

## A14-031

## Multiple Somatosensory Technology for Wireless Video Car

## 多模體感無線影像遙控車

## 隊伍名稱

模式任你選 / Take your pick mode

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## 作品摘要

由於3C產品之蓬勃發展，採用體感技術的產品越來越多，諸如遊戲機上盒Wii、體感Kinect遊戲與智慧型電視之體感滑鼠搖控器產品，這讓體感技術受到重視，相繼投入體感相關作品之開發，因此本作品突發奇想設計使用智慧型手機或平板電腦等裝置，以體感或觸控方式來控制藍芽車移動，並能回傳藍芽車行經路徑的影像回到智慧型手機或平板電腦，以提供操控者監看藍芽車移動路線之影像。本作品使用Keyfob、Android與iOS智慧型手機等3套裝置，以體感或觸控方式來操控藍芽車與回傳影音。為達到不同的操控效果，設計按鈕操控、體感直式操作、

汽車方向盤體感模式操作、觸控拖拉操作、走黑線與自走避障等6種不同藍芽車操控模式，並於藍芽車上架設業界體積最小的Wi-Fi Camera (Ai-Ball) 來實現影音回傳之效果。本作品以目前業界最新的藍芽4.0為基礎，在藍芽車上安裝藍芽4.0模組，另在遙控器端亦開發藍芽4.0模組，並加上G-Sensor來實現遙控器之體感功能，如下圖所示。

本作品的創意在於將6種操控模式整合在一個APP（市面上皆為單一功能），並在藍芽車上架設Wi-Fi Camera，讓在操控藍芽車移動時，亦能透過Wi-Fi Camera將藍芽車行經路徑之影像回傳到手機或電腦。未來亦考慮將影像與聲音同時整合至本作品，讓手機或平板電腦可同時接收到藍芽車行經路徑之影像與聲音，便可將藍芽車使用於探測與監控方面之應用。本作品設計之6種操控藍芽車模式中，所採用G-Sensor體感模式，亦可用於停車駕駛之功能，即走黑線功能可應用於工廠自動化；而避障模式可整合至其他應用模式中，諸如自動閃避障礙物與掃地機器人等方面之應用。

本作品的遙控端裝置可支援Keyfob、Android與iOS等3種裝置，並使用藍芽4.0做為與藍芽車的無線傳輸介面，而Android與iOS端亦支援Wi-Fi影像傳輸整合到APP上，讓Android與iOS等雙作業系統均可使用。本作品在整體實作可行性方面，依設計目標為而言為相當可行的技術，只要開發Keyfob韌體程式、APP程式、藍芽4.0傳輸技術與Wi-Fi影像擷取來加以整合即可，且目前已接洽廠商投入先期開發經費，希望有機會將本作品朝商品化發展。





## 指導教授

王炳聰 / 崑山科技大學電機工程系

曾任臺灣美國無線電公司（RCA）應用電子廠工程師、電信研究所基礎應用研究室助理研究員，於 1989 年進入崑山科技大學電機工程系擔任講師，1999 年起至今擔任崑山科技大學電機工程系暨研究所副教授。

## 研究領域

數位積體電路設計與應用、FPGA/CPLD 設計與應用、嵌入式系統設計與應用。

## Abstract

Due to the booming of 3C products, more and more products adopt the somatosensory technology, such as game consoles on the Wii box, games and somatosensory Kicnet mouse, somatosensory Smart TV's remote control product. The growing attention on somatosensory technology promotes the development of related somatosensory works. This work is designed to use your smartphone or tablet PC and other devices to control moving of the Bluetooth car by somatosensory or touching, and return the path via the Bluetooth car image back to your smartphone or tablet PC. Video of the Bluetooth car's moving route is provided to the manipulators for monitoring. This work uses three sets of devices, namely keyfob, Android and iOS smartphones to operate the Bluetooth car and provide video return in somatosensory or touching ways. To achieve different effects of operation, Portrait, Landscape, Driver, Touch, Go black line and Anti-Collision mode from six different Bluetooth car control modes are adopted. The erection industry's smallest car Wi-Fi Camera (Ai-Ball) is also used to achieve the effect of the video return. Based on the industry's latest Bluetooth 4.0, this work installs and develops the Bluetooth 4.0 module on Bluetooth car as well as at the other end of the remote control. G-Sensor is also added to achieve the body function sense of the remote control, as shown below.

The innovation of this work lies mainly in the integration of six kinds of control mode in an APP (Currently single function is available in the market.) and the installation of Bluetooth car erection Wi-Fi Camera, which allows passing image paths back to the phone or computer via Wi-Fi Camera during the operation of car moving. Simultaneous integration of images and sound will also be considered in the future, so that the phone or tablet can receive video and audio signals via Bluetooth dealers' paths. Bluetooth cars can then be used for the application of detection and monitoring. With the winning design of six kinds of operating Bluetooth car model and G-Sensor somatosensory mode, the driver can use it for parking purposes. Black lines function can be applied in factory automation; and obstacle avoidance mode can be integrated into other application modes, such

as the application of the automatic dodge obstacles and sweeping robot.

The remote client device of this work supports keyfob, Android and iOS, and uses Bluetooth 4.0 as a wireless transmission interface with the Bluetooth car. The Android and iOS client also supports Wi-Fi image transferring into the APP. Such design allows the use of both Android and iOS operating systems. According to the design goal, the implementation of this work is quite feasible in terms of technology as long as the Keyfob firmware program and APP program are developed, and Bluetooth 4.0 transmission technology is integrated with Wi-Fi capturing images. Recently we have approached manufacturers for early development funds. Hopefully this work can become a commercial product.



Fig.1 > Multimode somatosensory remote control schematic and video returns scenarios