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**CSE 532 MACHINE LEARNING**

**WEEKLY REPORT 1**

**[Group: Model Minds]**

**SECTION – 1**

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**Problem Statement:**

The primary aim of this project is to develop a robust methodology for calculating Ground Sample Distance (GSD) using an AU (Autonomous Unmanned) drone dataset. GSD is a critical parameter in aerial imagery, providing a relationship between pixel dimensions in images and actual distances on the ground. The project will focus on employing linear regression on real-time data to establish this relationship, enabling accurate object size and orientation determination in Machine learning and computer vision applications.

**Literature References:**

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| Title | Author | Approach |
| Analysis of the ground sample distance on large photogrammetric surveys | Beatriz Felipe David Hernandez José Luis Lerma | The approach used for estimating GSD involves image processing techniques. Specifically, the authors likely employed algorithms to analyze the UAV-based photogrammetric survey images to automatically estimate the Ground Sample Distance. This likely involved identifying reference points or features in the images and then calculating the corresponding distance on the ground to determine the GSD. |
| Accuracy and Resolution of Kinect Depth Data for Indoor Mapping Applications | Khoshelham, K., & Elberink, S. O. | This paper does not directly focus on Ground Sample Distance (GSD) estimation, as it primarily evaluates the accuracy and resolution of depth data obtained from Kinect sensors for indoor mapping applications. However, if we were to relate this to GSD, it might indirectly touch upon it in the sense that the accuracy and resolution of depth data can influence the quality of mapping and thus the GSD indirectly. |

Weekly Progress:

Our literature review on Ground Sampling Distance (GSD) calculation using machine learning revealed several key findings. Firstly, various approaches, including regression models and deep learning algorithms, have been proposed for GSD estimation. Secondly, the choice of input features such as sensor characteristics, environmental factors, and terrain information significantly impacts model performance. Additionally, the availability of labeled training data and the selection of appropriate evaluation metrics are crucial for model validation. Overall, integrating machine learning techniques shows promise in accurately estimating GSD, with further research needed for optimization and validation across diverse datasets and environments. As we continue, we'll use this knowledge to guide us in doing the project.