A13-183

Visual Fighting

強視對覺

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作品摘要 Abstract

目前交警在指揮交通時，大多使用採用反光條的反光背心以及交通指揮棒來達到指揮行車與路人的目的。但在大雨中或光源不足時，會導致指揮手勢無法清楚地被看見，且易影響交通警察自身安全。因此，為了改善上述之人身安全問題，本專題以LED矩陣圖示狀態來告知駕駛人目前的行車狀況。由於欲增加駕駛人的注意力與手勢之辨識度，因此將LED矩陣由原本之靜態顯示改為動態顯示，透過不同之指揮手勢來產生相對應之動態圖形。舉例而言，如果目前指揮狀態為向右行駛，此時LED矩陣產生向右移動之箭頭。

In general, the most common equipments for a traffic police to direct traffic would be a reflective vest and a light baton. It is not easy to see when the visibility of environment is low that may result from lack of light, fog, or heavy rain. Therefore, position and hand gestures of traffic police could not be seen clearly, it would increase the risk of traffic accident for both the car drivers and the officer him/herself. In order to solve this problem, we came up with a solution through the mount the LED matrix on the vest and a motion sensor to detect the hand motion of traffic police. The LED matrix has the advantage to remind the driver from traditional static display into dynamic one, and hand motion sensor can detect the hand gesture of traffic police. Hence, the picture shows in the LED matrix would follow the change from police's hand gestures respectively. For example, if the police makes a "turn-right" gesture, the LED matrix would display a "turn-right" picture as well. As a consequence, we believe this could help drivers to pay attention easier than the reading the tradition hand gestures of the officer.
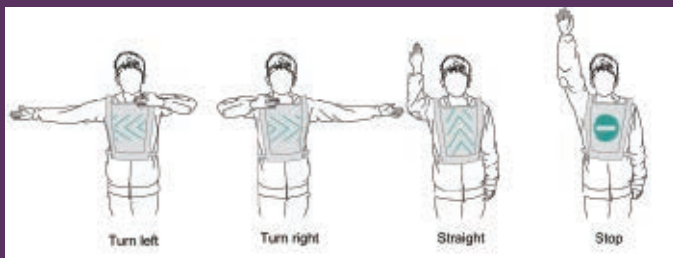
圖1 > 成果示意圖

在實作面，本專題使用emotion board之十軸感測器來取得目前手掌的加速度以及角加速度，透過演算法來分析目前的手勢動作，藉由不同之手勢產生其相對應之動態圖形，透過人對於動態圖形的反應優於靜態圖形的特性，使得機車騎士和汽車駕駛更直覺地瞭解當下路口的行車狀況，以達到加強指揮效果的目的。
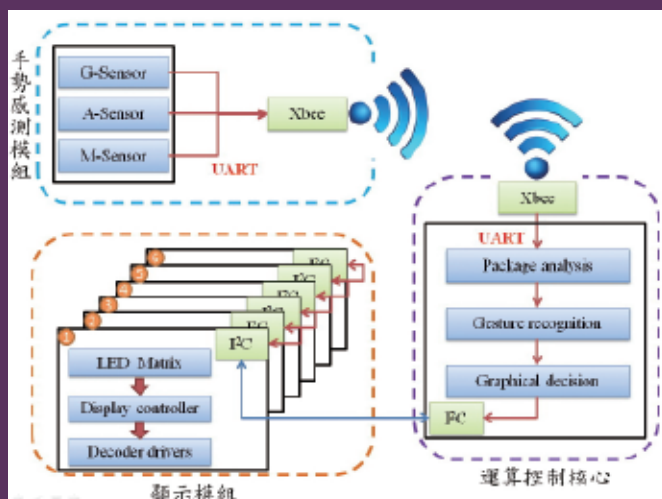
For implementation of this idea, several modules are used in this project which including motion detection module, processing kernel, display module, and wireless communication module. For motion detection module, a ten-axis motion board is used to detect the acceleration and the angular velocity of hand. Processing kernel receives the motion data from motion detection module wirelessly then input into the gesture detection algorithm to find out the corresponding gesture. After extract the hand gesture, the corresponding I/O setting for display module will transmit via I2C. As this result, the dynamics graph could be shown according to the police posture. Since the dynamics graph allows the drivers to realize faster and easier, this solution could accurately convey the instruction from the office and improve the overall result.

圖2 > 系統架構圖