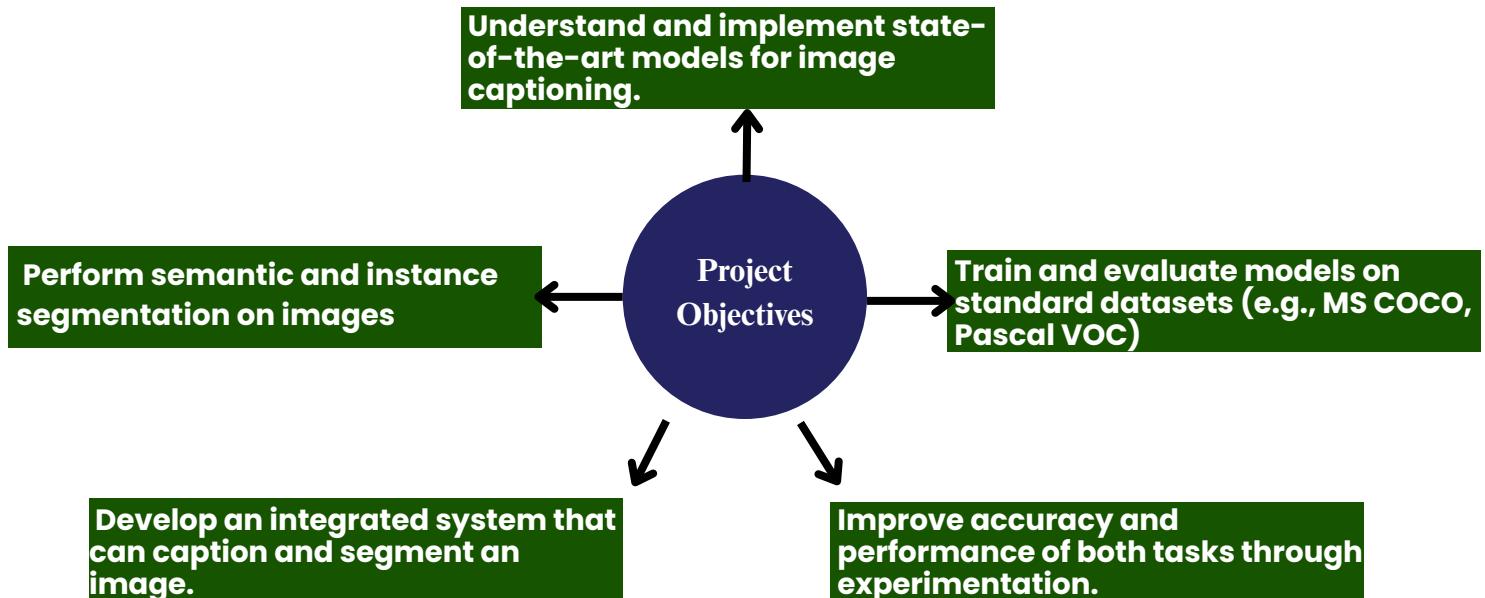
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## Project Overview:

This project focuses on the dual task of Image Captioning and Image Segmentation. Image Captioning involves generating descriptive textual captions for a given image using deep learning models, while Image Segmentation involves identifying and labeling regions of an image with corresponding objects or categories. Combining these two tasks will give interns hands-on experience with computer vision, natural language processing, and deep learning concepts.



## Tech Stack & Tools

- Python
- TensorFlow / PyTorch
- OpenCV
- NLTK / spaCy (for language preprocessing)
- Flask / Streamlit (for deployment)
- Jupyter Notebook

## Dataset

You may use publicly available datasets like MS COCO or Pascal VOC for training and evaluation. These datasets contain thousands of annotated images with segmentation masks and captioning metadata.

## Tasks and Timeline

- **Week 1-2:** Literature review, understanding concepts of image captioning and segmentation.
- **Week 3-4:** Setup environment and load datasets.
- **Week 5-6:** Implement and train captioning models (CNN+LSTM or Transformer-based).
- **Week 7-8:** Implement and train segmentation models (U-Net, Mask R-CNN, etc.).
- **Week 9:** Integrate both systems.
- **Week 10-12:** Testing, refinement, and final deployment.

## Expected Deliverables

- Well-documented codebase with GitHub link.
- Research summary report.
- Final demo or web-based application (optional).
- Presentation or walkthrough video.

## Learning Outcomes

- Deep understanding of computer vision and NLP integration.
- Proficiency in working with deep learning frameworks.
- Ability to handle large datasets and train models efficiently.
- Real-world project experience in AI/ML.