



作品名稱	智慧型自主式車 Intelligent Autonomous Mobile Car
隊伍名稱	我是車 一號 IAM CARI
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### 作品摘要

本作品的中央系統分別為：

1. 筆電的作業系統 驅動webcam
2. Altera DE2 FPGA板子 驅動各個馬達元件

webcam是針對道路線與停車格的辨識，考量到現實環境中停車格四周有障礙物，因此在車子四周加上了距離感測器與影像做一個整合性的結合。因硬體性能的不足上，將重點著重於精準的演算法及電路的設計上，即便使用價格低廉的感測器，依舊達到高水準的效能展現。

此外，並透過手機的藍芽無線傳輸裝置對車子進行控制，可以分成幾段控制模式，例如「左右轉」、「前進後退」、「尋找停車格」、「自動駕駛」等行為模式。可讓駕駛人即使不在車上，依舊能夠下達命令給車子，並使其完成動作。

值得一提的是，智慧型自主式車具有自我學習的功能，包含防撞系統與人工智慧，能在各種情況下做出正確並最適合的判斷。在行駛學習方面，利用的是監督式類神經網路架構，達到自我學習並且可適當調整前輪的轉彎角度。

### Abstract

This pieces central processing system including:

1. Notebook operating system – image processing (webcam)
2. ALTERA DE2 board – to drive each motor component

Webcam is to the lane recognition and parking lot detection, for considering the realistic environment exist different kind of obstacle, we have adopted the ultrasonic sensors around the Mobile Car to integrate with webcam. Because on the deficiency of the performance of the hardware, will focus on the perfect design of the algorithm performance and circuit, even if use the low cost detecting device, still reach high-level efficiency to represent.

In addition, we can control the car through the Bluetooth transmitting device of the cell-phone, can divide to several control mode, for example: "left and right turning", "forward and backward", "parking lot searching", "auto-driving" etc. Even the driver not in the car, can still assign the command to the car, and make it finish movements.

What deserves to be mentioned is, the intelligent autonomous car has function of self- learning, include the anti-collision system and artificial intelligence, can make the correct and most suitable decision under various kinds of situations. For the drive-learning part, it utilizes supervised neural network structure to reach self-learning and adjusting the turning angle of front wheel properly.