GILS: Automatic Security and Gas Detection Robot

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Abstract - *This paper shows the brief idea on how robots can work as a service to mankind. As we all know that we humans can't reach out at some places as it may be dangerous to our life but without going there it's impossible for us to analyze and experience what is actually happening at that place. The problem is that our life is priceless thus we have thought about the use of robot instead of man who will work for man and give information about the place in the environment. Main intention of this paper is to plan and assemble a robot which will be controlled by the humans with the help of various technologies like android application, internet, Bluetooth etc. There will be a robot having a mobile phone device placed within it which will be used transmute the data and robot will be controlled through the internet by the personal computer. The camera of mobile device will capture the images and videos and give live feed to the server regarding the danger or any security disputes.GPS of the mobile system shows the location we are travelling using our robot. The different sensors like the light, gas, IR will be used to detect the hazardous gases in that particular area where the robot has reached and give the humans alert concerning it. Hence in this project our robot will be able to place anywhere on land all over the world and help humans to stay alive in worst situation.*

Key Words: **Client sever architecture, Database, Gas sensor, Infrared sensor, Micro-controller.**

1.INTRODUCTION

There were many life taking situation since ages and to overcome these use of robots, in the place of humans is required. We all our almost familiar with the incidents such us the terror attack in Mumbai at Taj Mahal Palace which took life's not only due to use of bombs and gun firing but also hazardous gases which killed many. Adding on with the Japan's Nuclear power explosion which was a great bang of destruction in all the form like man, wealth, and environment. All such incidents had severe impact not only to man but also to environment. So to tackle with such problems this robot will be used in such situations and generate alert and help man to come out of this problem before hand or even at initial stage. And due to live feeds it will help in security problems too. It can be also used in various organizations for security purpose.

2. LITERATURE SURVEY

Bethsheba David, Tushar Vispute, Aishwarya Patil, Diksha Kalbhor

"Life Saving and Security Alert Human Friend Robot" (2016)

This survey paper describes how robot being a machine is helping man for security using technologies and sensors that will detect unsafe gases for the health of man. Not only that this robot works on micro controller which is connected with various components and device drives. Even use of internet is also seen. We are familiar with the bankrupt in our locality so, this robot will help us to detect unauthorized objects using image processing concepts and give alters via messages.[9]

Bh.S.R.Phanindra Varma, R.Dhanabal, V.Bharathi

"Remote Access of FPGA Robot via Internet" 2014.

This paper describes that where human begins cant reach out we use robots. The enlargement of an FPGA base robot is handled remotely through internet. Mobile app works like a transmitter and Bluetooth unit used to provide a route to the robot. Vitalization is done with help of camera situated on the mobile phone. The robot communicates with humans via text speech. Robots thus can be used to gather data from various places.[7]

GOLDSMITH, Ben.

"The Smartphone App Economy & App Ecosystems."

This paper gives information of Smartphone app economy. It focuses on operating systems, apps, handset manufacturers, network operators. It also helps the developers for analyze the application. [2]

Jake, Tom. dc jednotka.

"Lego mindstorms Nxt Robotick"

This paper concludes that LEGO Mindstorms NXT acts an tool for robots using different sensors like touchultrasonic etc. Obstacle detection is done by ultrasonic sensors. This tool also uses motors, speaker etc for thecontrol of robot and proper functionality of robot. Light sensors are used to detect light in a particular area. [4]

Andrew Whigham,Sebastian Delden

 "Bluetooth based Architecture for Android Communication with a Articulated Robot".

Robots are developed to reduce man power to perform difficult task in an easy and efficient way.With the help ofTeach Pendant we can program and manually control the robot .Programming interface of each robot is different asper the task the robot is designed for. Above paper concludes that a client server architecture is established betweenthe android mobile (clients)to observe the task performed by the robot by means of Bluetooth. [8]

3. OUR SYSTEM

As we have seen in other paper how the robot moves from one place to other to gather the data in the form of images and stores in the database, so in our paper we making further implementation of adding sensors like the gas, light, IR these are used as our new contribution. Where these sensors will help us to detect the hazardous gases in the environment, thus this gas sensor will sense the gases and give alert to the server .And if this robot goes in the dark places like coal mines etc. where there is no light and gases are very harmful to inhale, then the robot will capture the images with help of the light sensors that will be switched on so that in darkness also data can be captured easily.
        Here we connect the server and the android device with Wi-Fi to send the live data to be displayed on the server

screen .Whereas the android device and the robot are connected using the Bluetooth so that the hardware works properly and helps the android device to capture the proper data. Thus when we think about the security in various organizations etc this robot will capture the video and images and send to the server and display if actions need to be taken.
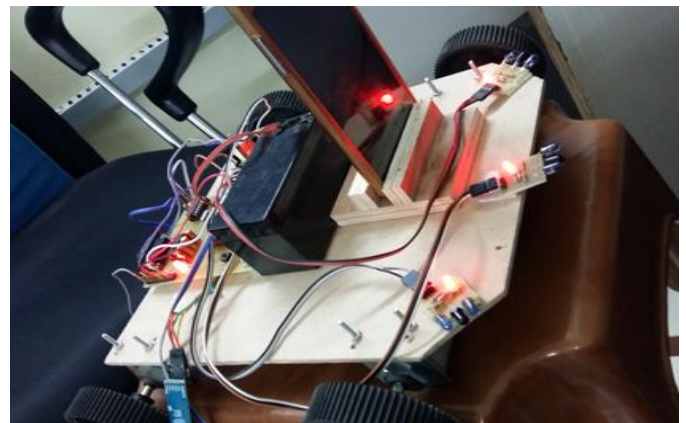
4. SYSTEM ARCHITECTURE

   Our Robot vehicle consists of sensors, micro-controller, device drivers, motors. It also has a mobile device which is used for capturing data and then will send it to the admin(sever side).Medium of sending data from device to the sever end will be internet. Various sensors like gas sensor for detecting hazardous gases , light sensors used to detect light ,infrared sensor for detecting obstacles. Motors present for the movement of the robot device .Our robot also used for security purpose for various organization like banks, institutes.
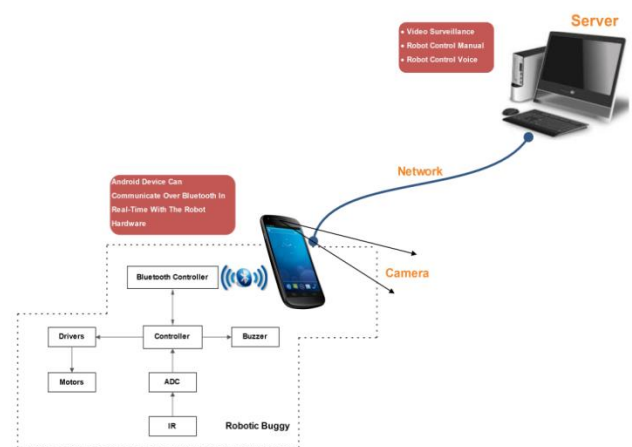

Fig 1: System Architecture

5. ALGORITHMS AND METHODS

Otsu's Method

$$\sigma_w^2(t) = \omega_0(t)\sigma_0^2(t) + \omega_1(t)\sigma_1^2(t)$$

Where ,

$\sigma_w^2(t)$ is the variance

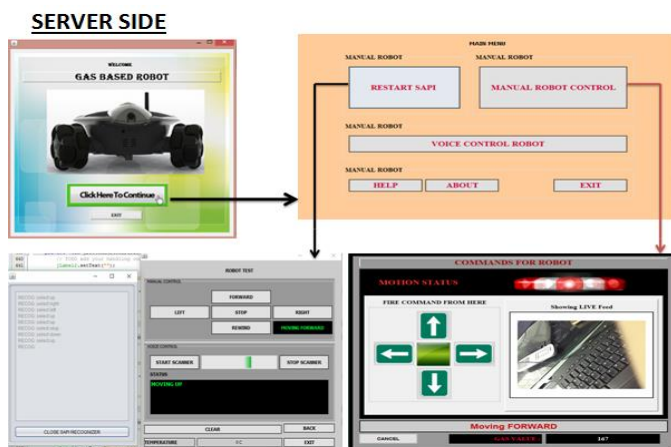$\omega_{0,1}(t)$ is the class probability
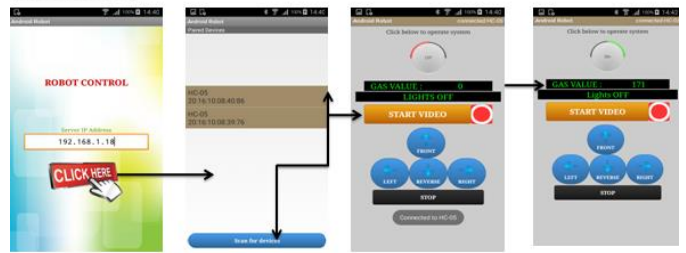
t is the threshold

Original Image

An example image thresholded using Otsu's algorithm

6. RESULT

The robot will capture the feeds with help of mobile and send it to the server end. It will detect hazardous gases and also provide security for organizations like banks, institutes etc.

SERVER SIDE

MOBILE APP

7. FUTURE SCOPE

- In future, we can add features that includes more intelligent system where hazardous gas after being detected will directly give a call to the server.

- Future implementation can be done on other operating system (ios).

8. CONCLUSION

The illustrated paper will put up some lights on the robot which give us alert from dangerous gases and also security responsive. The gas sensor is used to detect hazardous gas leakage in the environment (e.g.: Industries, Power plants, Houses).This unit can be easily incorporated into an alarm unit, to sound an alarm or give visual indication of hazardous gases and unauthorized objects. The sensor has excellent sensitivity combined with a quick response time.

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