

Reflection Report for Assignment 2 (Features Tracking for Web-based AR Application)

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In this group assignment, we focus on developing a web-based app that converts coloured images to features-based markers using CV technology, overlaying 3D objects onto them.

Reflection

We are creating a web page for generating feature-based markers by using JavaScript libraries like OpenCV.js, tracking.js and converter.js libraries. We want to let users upload images, convert them to grayscale, and detect features interactively. While we were doing this assignment, the first challenge that we met was how to extract the features of the picture and had difficulty integrating the ability to upload images for feature extraction. Therefore, we find some ideas from online resources. We utilize the tacking.js and converter.js libraries for tracking the features of the image and generating the grayscale image. Finally, we solve this problem and produce a web that can generate grayscale images. Then, we use opencv.js with the help of converter.js to detect the features of our grayscale images. Besides, we have implemented the sliders to allow the users to adjust the value of the threshold. We use the FAST (Features from Accelerated Segment Test) algorithm, which is a corner detection algorithm commonly used in computer vision tasks. While increasing the threshold leads to fewer but more pronounced feature points being detected, then decreasing the threshold results in more but potentially less prominent feature points being detected. We also have designed the buttons for users to download the grayscale and feature-based images. Lastly, we use CSS to enhance the appearance of our HTML page.

We conducted research on marker-based augmented reality (AR) using various online resources. Initially, we utilized NFT (Natural Feature Tracking) creators to convert our colored images to NFT, integrating an AR.js extension tailored for marker-based AR experiences. Additionally, we integrated the A-frame library to build 3D scenes in a web browser. We utilize the raw.githack as a content delivery network (CDN) to link source code on GitHub to generate URLs for our NFT and Gltf format models for development. This Gltf format model is our 3D model with texture that used to overlay on the top of our marker image. We then created a camera entity to enable webcam access on our website. After completing these steps, we successfully displayed the 3D model and overlaid the texture onto the feature-based marker (coloured image). We think what we have accomplished is wrong because the feature-based generator we made cannot be used to generate NFT. Due to our lack of understanding, the marker-based augmented reality is accomplished by using the online resources rather than using our feature-based generator.

Demo reel - <https://youtu.be/OcZy-dlwE-A>

