PROJECT CHARTER

GENERAL PROJECT INFORMATION

PROJECT NAME	COURSE PROFESSOR	PROJECT PI/SPONSOR
Hand Gesture Tracking in Videos	Jeongkyu Lee	Mohammad Toutiaee

STUDENT	EMAIL	Expertise
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PROJECT OVERVIEW

PROBLEM OR ISSUE	Hand gesture recognition is a crucial aspect of human-computer interaction, but accurately identifying subtle hand movements in videos remains a challenging problem. This project aims to develop an AI model capable of recognizing hand positions and predicting hand movements based on video data. The focus is on the game *"Guess Which Hand,"* where an object is hidden in one hand, and another player guesses its location.
PURPOSE OF PROJECT	The purpose of this project is to train a deep learning model for hand posture and movement recognition. The model will analyze video data to predict which hand contains the hidden object. The research will explore pose estimation techniques, feature extraction, and deep learning frameworks to improve gesture tracking accuracy.
BUSINESS CASE	Hand gesture tracking has applications in various domains, including gaming, augmented reality, healthcare, and robotics. Developing an accurate model can enhance AI-driven gesture recognition for interactive applications and human-computer interaction technologies.

GOALS / METHODS / METRICS	**Goals:** Develop a labeled dataset of hand movements in videos. Train a deep learning model for gesture recognition using frameworks like TensorFlow or PyTorch. Achieve high prediction accuracy for hand movement detection in different scenarios. **Methods:** Dataset preprocessing, including annotation and augmentation. Model training using deep learning techniques (YOLO, HRNet, OpenPose). Iterative model validation and optimization. **Metrics:** Accuracy of hand detection and object localization. Model precision and recall in gesture classification. Robustness of recognition across different lighting conditions and hand orientations.
EXPECTED DELIVERABLES	Labeled dataset with annotated hand positions. Trained deep learning model for gesture recognition. Research documentation and performance analysis. Demonstration video showcasing model predictions.

PROJECT SCOPE

WITHIN SCOPE	Collection and annotation of hand gesture video data. Model training, testing, and optimization. Evaluation of different pose estimation models for hand tracking.
OUTSIDE OF SCOPE	Real-time implementation in gaming or AR/VR applications. Hardware-based solutions (e.g., wearable sensors for tracking).

TENTATIVE SCHEDULE

KEY MILESTONE	START	FINISH
Preliminary Review / Scope	02/03/2025	02/09/2025
Finalize Project Plan / Charter / Kick Off	02/10/2025	02/16/2025
Define Phase	02/17/2025	02/23/2025
Measurement Phase	02/24/2025	03/02/2025
Analysis Phase	03/03/2025	03/09/2025
Improvement Phase	03/10/2025	03/16/2025
Control Phase	03/17/2025	03/23/2025
Project Summary Report and Close Out	03/24/2025	03/30/2025

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3. **Sun, K., Xiao, B., Liu, D., & Wang, J. (2019). Deep High-Resolution Representation Learning for Human Pose Estimation.**
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