COMP 360B Introduction to AI

**Project Proposal: Image Deblurring**

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**Project Description:** Our project aims to explore and implement deep learning techniques for image deblurring. Image deblurring is a crucial task in computer vision, with applications ranging from enhancing photographs to improving the quality of medical or **forensic** imaging. We intend to leverage modern deep learning architectures, particularly convolutional neural networks (CNNs), to develop an efficient and effective solution for deblurring blurred images.

**Approach:**

1. **Literature Review**: We will conduct a thorough review of existing literature and research papers on image deblurring methods, focusing on recent advancements in deep learning-based approaches.
2. **Dataset Selection**: We will identify and gather a suitable dataset of blurred images along with their corresponding clear versions. The dataset will be diverse, encompassing various types of blurs, including motion blur, out-of-focus blur, and Gaussian blur.
3. **Model Architecture**: Based on our literature review, we will select or design a suitable deep learning architecture for image deblurring. We may explore architectures such as convolutional neural networks (CNNs), generative adversarial networks (GANs), or encoder-decoder networks.
4. **Implementation**: We will implement the chosen model architecture using deep learning frameworks such as TensorFlow or PyTorch. The implementation will include data preprocessing, model training, and evaluation.
5. **Evaluation Metrics**: We will evaluate the performance of our model using standard image quality metrics such as peak signal-to-noise ratio (PSNR), structural similarity index (SSI), and mean squared error (MSE).
6. **Experimentation and Analysis**: We will conduct experiments to assess the effectiveness of our approach on deblurring various types of images. We will analyze the results to identify strengths, weaknesses, and potential areas for improvement.

**Expected Outcome:** By the end of the project, we aim to have a well-trained deep learning model capable of effectively deblurring blurred images. We anticipate achieving competitive results compared to existing state-of-the-art methods in image deblurring.