

## Helmet Deduction Using Image Processing

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### ABSTRACT

The project aim is to build a smart, little power bicycle dashboard with advanced vision sensor to find whether the rider is wearing a helmet or not and allows start/stop the bike ignition system. Even while riding the bicycle, the system continues the monitoring process, prevents the fire and sends alert messages to traffic authorities if the helmet not worn at any point in time. An alcohol sensor is built-in within the dashboard to prevent the drunk driving situation. GPS and motion sensors assist the system identifies accident scenario and sends alert SMS to traffic authorities and family members. Twitter's Sentiment Analysis on Gsm Services using Multinomial Naïve Bayes discussed in [1]. The dashboard unit has a Bluetooth transceiver that helps the system to communicate with an Android mobile app running on the user Smartphone to provide SMS sending capability. Weighted Least Squared Approach to Fault Detection and Isolation for GPS Integrity Monitoring discussed in [2]. This design eliminates building power-hungry GSM modems into the vehicle dashboard thus saving vehicle battery power. Model for Post placement Mousing based on GSM in Long-Distance discussed in [3].

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## 1. INTRODUCTION

The microcontroller does the massive task of embedded vision processing at very low energy consumption [4]. The project uses STM32F429 microcontroller for its processing needs that run the image processing algorithm using the images it gets from an OV2640 camera vision sensor [5]. The camera configures to output pictures in the RGB565 format at QVGA (320 x 240) resolution [6]. The helmet colour defines the threshold of the pixels in the image that is processed further [7]. This process of separating a region on interest in a digital image based on the given colour is called image segmentation [8]. Image Super-Resolution Using Wavelet Transformation Based Genetic Algorithm was proposed and described in [9]. After the picture segmentation is done, an algorithm recognises the contour of the image and its centre, which results in identifying the rider's helmet. Helmet Detection on Motorcyclists [10] proposed a system for detection of motorcyclist without a helmet. For this, we have applied the circular Hough transform and the Histogram of Oriented Gradients descriptor to extract the image attributes. Then, the Multi-Layer Perceptron classifier use and the obtained results were compared with other algorithms.

## 2. EXISTING PROBLEM

Not wearing the helmet is one of the main reasons for the high number of fatalities involving two-wheeler occupants in our country. Solar panel analysis using crack detection using optimisation techniques present with fuzzy C-mean. Even though the government has made it mandatory to wear a helmet, not

everyone is adhering to this law. The problem here is that government cannot watch every bike rider at all places and at all times. Our project proposes an innovative solution to overcome this scenario.

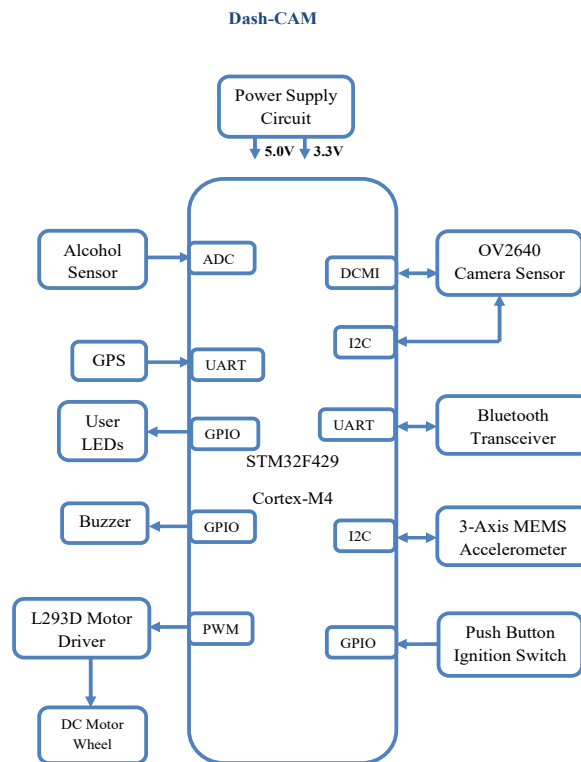


Figure 1. Block Diagram of Dash Cam

The microcontroller does the massive task of embedded vision processing at very low power consumption. The project uses STM32F429 microcontroller for its processing needs that run the image processing algorithm [11] using the images it gets from an OV2640 camera vision sensor. The camera configures to output pictures in the RGB565 format at QVGA (320 x 240) resolution. The helmet colour defines the threshold of the pixels in the image that process further. This process of separating a region on interest in a digital image based on the given colour is called image segmentation. After the picture segmentation is done, an algorithm recognises the contour of the image and its centre, which results in identifying the rider's helmet.

**3. PROPOSED SYSTEM**

Automated Helmet unit incorporates earphone/speaker, inside the mouthpiece, push catch switch, GPS satellites, MP3 sound decoder, ARM Cortex-M4, GPS collector, IEEE 802.15.4/handset, miniaturised scale SD/memory and outside mouthpiece. Earphone goes about as a speaker to hear a recorded voice and mp3 tunes. The receiver is utilised to record voice or summons given by rider with the assistance of push catch switch provided in the head protector. GPS beneficiary is used to get the area of the rider through GPS satellites. IEEE 802.15.4 assists in speaking with bicycle dashboard unit. ARM Cortex-M4 controls everything and outside mouthpiece is used to screen activity sounds.

**4. RESULT**

Bike engine starts only when the helmet is brought near to bike dashboard unit. The condition is – helmet: present = engine and helmet: absent = engine: off. Hazard warning information is passed to the rider when he is a distance of 10 meters from the danger to alert him. The volume of MP3 playback is automatically adjusted to mute when critical traffic sounds are detected. Comparative study and performance analysis of automotive braking system discussed in [12],[13].



Figure 2. Prototype for Dashcam

## 5. CONCLUSION

Helmet for road hazard warning designed with wireless bike authentication and traffic adaptive mp3 playback. The main aim of this project is to encourage people to wear a helmet and to prevent road accidents, which achieved. Thus traffic accidents can be limited to some extent and safety of bike riders is ensured.

## REFERENCES

- [1] A. R. Susanti, *et al.*, "Twitter's Sentiment Analysis on Gsm Services using Multinomial Naïve Bayes," *TELKOMNIKA (Telecommunication, Computing, Electronics and Control)*, vol/issue: 15(3), 2015.
- [2] E. Wang, *et al.*, "Weighted Least Squared Approach to Fault Detection and Isolation for GPS Integrity Monitoring," *TELKOMNIKA (Telecommunication, Computing, Electronics and Control)*, vol/issue: 15(3), 2017.
- [3] X. Gao, *et al.*, "Design for Postplacement Mousing based on GSM in Long-Distance," *Indonesian Journal of Electrical Engineering and Informatics (IJEEI)*, vol/issue: 5(3), 2017.
- [4] Wolfe J. M., *et al.*, "Visual search in scenes involves selective and non-selective pathways," *Trends Cognit Sci.*, vol/issue: 15(2), pp. 77–84, 2011.
- [5] Goferman S., *et al.*, "Context-aware saliency detection. IEEE Trans on Pattern Anal," *Mach. Intell.*, vol/issue: 34(10), pp. 1915–1926, 2012.
- [6] Christopoulos C., *et al.*, "The JPEG2000 still image coding system: An overview," *IEEE Trans. Consum. Electron*, vol/issue: 46(4), pp. 1103–1127, 2000.
- [7] Rutishauser U., *et al.*, "Is bottom-up attention useful for object recognition?" in *Proc. IEEE CVPR*, vol/issue: 2(2), pp. 37-44, 2004.
- [8] Lti L., *et al.*, "A model of saliency-based visual attention for rapid scene analysis," *IEEE Trans. Pattern Anal. Mach.Intell.*, vol/issue: 20(11), pp. 1254–1259, 1998.
- [9] Pandas S. and Jena G., "Image Super-Resolution Using Wavelet Transformation Based Genetic Algorithm," in *Computational Intelligence in Data Mining Springer India*, vol. 2, pp. 355-361, 2016.
- [10] Silva R. R. V., *et al.*, "Helmet Detection on Motorcyclists Using Image Descriptors and Classifiers," *27th SIBGRABI Conference on Graphics, Patterns and Images, Rio de Janeiro*, pp. 141-148, 2014.
- [11] Poudel P. and Shirvaikar M., "Optimization of computer vision algorithms for real-time platforms," in *System Theory (SSST), 42nd Southeastern Symposium IEEE*, pp. 51-55, 2010.
- [12] Nagarajan, *et al.*, "Comparative study and performance analysis of automotive braking system," *International Journal of MC Square Scientific Research (IJMSR)*, vol/issue: 7(1), pp. 117-123, 2015.
- [13] Nagarajan, *et al.*, "Experimental study and Investigation of composite coir fibre in disk brake rotor," *International Journal of MC Square Scientific Research (IJMSR)*, vol/issue: 8(1), pp. 128-140, 2016.