Project Proposal

Contents of proposal

1. Context (What)

Data science has experienced tremendous growth in the past few years. One area that has received significant attention is computer vision. Computer vision is about how computers can make sense of pictures and videos to extract a high-level understanding.

Computer vision's recent growth has been compounded by the interest in drones, robots and self-driving cars cars. Computer vision has also made great progress due to the help of neural networks and deep learning.

The growth has not been limited to these frontier applications of technology, but is also being used in existing industries. One such application is in the movie industry where Computer Generated Imagery (CGI) are added post production to a scene that is filmed against a green screen. In order to do this, the green background must be removed and replaced with the movie's graphics.

2. Goal (Why)

This process of identifying the foreground and background components of an image is known as Image Matting. The goal of the project is to develop a tool that can effectively separate background and foreground components in images.

By using AI to automatically remove backgrounds from images in the wild (i.e. not against the green screen), this could potentially eliminate the need for green screen sets. This technology also has applications in the AR/VR sphere.

3. Data & Sources (From Where & When)

Alpha matting dataset is a valuable resource for image matting as generating ground truth for matting is difficult. However, the dataset is small and contains only 27 training images and 8 test images. Furthermore, most of these images are objects in front of an image on a monitor. The limitations of quantity and the context in which the images were created are real constraints.

4. Approach (How)

This exercise explore a range of computer vision techniques.

i. Image acquisition
ii. Pre-processing (e.g. noise reduction, contrast enhancement, scale space)
iii. Feature extraction
iv. Detection / segmentation
v. High-level processing

vi. Decision making

5. *Tech & packages (How)*

Language: Python
Packages: TBD

6. *Deliverables*

- code (GIT)
- Slide deck
- Report

7. *Personal learning objectives*

- Explore methods used in an computer vision problem