Subject: Phase 1 - Talluri: Denoising Diffusion Probabilistic Models for Image Inpainting
Phase 1 Project Selection Status Report
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CRSID: pt442
Director of Studies: Dr. Amanda Prorok

1. Please write 100 words on your current project ideas.

Denoising Diffusion Probabilistic Models (DDPMs) are a class of latent variable models that have been shown to deliver state-of-the-art results for generative applications compared to GANs, VAEs and normalising flows. A 2022 paper also introduces a framework for conditional image synthesis using DDPMs. One of its applications is image inpainting, in which a model realistically fills in masked regions of an image.

In my project, I would like to implement unconditional DDPMs and then the framework described in recent literature for conditional synthesis. Finally, I would like to create an application that combines semantic segmentation and DDPMs for image inpainting.

2. Please list names of potential project supervisors, indicating any interactions you have had with them, for example: not contacted, awaiting reply, in discussion, agreed to supervise.

Param Hanji - Agreed to Supervise

3. Is there any chance that your project will involve any computing resources other than the Computing Service's MCS and software that is already installed there, for example: your own machine, machines in College, special peripherals, imported software packages, special hardware, network access, substantial extra disc space on the MCS. If so indicate below what, and what it is needed for.

Yes. In the course of my project, I will use my personal laptop to create implementations and applications. I may also use require usage of the university's computing cluster for training models. Specifically, I will apply for usage of CSD3.