SMART INDIA HACKATHON 2023

Ministry/Organization Name/Student Innovation:
Ministry of Defence

PS Code: ***SIH1419***

Problem Statement Title:
Robust human target detection and acquisition

Team Name: ***FUZION 2.0***

Team Leader Name: ***Dhruba Jyoti Das***

Institute Code (AISHE): ***U-0052***

Institute Name: ***Gauhati University Institute of Science and Technology***

Theme Name: ***Miscellaneous***

Our Solution:

Robust Tracking:

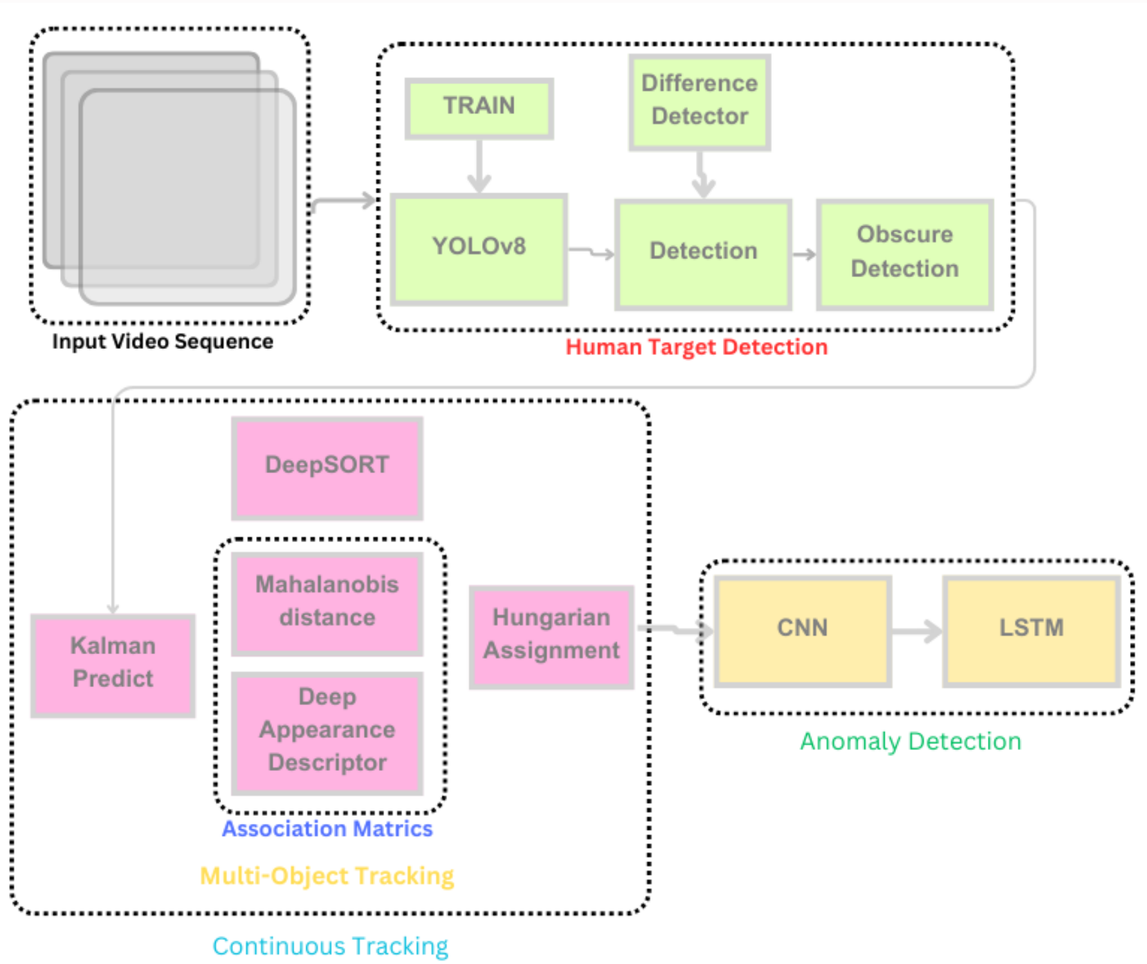
Our system employs cutting-edge technology to maintain continuous tracking of humans in challenging outdoor scenarios, even when they are partially obscured by obstacles or under adverse lighting conditions.

Advanced Algorithms:

To ensure robust tracking, we leverage a combination of state-of-the-art object detection (Employ YOLOv8 to detect and identify human targets.) and tracking algorithms (Implement DeepSORT to maintain continuous tracking even under occlusions.), delivering uninterrupted monitoring once a human target is acquired.

Anomaly Detection and Alerts:

In addition to tracking, our system integrates advanced anomaly detection capabilities (Utilize CNNs with LSTM units to recognize unusual human behaviors.). It identifies unusual human behaviors such as jumping, crawling, or running, and triggers immediate visual alarms to notify operators of potential security breaches or emergencies.



Technology Stack:

YOLO DeepSORT PyTorch django

CNN-LSTM

Use Cases & Dependencies

Use Cases:

Outdoor Security:
Surveillance of outdoor areas such as parks, construction sites, and perimeter security of critical infrastructure.

Wildlife Monitoring:
Tracking and monitoring wildlife behavior in their natural habitats.

Search and Rescue:
Assisting in locating and tracking missing persons in wilderness areas.

Military Applications:
Supporting military operations with improved situational awareness, tracking soldiers during training exercises or in the field, and detecting potential threats.

Autonomous Vehicles:
Enhancing the safety of self-driving cars by detecting pedestrians and ensuring continuous tracking, especially in complex urban environments.

Dependencies:

Quality of Cameras:
The effectiveness of the system depends on the quality and positioning of surveillance cameras. Low-resolution or poorly positioned cameras can hinder accurate detection and tracking.

Hardware Requirements:
Real-time processing and tracking demand powerful GPUs and sufficient computational resources.

Environmental Factors:
Weather conditions (e.g., heavy rain, fog) and lighting can affect the system's performance, and mechanisms to handle such variations need to be considered.

Training Data:
The accuracy of object detection and anomaly detection models heavily relies on a diverse and representative dataset for training.

Meet Our Team

Team Leader : Dhruba Jyoti Das
Branch: BTech Stream: ECE Year: IV

Team Member 1: Anushuya Ghatak
Branch: BTech Stream: BET Year: IV

Team Member 2: Tonuj Pritam Deka
Branch: BTech Stream: ECE Year: IV

Team Memeber 3: Subarna Saikia
Branch: BTech Stream: CSE Year: II

Team Member 4: Anubhav Dey
Branch: BTech Stream: ECE Year: IV

Team Member 5: Gautam Hazarika
Branch: BTech Stream: CSE Year: II