

International Journal on Recent Researches In Science, Engineering & Technology

(Division of Computer Science and Engineering)

A Journal Established in early 2000 as National journal and upgraded to International journal in 2013 and is in existence for the last 10 years. It is run by Retired Professors from NIT, Trichy. It is an absolutely free (No processing charges, No publishing charges etc.) Journal Indexed in JIR, DIIF and SIIF.

Research Paper

Available online at: www.jrrset.com

Smart Bicycle Dashboard with Helmet Recognition Capability based on Embedded Vision Processing to ensure Compulsory

Wearing of Helmets by Riders

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Abstract

The project aim is to create a sensible, low power bicycle dashboard with advanced vision sensing element to search out whether the rider is wearing a helmet or not and permits start/stop the bike mechanism. Even riding the bicycle, the system continues the observance method, stops the ignition and sends alert messages to traffic authorities if the helmet isn't worn at any purpose of your time. Additionally alcohol sensing element is placed among the dashboard so as to stop intoxicated driving scenario. GPS and motion sensors assists the system identifies accident state of interaction and sends alert SMS to traffic authorities and members of the family. The dashboard unit contains a bluetooth transceiver that helps the system to speak through mobile app running on the user Smartphone so as to produce SMS causing capability.

Keywords: GPS, SMS, Helmet, STM32F429 Microcontroller and OV2640 Camera.

I. INTRODUCTION

The microcontroller performs the serious task of embedded vision process at terribly low power consumption. The project uses STM32F429 microcontroller [1] for its process wants that runs the vision process algorithmic program mistreatment the photographs it gets from associate degree OV2640 camera vision sensing element [2]. The camera is designed to output footage in RGB565 format at QVGA (320 x 240) resolution. The helmet colour defines the brink of the pixels within the image that's processed additional. This method of separating a neighbourhood on interest during a digital image supported the given colour is termed image segmentation [3]. When the image segmentation is completed, algorithmic program acknowledges the contour of the image and its centre, which ends up in distinctive the rider's helmet.

Not wearing helmet is one in all main reason for the high range of fatalities involving twowheeler occupants in our country [4-5]. Although the government has created it required to wear helmet, not most are adhering to the current law. The matter here is that government cannot watch each bike rider in the slightest degree places and in the least degree times. Our project proposes and sense the helmet detection and alcohol detection [6-7].

II. PROPOSED SYSTEM

The camera is designed to output footage in RGB565 format at QVGA (320 x 240) resolution. The helmet colour defines the brink of the pixels within the image [8] that's processed additional. This method of separating a neighbourhood on interest during a digital image supported the given colour is

ISSN (Print) : 2347-6729 ISSN (Online) : 2348-3105

Volume 5, Issue 1, January 2017.

JIR IF : 2.54 DIIF IF : 1.46 SJIF IF : 1.329 termed image segmentation. When the image segmentation is completed, algorithmic program acknowledges the contour of the image and its centre, which ends up in distinctive the rider's helmet. Figure 1 represents the hardware module.



Figure 1: Hardware Module

Automated Helmet unit consists of earphone/speaker, switch, GPS satellites, MP3 sound decoder, ARM Cortex-M4 Microcontroller, GPS collector, IEEE 802.15.4. In this proposed system based on Embedded domain. Initially, embedded is defined as combination of hardware and software. In hardware side we used microcontroller and other peripherals and the software side we used AtollicTrue Studio.

III. RESULT AND DISCUSSIONS

Bike engine starts only helmet is brought with regards to bike dashboard unit. The condition is user wear the helmet means the bike is automatically start otherwise the engine is OFF. Similar to the user drinks alcohol means the bike is automatically OFF. The degree of MP3 playback is mechanically adjusted to mute, once necessary traffic sounds area unit detected. Figure 2 shows that the hardware implementation.

International Journal on Recent Researches in Science, Engineering and Technology, Vol.5, Issue 1, January 2017. ISSN (Print) 2347-6729; ISSN (Online) 2348-3105



Figure 2: Hardware Implementation

Project Demonstration Procedure

- 1) During Start up, first switch on the Microcontroller Board.
- 2) Give 5v power supply.
- 3) The BT interface App should be installed in the ANDROID SMARTPHONE.
- 4) Connect Bluetooth (HC-05) with android mobile phone.
- 5) Open the App a BT interface free trial screen will be displayed and Bluetooth is automatically enabled.
- 6) In that BT interface free trial screen Press "Screen1" button a window is opened scroll down to the bottom and click the check box CR.
- 7) Come back to the Main Menu of the BT interface App choose "Discover" button.
- 8) The Smartphone will be searching to find enabled Bluetooth devices, after completing the Search, a select device dialog box appears.
- 9) In that dialog Box choose respective enabled device then password will be asked for pairing the two devices.
- 10) Enter the password as "0000" or "1234" two devices will be paired and Smartphone can communicate with robotic dog.
- 11) After the two devices have paired the Led which is in the Bluetooth module glows steadily and Print "Connected "in smart phone app display.
- 12) Immediately a Screen "DASH CAM" commands Menu will be opened.
- 13) In this project have two mode
- 14) One is helmet select mode and another one is alcohol detection mode.
- 15) Selecting the Helmet colour for example green or blue colour.
- 16) In case you don't wear the helmet automatically warning message send to your home with location.
- 17) Press alcohol detection mode. We used gas sensor some gas liquid split into gas sensor at the time alcohol is detected means automatically motor is off.

IV. CONCLUSION

Helmet for road hazard warning is intended with wireless bike authentication and traffic accommodative mp3 playback. The most aim of this project is to encourage folks to wear helmet and to stop road accidents that is achieved. So road accidents will be prevented to some extent and safety of motorbike riders is ensured. In this proposed system used to identify the helmet and alcohol detection. In helmet side we used image processing method. It is very useful to identify the helmet.

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