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AUTOMATIC SPEED CONTROL OF VEHICLE USING VIDEO PROCESSING

M.M.Santhosh kumar[1], S.Bharath kumar reddy[2], S.Siva kumar reddy[3], Dr. J.Kirubakaran[4]

[1, 2 & 3]UG Students, Department of ECE, Muthayammal Engineering College, Tamilnadu, India
[4]Associate Professor, Department of ECE, Muthayammal Engineering College, Tamilnadu, India

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Abstract - *Globally road accident is considered to be an important issue, which can be reduced by proper vehicle speed monitoring system. More recently, the advancement in wireless sensor technology shows great promise in designing. The aim of this research is to develop a prototype vehicle speed monitoring system using accelerometer based wireless sensor. The Research focus on unifying the Global positioning system with embedded wireless fidelity (Wi-Fi) is the new approaches in intelligent vehicle control for critical remote location application using ARM. In conventional system they are designed to control the speed of vehicles in all days. The main objective of the proposed system is to operate the vehicle in safe speed at critical zones. The functionality of the system has been simulated in laboratory environment by setting different speed limits for monitoring single or multiple vehicle speed scenarios through appropriate algorithm and code development. The Graphical user interface (GUI) of the software continuously presents the vehicle speed with time and the over speeding conditions are indicated. The speed details are also continuously updated on the left hand side of the GUI*

Key Words: **Accident, Wireless Sensors, Wi-Fi, Vehicle, Speed**

1. INTRODUCTION

Vehicle is an integral part of our daily life and its growth incremented day by days. The scenario of increased vehicle density in India from 2001 to 2015. Due to increased vehicle density and over speed driving causes more accidents. The statistical reports of occurred accidents are shown. There are lot of reasons behind it. These are increased rate of vehicle density, the Indian roads are not changed up to the expecting level excluding the national highway, multiple functioning at the time of driving the vehicle that is like use of mobile, drink while driving, disobey of traffic rules and regulation, crossing speed limits which is dangerous for your own safety and that of others and many more.

1.1 Proposed System

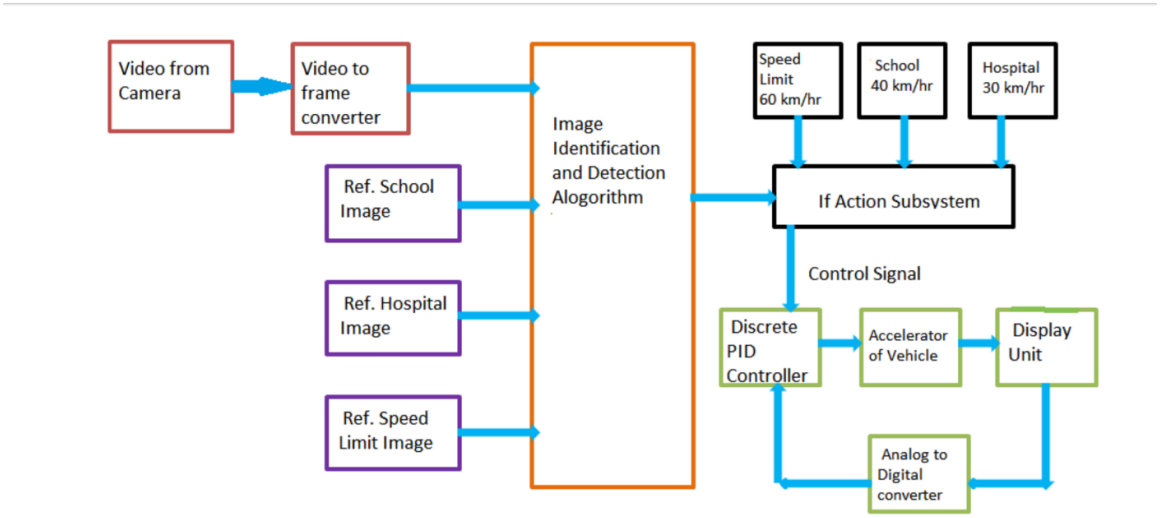

Fig- 1: Proposed diagram

The small camera mounted on the vehicle records the video signal and gives primary input to this system. The recorded video has to convert into frames to identify and detect the desired traffic sign. While converting video signal into frames approximately 30 frames are produced in1second.But30 frames per second contain the redundant that is data wise similar frames which take more time for identify and detect of the desired traffic sign.

Due to this system becomes sluggish and will not provide the fast response for control action. Therefore redundant data are reduced and only single frame per second is taken for the comparison purposes. So the time required for data processing is very less which will increases overall system performance.

1.2 Working Principle

In SURF algorithm the matching is takes place by using the two images, one is reference image stored in database and another is the scene image from the camera mounted on the vehicle. The first step into the SURF algorithm is to convert the color image into the grey scale image. From both image it detects the SURF features. The detection of key points is based on (the determinant of) Hessian matrix. The determinant of the Hessian matrix at each location in the image over different scales is computed and stored to search for local maxima.

Fig- 2: RGB to GRAY Scene Image

The strong feature points are detected and extracted from both images. That extracted feature points are taken out for matching purpose. Image recognition is the process of identifying and detecting an object or a feature in a digital image or video. This concept is used in many applications like systems for factory automation, toll booth monitoring, and security surveillance.

Fig- 3: RGB to GRAY Scene Image

2. MATERIALS AND METHODS

2.1 Arduino Leonardo

The Uno is a great choice for your first Arduino. It's got everything you need to get started, and nothing you don't. It has 14 digital input/output pins (of which can be used as PWM outputs), analogue inputs, a USB connection, a power jack, a reset button and more. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Fig- 4: Arduino leonardo

2.2 Lilypad Arduino

This is LilyPad Arduino main board LilyPad is a wearable e-textile technology developed by Leah Benchley and cooperatively designed by Leah and Spark Fun. Each LilyPad was creatively designed with large 12 connecting pads and a flat back to allow them to be sewn into clothing with conductive thread. The LilyPad also has its own family of input, output, power, and sensor boards that are also built specifically for e-textiles. Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.

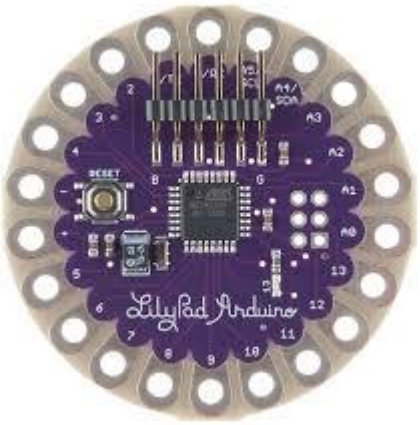

Fig-5: Lilypad arduino

2.3 Web Camera

The evolution of webcam technology uses advanced webcams for the better capturing system. Rather than just hearing, visibility while talking improves communication in better way. These are available at different sizes and ratings from simple to complex forms. Webcams can transmit their images or videos to the host computer or other devices. These are used in several industries including marketing, security, traffic management and healthcare systems. Camera is a machine vision system which, in addition to image capture circuitry, is capable of extracting application-specific information from the captured images, along with generating event descriptions or making decisions that are used in an intelligent and automated system. A smart camera is a self-contained, standalone vision system with built-in image sensor in the housing of an industrial video camera.

Fig- 6: Web camera

3. SYSTEM IMPLEMENTATION

In below fig 7 consist of Arduino, LCD display, web camera. The Arduino hardware and software was designed for interested in creating interactive objects or environments. Arduino can interact with buttons, LEDs, motors, speakers, GPS units, cameras, the internet, and 15 even your smart-phone or your TV This flexibility combined with the fact that the Arduino software is free, the hardware boards are pretty cheap, and both the software and hardware are easy to learn has led to a large community of users who have contributed code and released instructions for a huge variety of Arduino-based projects.

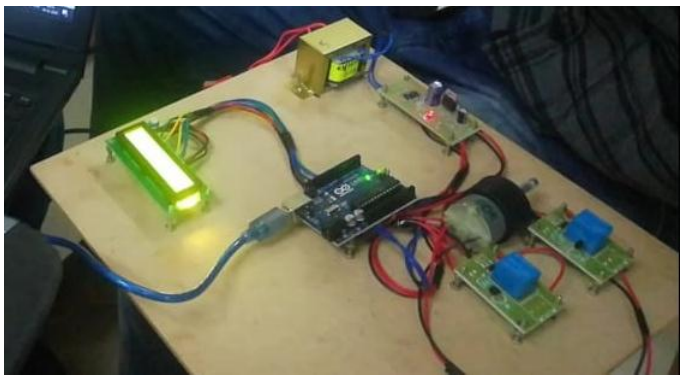

Fig- 7: Speed control device

4. CONCLUSION

Automatic speed control of vehicle at specific areas like residential areas, market places, school, hospital and different curves on road. With the help of this system the automatically vehicle speed will control and reduces the accidents due to over speed driving. That means it is nothing but Driver Support Autonomous Intelligent systems to take decision about their speed at curves, school and hospital and send a warning signal, warn and limit uncontrolled driving. For detection and matching of frames, Speeded Up Robust Function (SURF) algorithm is used because of its high accuracy and efficient than the others. The system is developed in MATLAB Simulink software environment and results are obtained. But to implement it practically advanced controller should use which is compatible with MATLAB software like Raspberry PI computer board. Also this system is only support the road sign available in India, for global use system database with global road sign is required.

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