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ANTI-SUFFOCATION IN VEHICLES : ELECTRONIC MESSAGE ALERT

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Abstract **-**The "Internet of Things" (IOT) is often described as a collection of connected sensors, but it is actually a much complex concept. It involves not only the connection and integration of devices that monitor the physical, but also the aggregation, relationship, and analysis of the information those devices create. In order to be successful with the IOT, firms need to focus not only on their own products and services but outward to a complex ecosystem of partnerships and collaborations.Many think of sensors and local control as the Sum total of the IOT, yet it is a new Internet technology capable of connecting things over a network, share the live streaming data and communicate each other to provide a better life for humans.

Keywords – Raspberry Pi, ThingSpeak Cloud, Collaborate, Sensor, temperature, suffocation, Carbondioxide, Arduino,

I. Introduction

Internet of people changed and there is new internet which is emerging and that new internet is not about connecting people but about connecting things, so it is named Internet of Things. Here things start to share their experiences with other things, well it works like this – if we take things and give it sense and communication, it is an opportunity for the things to interact, collaborate with other things. Take things and add sense to communicate, touch, control where there is an opportunity of collaborating things with the other things Big business cares, they care to the tune of billions of dollars and they are big investments by these companies towards internet of things.

Raspberry Pi based anti-suffocation is an IOT based temperature monitoring system for the safety of loved ones in which it takes the values of temperature and humidity from the temperature sensor, uploads to the cloud and alerts the people around the car to save the child or pet in the locked car. It uses Carbon Dioxide sensor and motion sensor to detect the living beings. So, whenever the temperature and suffocation increases and if it detects the presence of living beings in the locked car then it gives a big alarm to the people near the car and also sends a notification to the user.

II. Problem Definition

Unawareness of increase in temperature and suffocation caused to pets and children in locked cars and toddlers. In locked cars temperature would increase 19°F for every 10 minutes which would result in large increase in temperature in 2 to 3 hours and causes suffocation to living beings due to lack of oxygen in the car. In this situation, the pets and children could not do anything to save themselves as they are not known what to do at that instance and hence it results in the death of these living beings with a simple reason like parent's carelessness, suffocation and overheating.

Hence, there is a requirement for a system which autonomously operates with minimal power consumption and cost to overcome this sort of harm to human life. In this work, an attempt has been made to develop a system that works invariably, irrespective of the negligence of person handling the car.

III. Feasibility Study

End users of this product would be pretty much happy about its appearance its usage, its battery power, constant monitoring, appearance and so forth. 7 out of 10 people found that it is very much feasible to buy this product which is a very good sign to upgrade more features before it is available in the market. Technical feasibility study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.After conducting the technical feasibility study, it is proven that all the technical requirements like software requirements, hardware requirements, IDE's and any other software are available for developers to use them, build the product on them and make it a completely furnished product with hiding all the complex connections and all.

IV. Literature Survey

Heat Stroke Prevention System

It is a Safety system for passenger vehicles to prevent entrapment of child, disabled, aged or infirm person or pets being left in the sun so that they will not suffocate from heat. The invention is characterized by use of one or more systems to sense the occupancy state,

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temperature inside vehicle and provide one or more outputs which can be selectively employed to provide warning to permit rescue and or activate electro mechanical systems to relieve heat. System includes microcontroller, sensors and electromechanical system. Sensors include automotive occupancy sensor (AOS), ultrasound sensor, I.R. sensor, imaging sensor, microphone sensor, seat sensor, capacitance sensor, motion sensor, floor sensor, temperature sensor. Even though above system looks pretty good in terms of hardware and software used to solve the above problem discussed. But It didn't solve the problem effectively.

Automatic window and sunroof adjusting

"Vehicle for automatically adjusting window and sunroof positions after it being left unattended by its operator" (Liu, 2001).When an automobile is parked outside without overhead garages and with its windows closed or open it may be subjected, respectively, to freezing or overheating its interior depending upon its exterior temperature. Such extreme temperature will reduce the life span of electronic and mechanical components in or near the interior, cause discomfort to the passenger or driver and danger of life to kids, pets or disabled. System includes temperature sensing circuitry to sense interior temperature, microcontroller to sense the input signal and give the actuation signal to lower or close the power windows and sunroof.

Alerting, Monitoring and Controlling System

"System for Alerting, Monitoring and Controlling Heat Stroke inside Vehicles" (Garethiya, 2015). Has proposed a simple and effective solution to alert vehicle owners about the possibility of heatstroke inside it if any person is present and thus apparently avoiding death due to suffocation and also making system beneficial not only to the owner but also to the law enforcing agencies, using sensor and electronic units. System includes Temperature sensing, Pressure detection, GPS and real time modules.

V. Proposed Solution

An IOT device that captures the data from the sensor, Communicates to the cloud, analyses the live data and reacts at dangerous times to save the life of loved ones.

Secondly, an Android app to get recently updated temperature values. This IOT device is called E.A.S.T. In this solution Raspberry Pi is connected to temperature sensor using jumper wires, Wi-Fi router using Ethernet cable, battery/charging adaptor for power supply. This system is a prototype vehicle model of how sensors and actuators can be appropriately used as a setup to overcome this problem. Results indicate that with the help of sensors and actuators window glass is lowered and circulation of fresh air takes place, the temperature inside the car is lowered; this system prevents suffocation by intelligent sensing which works efficiently, this is an economic system without any compromise on its functioning.

When the Pi is powered on and the Raspbian OS is loaded into kernel then at that instance the temperature sensor is powered on, the python script would run automatically so that this python script takes the values from the sensor and stores in variables. These stored values are programmed to send to the cloud using the URL and read API key of the ThingSpeak platform. These sent values are stored in the cloud for further analysis. Lastly, React module helps in alerting the people around the car with a buzzer only when pet or child in detected and also sends notification to the car owner.

VI. ThingspeakPlatform

ThingSpeak is an Internet of Things (IOT) platform enabling the collection, storage, analysis, and visualization of data gathered from sensors such as the Arduino and Raspberry Pi.

ThingSpeak stores data in Channels, each of which can have up to 8 data fields, as well as location and status fields. Data can be sent to ThingSpeak at a rate of at every 15 seconds or longer.

ThingSpeak Configuration

Step 1: Sign up for the new account

- https://thingspeak.com/users/sign_up

Step 2: Create a new Channel

- Select "Channels", "My channels", and then "New Channel".

Step 3: Enter Channel Information

- Name: Raspberry Pi + DHT11 Temperature & Humidity Sensor
- Description: DHT11 temperature & humidity sensor driven by a Raspberry Pi 2 running a Python script.
- **Field 1:** Humidity (%)
- **Field 2:** Temperature (°C)

Step 4: Record Write API Key

- Once the Channel is created, click on "API Keys" and note down the "Write API Key". We will use this value later in our script.

VII. Analysis OfTemperature Data InThingspeakPlatform

ThingSpeak platform acts as a cloud for this prototype of Anti-Suffocation system where the temperature and humidity values from the temperature sensor (DTH 11) are taken and sent to the channels in the ThingSpeak Cloud. Channels are the storage elements where it stores different kinds

of data like numerical, string and few other data types. These channels can be created in the user's ThingSpeak account. So, Every time the data is uploaded to the cloud that means data is written into that particular channel created in the user's account. This stored data can be monitored continuously and also analysed using MATLAB Analytics in the platform for better understanding of the temperature and humidity levels in the locked cars.

Fig 7.1 Graph of Humidity values

Fig 7.2 Graph of Temperature values

A	B	C	D
created_at	entry_id	field1	field2
2017-09-05 03:16:33 UTC	1	53	29
2017-09-05 03:17:07 UTC	2	49	29
2017-09-05 03:22:09 UTC	3	49	29
2017-09-05 03:27:11 UTC	4	49	29
2017-09-05 03:32:13 UTC	5	49	29
2017-09-05 03:37:15 UTC	6	49	29
2017-09-05 03:42:17 UTC	7	49	29
2017-09-05 03:47:19 UTC	8	50	29
2017-09-05 03:52:21 UTC	9	49	29
2017-09-05 03:57:25 UTC	10	49	29
2017-09-05 04:02:27 UTC	11	49	29
2017-09-05 04:07:31 UTC	12	49	29
2017-09-05 04:12:33 UTC	13	49	29
2017-09-05 04:17:35 UTC	14	49	29
2017-09-05 04:22:37 UTC	15	49	29
2017-09-05 04:27:39 UTC	16	49	29
2017-09-05 04:32:40 UTC	17	50	29
2017-09-05 04:37:43 UTC	18	50	29
2017-09-05 04:42:45 UTC	19	49	29
2017-09-05 04:47:47 UTC	20	48	29
2017-09-05 04:52:49 UTC	21	47	29
2017-09-05 04:57:51 UTC	22	45	29
2017-09-05 05:02:52 UTC	23	44	29
2017-09-05 05:07:54 UTC	24	44	29

Fig 7.3 Excel Data Exported

The above figure shows the data values exported from the ThingSpeak platform in excel or CSV format which contains data uploaded frequently to the cloud and stored channels named by field1 and field2.

VIII. Conclusion

E.A.S.T is an IOT based temperature monitoring system for the safety of loved ones in which it takes the values of the temperature and humidity from temperature sensor, uploads to the cloud and alerts the people around the car to save the child or pet in the locked car. This device would one of the devices that would connect to the internet and has unique IP address to discover it on any network.

The target customer can now buy the product if they think about the safety of their loved ones or also for temperature monitoring system as a showcase material in the house. The target customers would be pet owners and parents who have children below 5 years. E.A.S.T uses technologies like raspberry pi, temperature sensor, ThingSpeak platform (IOT Cloud), MIT App Inventor to perform complete functionality that should be performed.

IX. Future Scope

For any product or application that we make initially has a lot of loopholes or any other improvements so as to make that product or application works more efficiently, increase its market space, reduce the cost and so forth. Likewise, E.A.S.T also has future scope to look in order to make it a wonderful IOT product.

The following are few important things that should be looked into for making this project a unique and modern product to the society:

- Including carbon dioxide and motion sensors to accurately detect the presence of living beings in the cars.
- Including camera to this project which would take the pictures inside the car and send to the car owner so as to know the status of living beings inside the locked car.
- Introducing Machine Learning and Artificial Intelligence to make sure effective solution to the problem of unawareness of increase in temperature and suffocation caused to pets and childlike, If temperature is increased, this product should understand that living beings are present and so it should communicate with the AC of the car to switch on or talk to window slider to slide the windows down to decrease the heat inside.
- Automatic mailing of analysed reports frequently for every month so as to understand at what times car stays heat.

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