

## Smart monitoring of roads using IoT

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**Abstract**— Smart monitoring of roads basically includes monitoring of the happenings on the road like traffic jam, diversions, under construction area, processions etc. Real time monitoring is being done as the travellers face lot of problems due to non-availability of accurate information. Hence to address this issue the images are being captured by the camera which is installed on the traffic poles and uploaded to cloud.

Digital camera systems allow rapid update of road maps and the same system can be utilized to carry out efficient road condition surveys, and facilities management.

**Keywords**-Image capturing ,Rasberry pi board, Camera module

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### I. INTRODUCTION

With a growing population driver questions regarding possible negative implications for road traffic are constantly being raised. Basically to reach to a particular destination there are various directions to go. When the driver is in urgency to reach to his destination it would be easier for him if he could know the happenings on the roads so that he can decide which direction to prefer to reach at the earliest .As there are many obstacles and hence monitoring of roads and making the driver get to know the scenario is important .

Necessity of monitoring the roads-

- (i) Traffic jam which would waste his time especially in metropolitan cities
- (ii) Not all roads are sealed with bitumen. Driving on unsealed roads can be more difficult than driving on bitumen. Driving on such road surfaces is very difficult which takes lot of time.
- (iii) The livestock and wildlife on or at the side of the road, especially at night.
- (iv) The processions, parade, cavalcade, motorcade, cortege and rallies that create chaos and disturb the public.
- (v) The accidents that occur frequently can be known by the police officers and hence medical assistance can be given.

### II. SYSTEM OVERVIEW

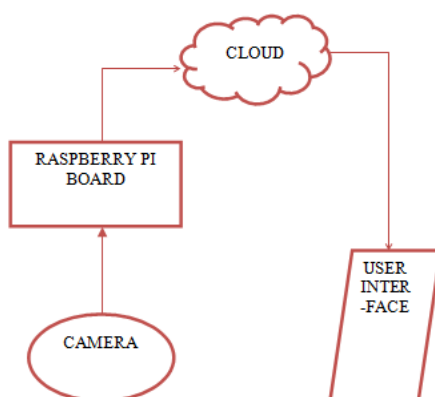


Fig.1. System Overview

### III. COMPONENTS DESCRIPTION

#### A. Raspberry pi board

The Raspberry Pi is a basic embedded system and is a low cost single board computer which is used to reduce the complexity of systems in real time applications. This platform is mainly based on python. Raspberry pi consist of Camera slot Interface (CSI) to interface the raspberry pi camera. It is based on the Broadcom BCM2835 system on chip (SOC). It includes an ARM1176JZF-S Core (ARM V6K)700 MHz CPU processor, Broadcom Video Core IV GPU which has17 pins, 3.5W of power and 512 MB of RAM memory. The Raspberry Pi system has secure SD card reader for boot media and persistent storage. Here Model B+ is used.



Fig.2.Raspberry Pi board (model B+)

#### B. Camera module

The camera specifications are as follows-

Pixel: 24MP (interpolated)

Max.Resolution:640\*480

Image sensor: CMOS

Lens: 2P+1R filter

Interface: USB type



Fig.3. USB Camera

#### IV. METHODOLOGY

The Raspberry pi is used as a main controller in capturing the images and uploading them to cloud. A latest version of raspbian OS is downloaded and installed in SD card.

After installing the raspberry OS into the memory card, the camera is interfaced with the Raspberry pi board. The images are captured by the camera. The resolution is set as per the convenience. The captured images are uploaded to DropBox in real time and stored in the file created in DropBox. The user is able to access the images through his smart phones as well as system.

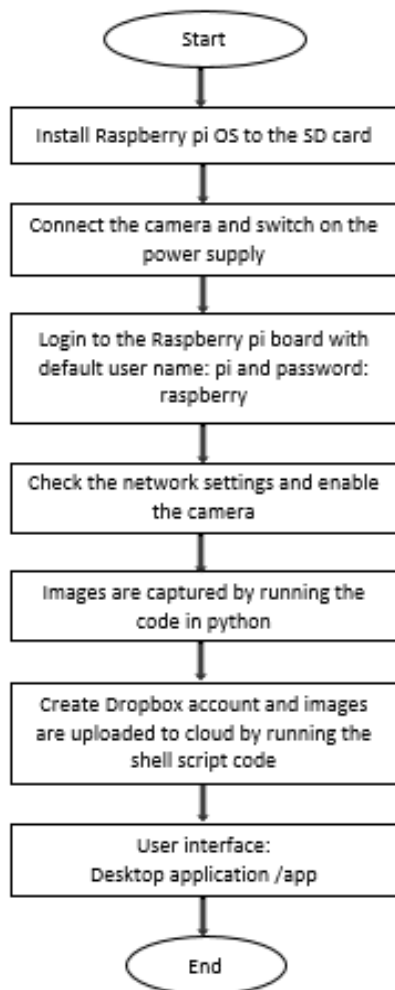


Fig.4. Flow Chart of Designed System

#### A. Capturing images

The USB camera is used to capture images in one frame per ten seconds. The library installed is fswebcam in raspberry pi to capture the images in sequence and coded in python script. The images are being captured with the caption name as in at which particular hour, minute and second the picture is being captured. The delay given is 10 seconds.

#### B. Uploading images to the cloud

DropBox is the cloud where images are uploaded for the storage. The images are captured and uploaded in real time continuously according to the frame rate set. A folder is created in DropBox by name “temp” where the images are being stored. These images can be seen by the user after logging in to his respective account. DropBox has a desktop application as well as can be accessed through smartphones by downloading the app.

#### V. RESULTS



Fig.5. Image captured by USB camera

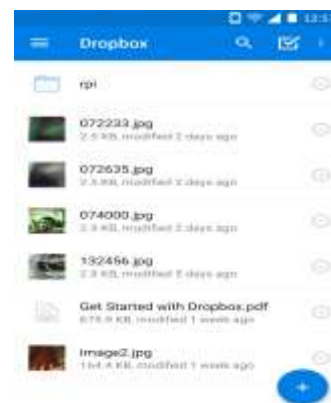


Fig.6. Dropbox app

#### VI. CONCLUSION

The images are captured and uploaded in real time for the user to access them. The images taken are uploaded for every 30 seconds. They can be accessed through desktop application as well as Smartphone app. From this one can know the exact scenario of the road and its conditions

#### VII. FUTURE SCOPE

The data analytics to be carried out so that along with the image the user can be able to read the data

analyzed i.e the messages indicating the abnormal conditions, under construction areas, accident prone zones etc.

The system to calculate the volume of traffic congestion on main roads and highways, detects abnormal traffic patterns and reveals the congestion generated by high traffic volumes.

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