MECHATRONICS BOOK SERIES

SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 2

Editors
Md. Raisuddin Khan
Md. Mozasser Rahman
Muhammad Mahbubur Rashid
Shahrul Na'im Sidek

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CHAPTER 21

PATH DETECTION IMPLEMENTATION USING FUZZY CLASSIFIER

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21.1 Introduction

Most surveillance systems today provide only a passive form of site monitoring. Extensive video records may be kept to help find the instigator of criminal activities after the crime has been committed but preventive measures usually require human involvement. In addition to this, there is a need for large amounts of data storage to keep up to several terabytes of video streams that may be needed for later analysis. For any sense of real-time monitoring, guards often need to be employed to watch video feeds for hours on end to recognize suspicious, dangerous or potentially harmful situations. In multi-camera scene monitoring systems, this becomes quite infeasible as there can be up to 20 to 50 cameras on average in a large complex such as an airport or Megamall. In this chapter, the Mamdani fuzzy path classifier has been coded in Visual Basic 6.0 and is designed to take partial tracking input from the previously discussed SwisTrack program. The implemented path classifier has been tested on 18 different scenarios extracted from video sequences at two different locations on the International Islamic University Malaysia, Gombak Campus. Different scenarios with varying levels of usual and suspicious behaviour were tested in order to check the robustness of the system. The fuzzy inference method was also compared to results from a normal Boolean logic calculation and from neural network classifier. Subjective testing was used as a closest approximate to the ground truth.

21.2 Output of tracker

Two different locations (Fig 21.1) at the IIUM Gombak campus were chosen to record video sequences of 2.5 hours length. Each video sequence contained approximately 2 hours of normal behaviour with the final 30 minutes recorded with intentionally suspicious behaviour of one individual. The second location was found to be more favourable and convenient for testing due to lighting, crowd behaviour and camera angle.