Tracking of multiple light-sources in a completely dark environment

Economy has grown rapidly nowadays; therefore, protection of entrepreneurs and houses has been more and more essential. It makes perfect sense that a smart security monitoring system has become the focus of development and research in the field of information technology during the past few years. At present, most of the monitoring systems are handled by manpower, which is inefficient. It is highly likely that operators overlook some certain thing. As a result, it is highly needed to have an automatic video monitoring system. On the other hand, crime rate is far higher at nighttimes than daytimes. It is certainly a difficult but crucial to monitor at nights. In this study, inexpensive webcams are used as equipment of video capture. Also, they are utilized to detect and track mobile light sources the light source intruders bring in the dark. By doing so, we can estimate the track of the light source holder. In the process of tracking multiple light sources, this research takes many factors into account, including multiple-light interference, effect of reflection of background objects, holders or shades of furniture. However, it mainly focuses on tracking multiple-mobile lights in the dark and on estimation of the track.

Keywords : intelligent video surveillance system, mobile light sources tracking, estimation of the track

Table of Contents

中文摘要 ...................................... iii 英文摘要 ....................................... iv 誌謝辭 .......................................... v 內容目錄 ....................................... vi 表目錄 ....................................... viii 圖目錄 ......................................... ix 第一章 緒論 ..................................... 1 第一節 研究背景與動機 ......................... 1 第二節 研究目的與方法 ......................... 2 第三節 研究限制 ............................... 6 第四節 論文架構 ............................... 6 第二章 文獻探討 ................................. 7 第一節 前景與背景分離 ......................... 7 第二節 移動物體追蹤 ........................... 9 第三章 前景物體偵測 ............................ 11 第一節 背景模型建立 .......................... 11 第二節 背景相減 .............................. 13 第三節 去除雜訊 .............................. 15 第四節 前景物體區域調整 ...................... 17 第四章 光源位置偵測 ............................ 20 第一節 光源種類分類 .......................... 20 第二節 打火機距離判定 ....................... 23 第三節 手電筒距離判定 ....................... 28 第五章 多重光源追蹤 ............................ 33 第一節 物體特徵抽取 .......................... 33 第二節 前景區域比對 .......................... 34 第三節 理想情況下光源追蹤 .................... 37 第四節 夜間光源追蹤常見問題 .................. 39 第五節 本研究所提之光源追蹤方法 .......... 45 第六節 移動軌跡合理性判斷 ................... 49 第七章 實驗結果與錯誤分析 ...................... 54 第一節 實驗結果 .............................. 54 第二節 錯誤分析 .............................. 56 第七章 結論 .................................... 60 參考文獻 ....................................... 61

REFERENCES


