

Priority List:

1. Blyncsy - Deep Learning-Driven 3D Reconstruction, Data Synthesis, and Size

Estimation for Road Signs: This his project fits my skillset very well, while still providing room to grow. As a Mechanical Engineer, I have extensive experience with CAD design and am very familiar with 3D modeling software. I have also previously developed optical character recognition deep learning models. As my research is often limited by data, I am particularly interested in the ability to develop artificial data which will then be used to train models.

Strategy: General strategy will be to use 'bpy', a blender python module, or other equivalent method, to create various sizes of signs. This dataset will then be combined with real images to train a size estimation model. Models will include text, which will be extracted from sign images with a separate model. Both size estimation and sign text will be available to the user through a custom tool which allows for image input and sign information output.

2. PhotoNode - Intelligent Simple Object Detection and Anonymous Privacy Protection

Feature for unclassified images/photographs loaded to a project and gallery: I have significant experience with two-dimensional image data. As previously mentioned, I have experience with character recognition and extraction from image data. Additionally, my research focuses on both classical image processing and deep learning approaches. Again, I am interested in the possibility of developing expertise in artificial data generation.

Strategy: The general strategy is well outlined in the project statement. Initially, artificial data will be generated. Examples of badges and event credentials will be used to create an artificial dataset. This seems simple enough that a traditional approach of image generation may be adequate. Following generation of artificial data, a pre-trained model will be altered to detect credentials (using the generated labeled data). This will be combined with a newly created model to decide if credentials should be blurred.

3. Blyncsy - Deep Learning for Estimating Lane Line Quality Using Retroreflectometer

Ground Truth: My past work experience focused heavily on sensor readings and experimental design. As such, I feel comfortable designing and completing the data collection portion of this project. My experience with image processing and deep learning focused on images will be helpful as well. This project is interesting because of the wide range in variables and conditions that may influence lane reflectivity as captured from images.

Strategy: Initially, data will be collected using a retroreflectometer and a standard dash-camera. Images will be labeled with retroreflectometer data for subsequent model training. Part of this process will involve testing different cameras to understand their impact on the ability to capture lane line quality. Final tools will be developed which allow for image inputs from dash-cameras and output lane line quality and reflective status.