**Group Name**

**Pavan Rocks, World Shocks**

**Group Members**

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**Project Title**

**Gesture Recognition and Background Manipulation in Live Camera.**

**Abstract / Overview**

This project is aims to crafting a real-time gesture-controlled system designed to seamlessly alter backgrounds (Background can be static image or a short video which runs in a loop) in both live video streams and static images. Focused on delivering an interactive and personalized experience, the application incorporates the utilization and customization of existing gesture recognition models. The project involves generating specific datasets for training and harnessing Convolutional Neural Network (CNN) layers to classify gestures accurately.

Prior to execution, a meticulous mapping process establishes the correlation between gestures and predefined backgrounds. The live camera feed or static image undergoes real-time gesture interpretation, triggering the selection of the corresponding background. The integration process employs image segmentation techniques to ensure a fluid and visually appealing transition, maintaining the integrity of the static image or live video. Through this approach, the project aims to enhance user engagement, offering a novel and immersive experience in dynamic background manipulation.

**Learning Objectives**

In this course project, our focus will be on acquiring a deep understanding of existing hand recognition models and their functionality. We will actively engage in the creation of a specialized dataset tailored for training the chosen model. Leveraging established Convolutional Neural Networks (CNN), we will delve into the intricacies of training the model using the meticulously crafted datasets. Subsequently, the acquired knowledge will be applied to implement segmentation techniques on static images and live video streams using the model's output. This multifaceted approach aims to provide participants with hands-on experience in the complete workflow—from model training to practical application in segmentation—enhancing their proficiency in the domain of hand recognition and image processing.

**Discussion of ethics**

The real-time gesture-controlled system project prioritizes ethical practices in various aspects. Capturing live video requires meticulous attention to user privacy and consent, adhering to legal regulations. Ethical data collection for training gesture recognition models is crucial to prevent biases and ensure diversity.

The integration of Convolutional Neural Networks (CNN) necessitates transparency and accountability, with measures in place to identify and address potential biases in the training data. Ethical concerns extend to background selection in live video streams, emphasizing the need for respectful, non-offensive choices. By prioritizing ethics, the project aims to build trust, accountability, and a socially responsible approach to technology implementation, respecting individuals' privacy and dignity.

**Reach Goal.**

The objective is to create a system for manipulating backgrounds through gesture control, employing computer vision and machine learning techniques.

**Minimum Goal.**

To employ a system which recognizes at least 2 Gestures and manipulating the background on a static image.

**Milestones and internal deadlines.**

**Milestone 1 -** Understand Hand Gesture recognition models and generating datasets.

**Milestone 2 -** Training the CNN classifier and mapping the outputs to the background.

**Milestone 3 -** Applying segmentation to embed backgrounds (Static image/recorded videos) and Quality Assurance.

**Organization of the team**

Everyone **-** Project Idea Brainstorming, Documentation and Code quality.

Ramprasad Kokkula -Understanding existing hand gesture models and generating specific datasets.

Person 2 - Training the CNN classifier.

Person 3 - Mapping the CNN classifier output to the Backgrounds.

Ramprasad Kokkula - Implementation of segmentation on the static image / live video