Chapter 5
Social Perspective of Suspicious Activity Detection in Facial Analysis:
An ML-Based Approach for the Indian Perspective

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ABSTRACT

The world is witnessing an unprecedented growth of cyber-physical systems (CPS), which are foreseen to revolutionize our world via creating new services and applications in a variety of sectors such as environmental monitoring, mobile health systems, and intelligent transportation systems and so on. The information and communication technology (ICT) sector is experiencing significant growth in data traffic, driven by the widespread usage of smart phones, tablets, and video streaming, along with the significant growth of sensors deployments that are anticipated soon. This chapter describes suspicious activity detection using facial analysis. Suspicious activity is the actions of an individual or group that is outside the normally acceptable standards for those people or that particular area. In this chapter, the authors propose a novel and cost-effective framework designed for suspicious activity detection using facial expression analysis or emotion detection analysis in law enforcement. This chapter shows a face detection module that is intended to detect faces from a real-time video.

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INTRODUCTION

Suspicious Activity

The chapter describes initially the basics of initial crime status at world, face recognition and its tells and techniques, machine learning and data analytics, and its tool and techniques. For ease of audiences, it also gives a brief review of Data mining, Regression, AI, and CPS. In the next section of the literature review, the famous authors and the gist of their work on the content have been enlisted. Then in the application section, the latest classification techniques of support SVM, Dlib, CNN, and RNN has been introduced and their application on the data set is reflected. In the result section, the different emotions and objects have been recognized and their accuracy has been discussed. Then in the later part the recommendations, novelty, application, limitations have of the research work are explained followed by concluding remarks.

Face Recognition

The world is going through an extraordinary heightening of the CPS also known as cyber-physical systems, which are envisaged to transfigure our world by creating new software applications and services in a large variety of domains such as intelligent transportation systems, systems for monitoring the environment, and intelligent transportation systems and so on. The ICT sector also known as the information and communication technology sector is also going through an impact making growth in data traffic, which is driven by the high usage of tablets, smart cellphones, and video streaming along with the notable growth of deployment of sensors that are forecasted soon [Toygar et al., 2003; Viola et al., 2004].

Machine Learning

If the performance at tasks as measured by the performance measure (known as P) improves, then the agent is said to have to gain knowledge or learning from experience denoted by E for some set of tasks denoted by T. For example, Mailing System [Mitchell, 1997], Playing Checkers game.

There are different categories of machine learning:

1. Supervised machine learning teaches us about learning an input and output map (classification: categorical output, regression: continuous output)
2. Unsupervised machine learning teaches us about discovering patterns in the input dataset (clustering: cohesive grouping, --association: frequent co-occurrence)
3. Reinforcement machine learning – learning control

Data Analysis

This is the technique used for extracting useful, relevant, and meaningful information from the huge amount of data in a structured manner for fulfilling the purpose of Parameter estimation also known as inferring the unknowns, identification and classification of features, testing of Hypothesis, and detection of fault and Development and Prediction of Model also known as Forecasting.