DepthArt: From Snapshot to Landscape

Problem Selection and Justification:
We have chosen the problem of image matching for the final project, where we will be reconstructing 3D images from a set of regular 2D images. This challenge intrigues us due to its practical applications in various domains such as augmented reality, 3D reconstruction, and navigation systems. Image matching is a cornerstone for understanding and interpreting the world visually through machines, making it an essential task in computer vision.

Dataset:
The dataset consists of a large collection of images designed for benchmarking image matching techniques. It is sufficiently large and diverse, containing images from different locations, under varying conditions, which makes it ideal for training deep learning networks to perform image matching tasks effectively.

Deep Network and Customization:
We plan to utilize a Convolutional Neural Network (CNN) architecture, specifically focusing on Siamese networks for this task. Siamese networks are particularly well-suited for image comparison tasks, as they can learn to differentiate between similar and dissimilar images. Given the uniqueness of the challenge, we anticipate customizing the network architecture to enhance its ability to recognize and match images under diverse conditions.

Framework:
The implementation will be carried out using Tensorflow/PyTorch. Tensorflow/PyTorch offers extensive libraries and tools for deep learning, and its dynamic computation graph facilitates rapid experimentation and modifications, which is crucial for this project's iterative development process.

Reference Materials:
To obtain a solid background in applying deep learning to image matching, We will consult a range of materials including academic research papers, PyTorch documentation, and tutorials specific to Siamese networks and CNNs. Key resources will include recent publications on image matching and feature extraction techniques in computer vision.

Performance Metrics:
The network's performance will be judged based on Mean Average Accuracy (mAA).

Schedule:

March 25th - April 1st : Problem selection
April 2nd - April 10th : Understanding the nuances, Research Ideas, reading of papers and different ways of implementation
April 11th - April 21st : Code Implementation
April 22nd - April 26th : Streamlit and finalizing