

# A Survey on Smart Child Monitoring and Tracking System Using Raspberry Pi 3

<sup>[1]</sup> S.Asar Nisha, <sup>[2]</sup> Dr.S.Srinivasan<sup>[1]</sup> PG Student <sup>[2]</sup> Professor<sup>[1][2]</sup> Department of Computer Science and Engineering,

R.M.D. Engineering College, Chennai-601

<sup>[1]</sup> nishameha@gmail.com <sup>[2]</sup> ssnscse@rmd.ac.in

**Abstract:** Nowadays, most of the households have maids or nannies, who are spending more time with the children than the parents. Some parents are in employment and they don't have any choice, so under the care of housemaids, they have to leave their children. If the children are toddlers, they might be misbehaved when the parents are not at the home. Since they cannot speak, it is very difficult for the parents to know about what is happening in their house in their absence. As per the research of brain theory, the age from zero to six is very crucial stage for the brain development. When we endow our child to the care of a maid, we are trusting her not only with just to feed our child and make the child in a good manner. The baby monitoring and Tracking system which is proposed in this paper promises that the parents can see and listen to their kid and also they can track the location where the kid go with the maid by using Tracking device. The parents can monitor the kid from anywhere and anytime by the use of computer/Laptops or other devices. They can watch the video streaming of the kid, audio, and analyze the temperature of the kid's room. When the maid taking the kid outside the house, we can track the location by the use of wearable device as well as by the android app. The Raspberry Pi 3 is the latest version to be used in this device. Compared with various tracking methods, our mechanism can significantly improve the efficiency of tracking using the Raspberry Pi 3 and the pixel accuracy is higher and consumes lesser power. This paper brings out a survey of various ways of child tracking system which are examined previously.

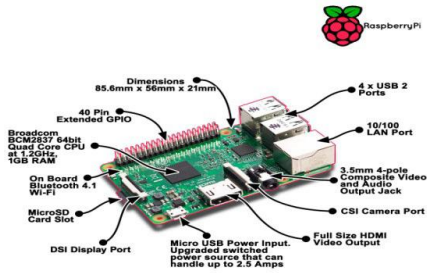
**Keywords:**-- Nannies, Children safety, Raspberry pi 3, Monitoring, Tracking.

## I. INTRODUCTION

The Internet of Things places the major role in tracking and monitoring systems. The Internet of Things (IoT) is the network of visible objects or "entity" embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and/or other connected devices. It also refers to the burgeoning network of geological information's that feature an IP address for internet connectivity, and the connection that occurs between these objects and other Internet-enabled devices and systems.

Leaving your child in the care of a maid does more harm than good. Even some maids are taking the baby's food and the parents are unaware of that. The monitoring process gives the output as the Audio and HD video streaming to a smart device or computer, The system will be having the information's about of a web portal and a series of apps which can be used with the monitoring and Tracking device. This system allows parents to keep track of, and share, practical information such as diaper, feeding

and sleeping habits, in addition to monitoring. The monitoring device is an eccentric-looking device which connects to a Wi-Fi network. The Monitoring duties are dealt with by a 5 MP camera with an IR light for night-time viewing, and a audio sound microphone. When streaming video to a smart device or laptops / computer from within the home network the flick will be HD 720p resolution, but slightly lower when being used remotely away from the home. The parents can get an alert from the monitoring device when the baby cries or if the room temperature of the kid is too high or too low. They also get warnings if the battery is too low or the Wi- Fi is disabled. The smart monitor can wirelessly connect via Bluetooth 4.1 to an optional sleep sensor, which is placed under the child's sheets and warns if life signs aren't detected.



**Fig.1: Raspberry Pi 3 Functional Diagram**

The Raspberry Pi 3 is used in the monitoring and tracking system. The Raspberry Pi 3 was launched in February 2016. It uses a 1.2GHz 64-bit quad-core ARM Cortex-A53 CPU, has 1GB RAM, integrated 802.11n wireless LAN, and Bluetooth 4.1. GSM Modem with sim900 module is built with dual band GSM/GPRS. It works on frequencies 900/1800 MHz. It has variable baud rate with range 9600 to 115200. The GSM Modem has RS232 interface which allows it to connect device like PC, Raspberry Pi. Microcontroller etc. this module can perform the basic functions of a mobile phone like receiving and sending SMS, voice calls and TCP/IP communication over GPRS based on various commands.

## II. ORGANISATION

The remainder of this survey is organized as follows. The section III demonstrates the literature survey of various Child tracking methods in IoT with the methodologies used and its disadvantages, and the procedures to overcome the limitations. Section IV demonstrates the future enhancement of the paper. Lastly we draw a conclusion in section V.

## III. LITERATURE SURVEY

### 1. GPS based child care system using RSSI technique, Kok Sun Wong, Wei Lun Ng, Jin Hui Chong, dec 2009:

Kok, Wei and Jin in 2009 has proposed global positioning system[1] based child caring system. The location of the child is received by the parent node by the use of GUI program which is embedded into the mobile device. The Received signal strength indicator (RSSI) delivers the data which is extracted out from the Bluetooth connection and it is used to find the distance between the parent and the child. It acts like the locator to find the exact location of the child.

### 2. Wearable and implantable wireless sensor network solutions for healthcare monitoring, Ashraf Darwish and Aboul Ella hassanien, May 2011:

The purpose of this paper is monitoring the patients by providing a current developments snapshot and research about wearable and implantable body area network systems. Ashraf and Aboul explained that how the body sensor [3] networks are used in the medical field to help the chronically ill and elderly people to live independent life. The body sensor nodes are senses the biological information from the human body and wirelessly sends it to a control device worn on the body or it is placed in an accessible location. Previously the monitoring devices are not completely wearable because they have their electronics are bulky and wires are used for connections to multiple sensors. In this paper, to collect the information from sensors, the wireless control unit is used.

### 3. Smart wearable systems: Current status and future challenges, Marie Chan, Daniel Esteve, Jean-Yves Fourniols, Christophe Escriba, Eric Campo, November 2012.

There have been extensive efforts made in the development of Smart wearable systems for the purpose of health monitoring. There were various components and devices used ranging from sensors to multimedia devices. This paper explains the systems which are used from earlier and till now for monitoring purpose. It also explains [2] the implementation of wearable health care system. The authors analyzed that the usage of Non-invasive sensor systems for monitoring of daily activities of the human. The main objective of this paper is to provide the current status future perspectives in research and development of wearable systems.

### 4. Perspectives for Wearable Electronics in Healthcare and Childcare, Johanna Virkki, pasi Raunonen, July 2013:

Johanna and pasi proposed the literature survey of wearable electronics [3] in the field of health care and child care in the field of medical. In Childcare application, the wearable electronics could automate the children security and safety. The name, age, kindergarten group and allergies of the child has been tagged inside the cloth to identify the kid easily. This paper proposes, the RFID tags[1] were embedded in the children uniform to manage the security of the child. It has been implemented in day care centers and schools to supervise the children.

**5. GPS and SMS-Based Child Tracking System Using Smart Phone, A. Al-Mazloun, E. Omer, M. F. A. Abdullah, November 2013.**

Al-Mazloun, Omer and Abdullah have proposed the child tracking system by the use of smart phone. There were many cases of missing children in between the age of 14 to 17 years are identified. This paper reveals an Android based [9] application to help the parents to track their children in real world. The Android phones are mostly using the GPS and SMS services. By the help of this, the parents can track their children by the visual map of the particular location. Both the parents and also children should have a smart phone to use this service. To target more users, the Android SDK Tools and Eclipse supporting android devices are used here for implementation purpose.

**6. Globally accessible machine automation using Raspberry pi based on Internet of Things, V. Sandeep, K. L. Gopal, S. Naveen, A. Amudhan, and L. S. Kumar, 2015.**

The authors has proposed an automation system which is used to control the electronic appliances used in home with high security and mobility. The accuracy of the output will be more when we are using the Raspberry pi[11] micro-controller. All the electronic equipments will be connected to the raspberry pi microcontroller board which obtains [20] the input from the user through the website. The user can customize the electronic equipments by using the website and he can have several buttons of the electronic appliances in the board. Electromagnetic relays are used to connect the equipments in the Raspberry pi board.

**7. A context detection approach using GPS module and emerging sensors in smartphone platform, Wenchao Xu, Ruizhi Chen, Tianxing chu, Jingbin Liu, February 2015.**

In this paper, the Smartphone platform [9] which has the intelligent contextual thinking artificially and response to the context has highlighted the application and research value. The complex applications are enabled such as context awareness, recognition of activity, monitoring the health care and so forth. To optimize the effectiveness of the application the contextual information is needed. Based on the generic smart phone platform, the indoor and outdoor detection method is developed.

**8. Shahin S Rupalwala, Ms. Nabila Shaikh” ARM 11 Based Real-Time Video Streaming Server Using RTSP” JETIR Dec 2014**

In this paper the embedded processor [23] based on real time multimedia has been described. The users need not to download to watch video streams, instead they can use WiFi enabled handheld devices. The main objective of this paper is to provide the feature of Video-on-demand for the user. He can watch the video when ever he wants, he can pause it, rewind and forward the video. The performance is improved as well as the delay has been reduced by using the ARM 11 processor.

**9. J.Saranya „J.Selvakumar” Implementation Of Children Tracking System On Android Mobile Terminals” International conference on Communication and Signal Processing, August 2013, India**

This paper focuses on implementing children tracking system for every child attending school. The authors described that, the usage of Global Positioning System[1] tracker in the Ad fruit platform[22] to locate the current geographic location of the school bus. And the GPS data is send to Ad fruit platform in real time. The real time school bus route map is plotted by the Ad fruit platform as per the school bus travels from School to Child’s bus stop or child’s bus stop to the school. The parents can track the school bus from their home by the use of Android phone. They need not to be wait for a long time in the bus stop for the school bus. The different version of the ARM 7 microcontroller is used to sense even the crying sound of the children.

**10. Rajaram, G.P., Machindra, G.S., pooja Ramdas, J. and Yashwant, Implementation of Child Tracking System Using Mobile Terminals, 2016.**

In this paper, the authors proposed that once the child press the SOS button[4] (panic button) the message along with the location of the child, latitude, longitude will be send to the respective parents. In this paper SIM908EVB Kit is used to track the above information’s.

#### **IV.FUTURE ENHANCEMENT**

Here, we enhance our survey of child tracking and monitoring system using the latest IoT device which is essential for the society. We divide our proposal into two roles namely tracking and the monitoring. When the parents want to track or monitor the child they can do it remotely. The solution is to be proposed in future takes the advantage of the computers, laptops and rich features offered in smart phones for the safety of the children. In the future paper we can develop the android application for the same and locate the IP address of streaming the video and map the GPS link in android application. Features can

be added to enhance the system such as emergency alerts and many others. The proposed system will be implemented, continued, reviewed and improved in a later work.

### V.CONCLUSION

After Literature Survey, it's to be finding out that there is a need for child monitoring and tracking system using Raspberry Pi and Android Phone. And the hardware design is done and further looking for its implementation in next semester.

### REFERENCES

- [1] W. Kok Sun, N. Wei Lun, C. Jin Hui, N. Chee Kyun, A. Sali, and N. K. Noordin, "GPS based child care system using RSSI technique," in Communications (MICC), 2009 IEEE 9th Malaysia International Conference on, 2009, pp. 899-904.
- [2] Darwish A., Hassanien A.E. Wearable and Implantable Wireless Sensor Network Solutions for Healthcare Monitoring. *Sensors*. 2011;11:5561–5595.
- [3] Smart wearable systems: Current status and future challenges, Marie Chan, Daniel Esteve, Jean-Yves Fourniols, Christophe Escriba, Eric Campo, November 2012.
- [4] Johanna Virkki, Pasi Raunonen, "Perspectives for Wearable Electronics in Healthcare and Childcare" *Ehealth Telecommunication Systems and Networks*, Vol.2 No.3, 2013.
- [5] A. Al-Mazloun, E. Omer, M. F. A. Abdullah "GPS and SMS-Based Child Tracking System Using Smart Phone" *International Journal of Electrical, Computer, Energetic, Electronic and Communication Engineering* Vol:7, No:2, 2013.
- [6] V. Sandeep, K. L. Gopal, S. Naveen, A. Amudhan, and L. S. Kumar, "Globally accessible machine automation using Raspberry pi based on Internet of Things," in *Advances in Computing, Communications and Informatics (ICACCI)*, 2015 International Conference on, 2015, pp. 1144-1147.
- [7] X. Wenchao, C. Ruizhi, C. Tianxing, K. Lei, Y. Yanqin, L. Xiao, et al., "A context detection approach using GPS module and emerging sensors in smartphone platform," in *Ubiquitous Positioning Indoor Navigation and Location Based Service (UPINLBS)*, 2014, 2014, pp. 156-163.
- [8] S. S. Rupalwala, "ARM 11 based real-time video streaming server using RTSP protocol," 2015 International Conference on Electrical, Electronics, Signals, Communication and Optimization (EESCO), Visakhapatnam, 2015, pp. 1-5.
- [9] J. Saranya and J. Selvakumar, "Implementation of children tracking system on android mobile terminals," *Communications and Signal Processing (ICCSP)*, 2013 International Conference on Melmaruvathur, pp.961-965. doi: 10.1109/iccsp.2013.6577199
- [10] Rajaram, G.P., Machindra, G.S., pooja Ramdas, J. and Yashwant, P.P., 2016. Implementation of Child Tracking System Using Mobile Terminals. *Imperial Journal of Interdisciplinary Research*, 2(4).
- [11] Zahari, Z.L., Arshad, A. and Ghani, S.A., 2016. An Implementation of Raspberry Pi on Children Tracker Application. *International Journal of Applied Engineering Research*, 11(6), pp.3976-3979.
- [12] Swati H Chungde, Prof.V.M Kulkarni "A Smart City Approach for Child Tracking With Video Streaming" *International Journal of Innovative Research in Science, Engineering & Technology*. DOI:10.15680/IJRSET.2016.0509142 Vol 5, Issue 9, 2016.
- [13] Dian Chu, Chun-hua Jiang, "The design and implementation of video surveillance system based on H.264, SIP, RTP/RTCP and RTSP", April 2013.
- [14] P. Iyyanar, M. Chitra, and P. Sabarinath "Effective and Secure Scheme for Video Streaming Using SRTP" *International Journal of Machine Learning and Computing*, Vol. 2, No. 6, December 2012.
- [15] Min Xing, Student Member, IEEE, Siyuan Xiang, Member, IEEE, and Lin Cai, Senior Member, IEEE "A Real-Time Adaptive Algorithm for Video Streaming over Multiple Wireless Access Networks" *IEEE Journal on Selected Areas in Communications*, vol. 32, no. 4, april 2014

[16] Shruti Kametkar, Priyanka Deshmukh” School Bus Tracking System “International Journal of Innovative Science and Modern Engineering” April 2015.

[17] Eitaro Kohno, Tomoyuki Ohta ,Yoshiaki Kakuda ,Shinji Inoue and yusuke Akiyama, “Performance Improvement of hiroshima city children tracking system by correction of wrong registrations on school routes” Proc. 9th IEEE International Symposium on Autonomous Decentralized Systems (ISADS 2009), Athens, Greece, pp.261-265, 2009.

[18] Otsason, A. Varshavsky, A. LaMarca, and E. D. Lara,”Accurate GSM Indore Location,” in Proc. Ubiquitous Computing: 7th Int. Conf. (Ubi-Comp 2005), Tokyo, Japan, pp. 141–158.

[19] Adewumi O, Djouani K, and Kurien A. RSSI based indoor and outdoor distance estimation for localization in WSN. Ind. Technol. ICIT 2013, pp. 1534–1539.

[20] P. Vamsikrishna, S. D. Kumar, S. R. Hussain, and K. R. Naidu "Raspberry PI controlled SMSUpdateNotification (Sun) system, " in Electrical, Computer and Communication Technologies (ICECCT), 2015 IEEE International Conference on, 2015, pp. 1-4.

[21]"Raspberry pi Fundation. "

[22] [http:// io.adfruit.co.in](http://io.adfruit.co.in).

[23] Bharathi, G., and L. Ramurthy. "Implementation of children tracking system using ARM7 microcontroller." International Journal of Industrial Electronics and Electrical Engineering 2.12 (2014): 18-21.