Proceedings of the International Conference on Inventive Research in Computing Applications (ICIRCA 2018)
IEEE Xplore Compliant Part Number:CFP18N67-ART; ISBN:978-1-5386-2456-2

A Hybrid Model on Child Security and Activities Monitoring System using IoT

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Abstract— **In real world, the children safety is a huge question mark in everyone's mind. Parents always expect their children should live in a secured place where they can spend their time and mind without any problem. But, typically half of them are facing so many issues. This issue can be monitored by using IoT components and sensors to check in the child environment whether people with unaccepted behavior are moving. If children close with them, then the system has to give an alert message that someone stands with the child. By tracing the locations of the children, the parents can able locate where the problem is and how they can help the child from such issues. The Alcohol and Smoke Gas Sensor are recommended along with Blood Pressure sensor to check whether the child in any abnormal conditions. By measuring the different input data and taking appropriate decisions may help the people to save the children.**

Keywords— ***Child Security, Hybrid IoT model, Activities Monitoring, Save Children***

I. INTRODUCTION

The happiness of the parents is the caring and helping the child to grow well in the beautiful world. But children are facing so many problems from the outside world. It may affect the mind to avoid having friendliness with everyone. And parents cannot sit with their children for 24x7 hours to secure their children and monitor the children activities. When a child is going to school, then her security and activities are assured by the school and the members of school only. So parents may feel that children are happy with the people, enjoying her environment and she ate food and drink as per the regular level required to have a good health in the life. But what happens finally is most of the children not taking food and water regularly, and they somewhat disturbed because of less cooperative mind. And children may lie that they eat food and water as per the instructions are given in the school. But sometimes it was not true when parents are talking with their teachers then they will get true information that they not happy where they are.

The smart watches are available in the market for kids monitoring by using advanced technology. Along with some extra features to be added with the basic function of smart watches to have complete watch on child work places [4].

A. IoT in Human security system

Now the modern world needs to have the advanced things through composing different technologies for helping to find solutions for their real life problems. The new technology Internet of Things (IoT) provides much support for making advanced devices and tools to design and implement the solutions on the real world life issues.

The IoT, it is most familiar and buzz word in technical society to solve different life issues by applying this technology. The IoT is made up of different wireless sensors, boards, LEDs, and devices as per the required application area for designing the solution effectively. It can cover many application areas such as

- Agriculture
- Healthcare
- Green Environment
- Industries using Remote Monitoring

B. Model of the problem

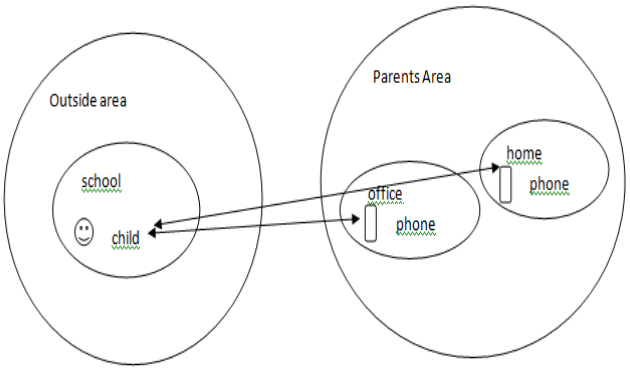

Fig. 1.Model of the Problem

The advanced technologies are available in the current technical world, and it may help the people to use it without any fear and purchasing them for a less price. In that wise, a wireless sensor can help to track the location of a child by attaching with the body of the child [11]. After sending children to school, the parents may get the SMS about the child whether reached the school is not [7]. If the system gets failed in the school, then the parents have made a call to the teacher to confirm about their child present in the school. But this manual approach may not give 100% satisfied results in all the occasions. Hence the tracking sensor may give 100% perfect result to the parents' smart phone about the status and location of their child.

Here we have taken one more problem that the level of people who are near to the child because the more violent problem is child abuse. It happened in any unsecured place to the child. So, the quality of the surrounding environment of the child to be sensed whether it is spoiled with any cigarette smoke or alcoholic smell. In such cases, the information can be sent to the parents immediately to enquire about the position of the child.

II. MOTIVATIONS FOR THE RESEARCH

The Android smart phones and wireless technologies promote communications between people. By adding GPS (Global Positioning System) tracking facility with smart phones can help the listener to find the actual current location of the moving object. Mori, Yuichiro, et al proposed ad hoc based android mobile terminals to track and find the location of the children [10].

The ARM7 microcontroller and GPS with Android smart phone features are used to track voice signals for tracing children locations [8].

The patient remote monitoring system was designed to help the patients whenever they are under health issue [13] & [15]. Patel, Shyamal, et al discussed about the tracking model using wireless communication techniques and ECG sensor to track the heart rate of the patient [9]. And they focused on the wearable sensors and the benefits of wearable sensors for sensing the situations and connecting the people for further required decisions. The wearable sensors can help the system to get the input from the environment according to their actions. Hence, wearable sensors are focused on to find the events and activities to satisfy its role on the system [12] & [14].

Gipsa Alex et al proposed a modern health care system for patients to take the pills perfectly as per the guidance of the IoT system. They made a 'Intelligent Medication Box' for getting the updated message from the doctors and it will send it to the patient about what medication to be taken in the right time. There doctors and patients are connected using internet facility for proper guiding the patient without any communication gap. And, when the patient is not ready to do that then the same alert signal will be given to care taker of the patient [3].

The eating activities of children are to be tracked properly whenever they are staying out of home. The parents of children always feel about that whether their child taking food on time when they are going to school. To confirm such activities the necklace based wireless sensor system can help the parents for the above purpose. The Nutrition monitoring also important one to test the level of the energy food what they consume on each day in their life [2]. This is most essential part in tracking the eating activities of children.

Haik Kalantarian et al proposed and designed a wearable sensor in necklace to trace the amount of food and the energy how much the user gained is measured for taking further decisions. Yin Bi et al. have proposed a system to track diet of people in their daily life. That AutoDietary system is a wearable one on the neck to monitor the eating chips, water and other snacks items in their day to day life [6]. This embedded system works by processing the acoustic signals received from the neck whenever user eating or drinking water. It is much useful one to trace the nutrition consumed in a day.

The children may be suffered by the seizure attacks at any time in their life and it has to be monitored without any delay to help the child. In such situations the wireless sensor with GSM can help to inform the parents or relatives about the current situations of the child. The GSM is playing a vital role in that to deliver the message immediately to save the child by giving proper treatment. D K Kamat, et al designed the above system and implemented the required software for sending messages to the appropriate persons for indicating the seizure attacks over the child [1].

Many smart watches are available in the market for kids care, but most of the parents are not aware and not purchasing those items for their children security [4]. So, awareness is to be given to all parents those who admitted their children in the school. The manufacturing and production cost has to be reduced for distributing the device to the parents. This helping device will be able to provide perfect response about the kid's physical and mental status. But, all the smart watches and innovations are not enough to secure the child from violence.

III. HYBRID MODEL USING IOT FOR CHILD SECURITY

The Hybrid Model on the proposed problem domain may provide the perfect solution to track child eating habits and monitoring that whether they are fully secured or not in their living place. Here we proposed a model to compose all IoT healthcare ideas with the 'Alcohol Smell and Smoke' sensing module to provide the best application for providing complete care for children. The abusing child is to be tracked even

parents in a remote place. It can be done by monitoring child's blood pressure to check whether it gets crossed the normal or acceptable level of a human body.

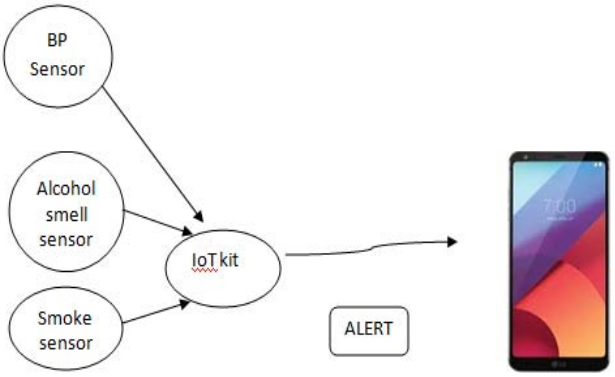

Fig.2. Hybrid Model for Child Security

The figure 2 shows that the basic components required for implementing the application for securing children from unwanted circumstances. The blood pressure sensor can be added with above sensor components to measure the blood pressure (BP) of the child for taking appropriate decisions. When child blood pressure is high or low the sensor can send an alert signal to the parents to take care of the child.

The smoke sensor can be used to get the details about any smoke from fire accidents. Through this feature the system can help the users in order to save their people from such risks immediately.

To measure the blood circulation or pressure many advanced kits are available in the market. The wearable model such as smart watches are having such features but the smoke and alcohol sensor have to be attached with the BP sensor in order to take decisions as per the situations arise in the environment.

Fig. 3. Sensors Model

In the above figure the required sensors and their model details are given for designing the proposed idea. The Alcohol gas sensor and Smoke Smell Sensor are to be connected with IoT board to pass the input to the system. But the sensors size have to be reduced to make very less weight of smart watches or in the form of wearable kits for implementing the proposed idea [5].

The execution model for this proposed idea is depicted in the following flow chart.

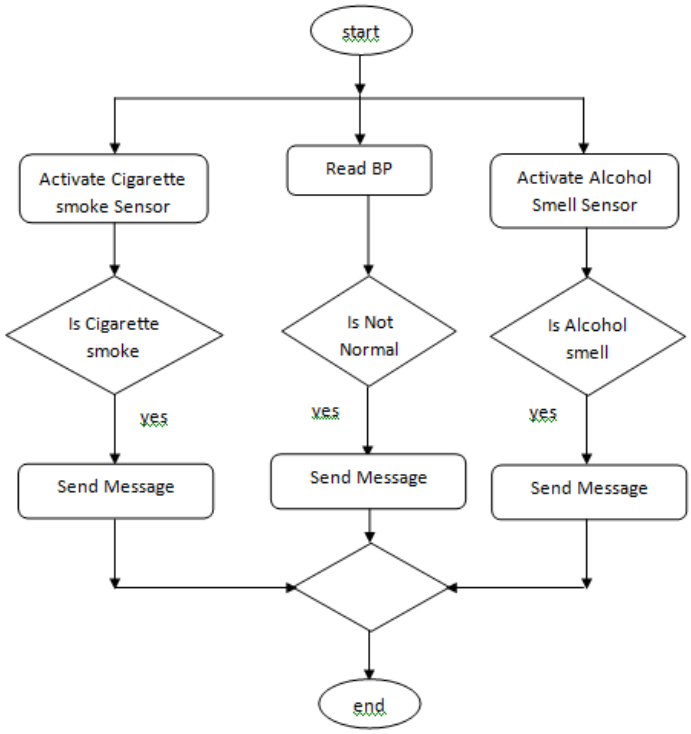

Fig.4. System Flow

The system will start with enabling all required sensor for tracking the location of the child and status of her surrounded place. The interconnection between these two modules is to be made for implementing the communication among the modules to provide the expected behavior. All the sensor modules are enabled to track the current situation in child environment. If any unacceptable incident is found then the corresponding respected module will do its task for completing its duty on this proposed system design. The main motive of this proposed model is in tracking the child security from violence. Hence, the message communication to proper destination place vital role. In this a small improvement also required to send the alert message only to their parents and care taker.

The system in the children side needs some response whether the destination module is ready to provide any support. So two ways communication is required to confirm that child will be secured soon. When no such communication

happened then the message will be delivered to emergency service such as Police Help Line or Child Help Line.

IV. MERITS AND DEMERITS

The main focus of this proposed hybrid model is finding possibility of saving children from abuse activities. The society is not ready to accept such issues in its side. It has to be removed from the society by giving providing good support to the child. Many incidents happened in and around the world but helping the children at last is not a perfect one. Every parent wants a peaceful environment for their child to live happily in the world. Hence, the given model may give a chance of saving child whenever they are in the trouble. But, the problem of this proposed model is on the size of the total system.

The components' size has to be reduced to make it as wearable one. The components small in size may be perfect one for completing the proposed hybrid model for providing good support for the children.

V. CONCLUSION

The IoT model is used on many application areas in order to reduce the problems on the application execution. Like smart watches more advanced wearable models are required to reduce the risks in the human lives by giving hands to the children. The composition of more different purpose sensor may improve the abilities of required system design on the given problem domain. This paper has covered about the issues of children how it can be overcome by using advanced IoT components available in the hand. But more research has to be continued to reduce the size of the device and fastness of the device in communication wise.

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