



**Ahmedabad
University**

Weekly Report 1

Group : 4

Course: Computer Vision

Instructor: Prof. Mehul Raval

Project: Road markings detection and road measurement in
aerial imagery

Group Members

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Objective: This week, the focus was on researching existing literature related to road marking detection and measurement in aerial imagery. Here's a summary of the key findings:

1. Road Marking Detection:

- **Prevalent Techniques:** Several methods are used for road marking detection, including:
 - **Image Segmentation:** Separates road markings from the background based on color, texture, or other visual properties. Techniques include thresholding, k-means clustering, and deep learning models like convolutional neural networks (CNNs).
 - **Edge Detection:** Identifies linear structures like road markings by analyzing image gradients. Techniques include Canny edge detection and Sobel filter.
- **Recent Advancements:** Deep learning approaches, particularly CNNs, have shown promising results in achieving high accuracy and robustness to complex road scenes.

2. "Pixel to cm" Mapping:

- **Calibration Techniques:** Establishing a relationship between image pixels and real-world measurements requires accurate calibration. This can be achieved using:
 - **Ground Control Points (GCPs):** Manually identifying and marking known locations with their corresponding real-world coordinates in the image.
 - **Camera Parameters:** Utilizing information about the camera sensor size, focal length, and flight altitude.

3. Error Analysis:

- **Bias and offset:**
 - Literature emphasizes the importance of reporting and analyzing biases and offsets in the "pixel to cm" mapping.
 - These errors can be caused by factors like camera calibration inaccuracies, terrain variations, and atmospheric effects.

Next Steps:

- In the coming week, the focus will be on:
 - Delving deeper into specific research papers and comparing different approaches for road marking detection and "pixel to cm" mapping.
 - Identifying potential research and exploring possible solutions for this project.
 - Formulating a preliminary research plan outlining the proposed methodology, evaluation metrics, and expected outcomes.

Preliminary Observations:

- Deep learning appears to be the dominant approach for accurate road marking detection in aerial imagery.
- "Pixel to cm" mapping requires careful consideration of calibration methods and error analysis to ensure reliable results.