Detect Anomalous Activities in an Apparel Manufacturing Plant

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DECLARATION

This dissertation has never been used to obtain a degree or diploma from a higher education institution. To the best of my knowledge and conviction, the thesis contains no previously published or written by another author, except as noted.

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ABSTRACT

Suspicious activity detection is one of the most rapidly developing areas of Computer Vision and Artificial Intelligence. Computer vision is used extensively in abnormal detection and monitoring to solve a variety of problems. Because of the growing demand for the protection of personal safety, security, and property, the need for and deployment of video surveillance systems capable of recognizing and interpreting scene and anomaly events is critical in intelligence monitoring. Because, as we all know, prevention is preferable to cure, preventing a crime before it occurs is preferable to investigating what or how the crime occurred. In the same way that vaccinations are given to people to prevent disease, it has become necessary in today's world with a much higher rate of crime to have a Crime detection technique that prevents crime happenings.

Security surveillance is a critical requirement in many places, including airports, train stations, shopping malls, and public places, where detecting suspicious and abnormal behavior has a significant impact on ensuring security. Despite the availability of CCTV (closed-circuit television) cameras in many locations, CCTV footage is used as an investigation tool to identify suspects. These Detection techniques can be used by police officers to detect crimes before they occur, allowing them to be prevented.

This is accomplished by turning a video into frames and then evaluating the activity of individuals within those frames. Human detection has long been a difficult challenge due to the non-rigid nature of human bodies, which alter shape at will. Human recognition and detection in both the interior and outdoor environments is a difficult task due to a variety of issues such as inadequate illumination, variations instances, and so on.

This study introduces a new approach to detecting human behaviors based on context and situation. We devised a three-stage procedure for analyzing abnormal situations and detecting suspicious behavior. We introduced methods for human detection with associated context objects in the first stage. To identify normal situations, the identified human objects were mapped with context information. Stage two created a model for recognizing human actions, which includes both normal and abnormal actions. In stage three, we developed a conventional model, to represent the normal situation of a given context. We combined the identified human actions with their context and compare them

with the conventional model. Deviation from the conventional model is used to recognize the abnormal actions along with their underlying situations.

To build our system, we used an unsupervised approach. We used publicly available datasets for the evaluation, and our abnormal situation detection approach performed better. When compared to the baseline systems, the results of the unsupervised approach are encouraging. This system will be useful for detecting abnormal and suspicious human behaviors in real-time, allowing people to be monitored.

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CCTV	-	Closed Circuit Television
CNN	-	Convolutional Neural Networks
RCNN	-	Region Convolutional Neural Networks
SVM	-	Support Vector Machines
ANN	-	Artificial Neural Network
ML	-	Machine Learning
DBN	-	Dynamic Bayesian Network
HMM	-	Hidden Markov Models
ROI	-	Regions of Interests
AMD	-	Advanced Motion Detection
YOLO	-	You Only Look Once
SIFT	-	Scale Invariant Feature Transform
CVPR	-	Computer Vision and Pattern Recognition
RPN	-	Region Proposal Network
PAL	-	Phase Alternating Line