St. Thomas College of Engineering & Technology
Vellilode, Sivapuram P.O., Mattanur, Kannur District, Kerala
Approved by AICTE New Delhi, Govt. of Kerala and Affiliated to APJ Abdul Kalam Technological University

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSD415 : PROJECT PHASE I

GROUP NUMBER: 06

GROUP MEMBERS:

1. ABHISHEK UK (STM21CS006)
2. ALBIN BINU (STM21CS015)
3. AYISHA ZOOMI (STM21CS022)
4. NASLA SAFIYA K (STM21CS045)

GUIDE:

Dr. SHINU MATHEW JOHN

PROPOSAL 1

Ergonomic Virtual Keyboard

ABSTRACT

In this project, we propose the development of an innovative virtual keyboard leveraging computer vision and advanced machine learning techniques. Unlike traditional physical or on-screen keyboards that rely on single-hand gestures and limited finger interaction, our virtual keyboard uses a camera or sensors to capture both hands and all fingers' movements, translating them into text input seamlessly. By detecting both hands and tracking the fingertips trajectories and patterns, the system predicts intended keystrokes with high precision, users interact with this virtual keyboard by mimicking typing motions.

This approach allows for a smooth and intuitive typing experience, akin to touch typing on physical keyboards. The virtual keyboard can be utilized across various device sizes, from small smartwatch to large desktop screens, and operates effectively in diverse environments, including zero-gravity conditions in space. Our project aims to revolutionize the way users interact with digital devices by offering a versatile, space-efficient, and ergonomic typing solution.

EXPECTED INPUT

Users interact with this virtual keyboard by mimicking typing motions.

EXPECTED OUTPUT:

By detecting both hands and tracking the fingertips trajectories and patterns, the system predicts intended keystrokes with high precision.

PROPOSAL 2

Adaptive Driver Assistance in Foggy Conditions

ABSTRACT

Determining the rigid-body transformation between a LiDAR and a monocular camera is crucial for accurate sensor fusion in autonomous systems. Small errors in rotation or translation can cause significant reprojection errors, such as 20 cm at 5 m, when aligning LiDAR and camera images. The challenges include the sparsity of LiDAR point clouds and systematic distance measurement errors. This paper presents three solutions: using targets with known dimensions to improve pose estimation, a fitting method for the LiDAR-to-camera transformation that avoids complex edge extraction, and a cross-validation approach by projecting LiDAR vertices onto camera image corners. These methods achieve a 50% reduction in projection error and a 70% reduction in variance. Additionally, the system incorporates a camera for real-time object detection within the screen's frame and a radar for object recognition in foggy conditions, enhancing detection and safety in low-visibility environments. The camera remains stationary during the process.

EXPECTED INPUT:

Road image, LiDAR LAS file

EXPECTED OUTPUT:

Way displayed on the screen.

PROPOSAL 3

Story Creator with Connected Images

ABSTRACT

Visual storytelling is a complex AI challenge that involves interpreting a sequence of images to generate a coherent narrative, which extends beyond basic image captioning by requiring coherence, continuity, and creativity. In this paper, we propose a method based on an encoder-decoder architecture to produce narratives from image sequences, utilizing both the images and their descriptions to ensure cohesive storytelling. Our model achieves highly competitive results compared to existing systems.

EXPECTED INPUT:

Sequence of images

EXPECTED OUTPUT:

Generated Story based on the images