

Year 10 -Project Update

► Project 10a.002.TAU-WP3 - Early Anomaly Early Anomaly Recognition System

Project Team

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Project Goals & Novelty of Approach

- ▶ Natural catastrophes and outbreaks, such as COVID-19, impose restrictions on citizens movement and daily life. Such restrictions are maintained by governmental bodies and agencies using CCTV cameras, monitored by operators, and by on site personnel. However, these conventional monitoring techniques are very labor intensive and suffer from subjective interpretations and human error due to fatigue.
- ▶ This project aims to provide a real-time early anomaly recognition system based on advanced Computer Vision and Deep Learning algorithms that can be implemented on top of a wide CCTV infrastructure and monitoring grid.
- ▶ The proposed system aims to detect and identify curfew infractions, social distancing violations, illegal gatherings, and general threats such as fire, smoke, unattended objects in public places, and abnormal behaviors.
- ▶ The application domains of this project include both surveillance and empathic buildings development.

Benefits to IAB

- ▶ The recent COVID-19 outbreak imposes immediate needs for such a comprehensive surveillance and tracking system for indoors and outdoors.
- ▶ The application domains include both surveillance and empathic buildings development.
- ▶ This is beneficial for any CVDI company who wishes to be among the pioneers of this next generation monitoring systems and empathic building.

Project Accomplishments

- Use advanced computer vision and deep learning algorithms to identify people in videos, compute their inter-personal distances, track their position in time, estimate their number, and to detect various anomalies.
- Detection of people, computing their inter-personal distances, and estimating the camera parameters will be performed using state-of-the-art object detectors, human pose estimators, and calibration techniques.

Publication

- Mohammad Al-Sad, Serkan Kiranyaz, Iftikhar Ahmad, Christian Sundell, Matti Vakkuri and Moncef Gabbouj, “Social distance estimation and crowd monitoring in surveillance systems,” future generation computer systems, submitted (Nov 2021).

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- Publication: Mohammad Al-Sad, Tuomas Jalonen and Moncef Gabbouj, “Social distance estimation and crowd monitoring in surveillance systems,” future generation computer systems, submitted (Nov 2021).

Future work will focus on

- Real-time tracking methods will be employed to monitor crowd behaviors and interactions through time.
- We will explore techniques that can learn, from the spatio-temporal data, to classify the crowd activity into a set of limited yet informative classes e.g. sparse, moving, dense, and disruptive
- Multi-view and sensor fusion methods will be used to merge the detections from different cameras in a building to yield a comprehensive early anomaly recognition

Next Steps/Deliverables & Timeline

Next Steps/Deliverables	Start Date	Completion Date
Identifying and collecting suitable datasets	Sept 2021	Jan. 2022
Proof of concept of the early warning system	Jan 2022	May 2022
System integration, verification and publication of the results.	June 2022	Sept 2022

Questions?