

KVH-009

ADVANCED CCTV ANALYTICS SOLUTION



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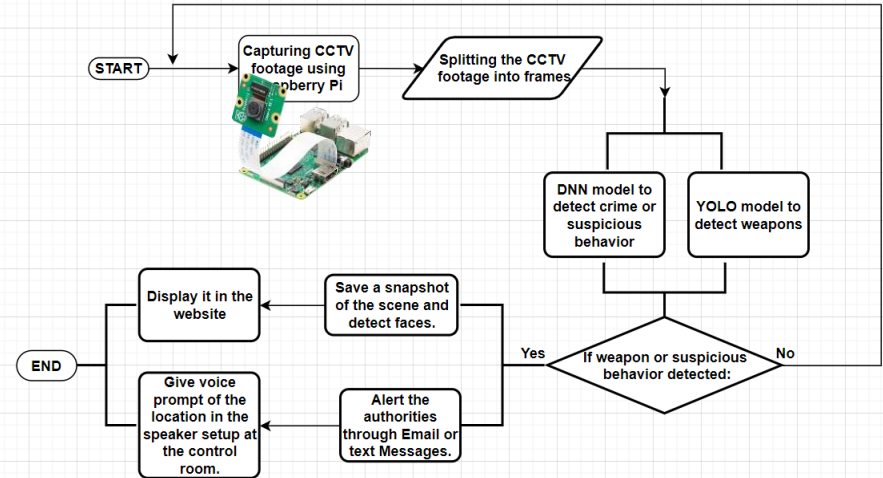
IDEA/APPROACH DETAILS

Description of idea/solution

- **Collecting CCTV footage:** The first step is to gather footage from CCTV cameras that are installed at various locations throughout the city or the area of interest.
- **Analyzing the footage:** The collected footage needs to be analyzed for any criminal activity or suspicious behavior.
- **Developing algorithms:** For the task of identifying any such behavior, 2 algorithms were developed. One aims to detect weapons and another for criminal activities.
- **Implementing the solution:** The snapshot of the detected scene along with the face of the culprit is saved and displayed in the website.
- **Alerting the authorities:** following the detection of any malpractice, an Email or WhatsApp/Telegram message will be sent to the authorities with the location of where the felony occurred. They will also receive a voice prompt at the station for the same.

TECH STACK

❖ PYTHON	❖ LOGIC OF THE SOLUTION IS IMPLEMENTED IN PYTHON
❖ TENSORFLOW	❖ THE DEEP LEARNING MODEL FOR DETECTING CRIME OR SUSPICIOUS ACTIVITIES
❖ YOLOv8	❖ DETECTING WEAPONS USING OBJECT DETCTION
❖ DJANGO	❖ BACKEND OF THE WEBSITE
❖ HTML/CSS	❖ FRONT END OF THE WEBSITE
❖ FIREBASE	❖ DATABASE
❖ OpenCV	❖ Detecting faces and taking input
❖ RASPBERRY PI , UV4L	❖ STREAMING VIDEO



IDEA/APPROACH DETAILS

Use case

- In the scenario of a bank robbery, the CCTV will detect the crime immediately and highlight any weapons wielded using the Deep Learning and Computer Vision models.
- Snapshots from the crime scene along with the felons' faces are stored in the database.
- The web application will reflect all the details of the crime scene like the location, date and time for reference.
- Parallely a voice prompt is generated in the control room about the location of the crime so that action can be taken without any delay.
- This data will help the police department apprehend the criminals as well as get analyzed CCTV footage evidence for the same.

In the case of street theft or mugging, the lighting conditions are very poor for the detection of criminal activities. Hence, such an algorithm will highlight any indecent/unlawful events and trigger the same chain of protocols as mentioned above to aid the police department.

Dependencies/Show Stopper

- The model accuracy is highly dependent on the size of the dataset and the quality of the images.
- The system requires continuous network connection for real-time streaming and analysis of the videos and displaying the output in the website.
- Continuous power supply is required for the CCTV and the Speaker.
- Felon faces may not be detected if they are wearing masks.

Future Scope

- The dataset containing real crime - scene footages can be updated and the model accuracy can be improved.
- A face recognition model trained on the dataset from the criminal database maintained by the police department will give more information about the crime scene.
- VPN tunneling can be implemented to improve the security of the streaming and data transfer.

TEAM MEMBER DETAILS

Sr. No.	Name of Team Member	Branch	Stream	Year	Position In Team
1	Giridhar S	B-Tech	Computer Science Specialization In AI and Robotics	2020	Team Leader
2	Mansi Dhanania	B-Tech	Electronics and Communication	2020	ML/DL Developer
3	Nithin K Shine	B-Tech	Electronics and Computer	2020	Hardware Engineer
4	Navaneeth Amarnath	B-Tech	Computer Science Specialization In AI and Robotics	2020	Back-End Developer
5	Christin T Kunjumon	B-Tech	Computer Science Specialization In AI and Robotics	2020	ML/DL Developer
6	Rohit Krishnan	B-Tech	Computer Science Specialization In Cyber Physical Systems	2020	Front End Developer

TEAM MENTOR DETAILS

Sr. No.	Name of Mentor	Category	Expertise	Domain Experience
1	Dr. Harini S	Academic	Distributed Architecture and Parallel Systems – AI/ML	13 Years
2	Dr. Saleena B	Academic	Data Mining, Machine Learning and Semantic Web	15 Years