

An Internet of Things Based Smart Mirror

Neeraj Kaushik

Department of Electronics and Communication Engineering
Faculty of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

ABSTRACT: *It is an all-around acknowledged truth that bringing up a kid is an incredibly dependable undertaking. One of the serious issues looked by guardians/watchmen these days is observing their youngsters while they are away grinding away. To screen them continually, there ought to be a system that can be effectively taken care of, easy to use and brilliant as per the quick headways in innovation. It is a keen mirror which will have the capacity to show propelled subtleties and interface with the client's advanced mobile phone by utilizing an Android application. Despite the fact that many smart mirrors have been grown beforehand, they had just a couple of highlights, for example, showing the date, time, and climate and news channels. In any case, the Raspbian reflect which is show in this paper is considerably more intuitive and progressed and will fundamentally target working guardians which will get warnings from the clients through their advanced mobile phones. The Raspbian enchantment mirror will show valuable data, for example, the date, time, climate and day by day updates, however it will likewise help guardians to screen their youngsters and help them with their examinations, and to sort out their everyday schedules. On account of young youngsters, guardians could utilize this mirror to appoint them family unit tasks also. This gadget could obviously be utilized as a normal mirror including all the above highlights that make everyday life simpler and quicker, which is a fundamental piece of home computerization too.*

KEYWORDS: *Internet of Things (IOT), Raspberry Pi, Home Automation, Mirror, Android.*

INTRODUCTION

In the present entangled world, effective child rearing turns out to be progressively significant, and guardians and watchmen must teach and raise their youngsters in a mechanically propelled condition. Youngsters need the direction of their folks like never before. However, in the present occupied world, where the two guardians are typically utilized, or on account of single guardians, this is very testing [1]. In any case, this issue could be defeated through a progressive gadget considered the Raspbian Magic Mirror that can be execute utilizing Raspberry pi innovation, which will be the subject of our examination dependent on IOT.

The smart mirrors presented by tech organizations' offer numerous administrations notwithstanding assuming the regular job of a mirror. They go about as advanced screen and show significant data, for example, updates, news channels, schedule, time and climate estimates [2]. In any case, the brilliant mirror as proposed by our exploration varies from current items since it targets families and gives an intelligent stage to guardians/watchmen to screen their youngsters while they are away grinding away, to empower them to help them with their examinations and to ensure their kids are sheltered at home, notwithstanding the highlights accessible in other smart mirrors[1]–[3]. This diminishes the time accessible for them to speak with their kids and to ensure that they are protected. It will likewise empower young people to make capable at their work.

This will be particularly helpful on account of contrastingly abled kids, since they would require increasingly grown-up oversight and consideration from their folks. The fundamental center is to spare the hour of working guardians, empower effective child rearing and make day to do life simpler and quicker which is a basic piece of home automation also. Raspbian Magic Mirror is a

smart mirror which will have the capacity to show advance subtleties and associate with the client's PDA by utilizing an Android application [4].

Since the Mirror is the primary gadget of its sort to be acquainted with the Sri Lankan showcase, it will empower us to quickly pick up piece of the pie and accomplish and keep up the status of market pioneer in Sri Lanka. Up until now, Raspberry innovation is at present not well known inside the Sri Lankan advertise, everyone accept the presentation of an intelligent gadget of this nature will improve the prominence of Raspberry innovation and aid the advancement of different other valuable applications utilizing this innovation. This part talks about the current writing that is accessible with comparative examinations from different pieces of the world.

BACKGROUND AND RELATED WORK

Since this examination depends on IOT utilizing Raspberry pi innovation, the foundation study was directed to recognize existing comparative systems so as to show signs of improvement result. Raspberry innovation has been utilized in many propelled applications with cutting edge results. This audit for the most part covers the approach followed out of sight study, including the focal points and burdens of the system [5]. One is about a smart reflect which is an intuitive system which has restricted highlights, for example, showing the date, time, and current climate condition and outside temperature and news sources. Be that as it may, it can basically show the data which is accessible on the Internet and can't associate with the advanced mobile phones utilizing an Android application. This smart mirror needs numerous highlights and individuals can't send warnings to the mirror, which is its principle hindrance which has not been settled as of not long ago.

The current research which is about an Environment Monitoring System can remotely screen natural parameters, for example, temperature, dampness, measure of CO₂ in air and a lot more in a given situation at any scale utilizing sensors, for example, DHT11 Digital Humidity and Temperature Sensor, ADIS16220 Digital Vibration Sensor and LPG Gas Sensor - MQ-6. Raspberry-pi utilized as the primary load up and sensors will gather all the continuous information from this condition and this constant information will be gotten by the web server and showed. This system can screen the vast majority of the parameters in nature and it is equipped for some other viable uses remembering checking of temperature and stickiness for a house, storehouse, nursery, or even an exhibition hall. Researcher present a Patient Monitoring System which can be utilized to remotely screen patients.

The physiological parameters, for example, temperature, circulatory strain, ECG and level of saline are estimated through WSN (Wireless Sensor Nodes) utilizing sensors, for example, Temperature sensor-LM 35, Blood pressure sensor, Level Detector, ECG anodes and RF modules. This will improve the typical existence of patient by decreasing the danger of disease and serious conditions when the specialist or medical attendant isn't close by. In any case, the serious issue of this system is the trouble to screen side effects that are not remotely noticeable, for example, melancholy and mental issue. Researchers talked about a safe and vitality effective Wireless Industrial Automation system which depends on Raspberry pi innovation. It controls mechanical gadgets, oversees power utilities and furthermore screens the worker exercises.

These are completely done through Wi-Fi connect with assistance of server PC. This server PC is secret word ensured and it very well may be opened distinctly by the approved individual. They have been principally centered around lessening the force utilization and to alarm the individuals about the basic circumstances in the business. This system forestalls more mishaps and gives greater security and protection to the associations like industry, training and clinics. This is a

system utilizing Raspberry pi on kids tracker application is for youngster's wellbeing security. This system for direction the client to recognize facilitate of their kids. In system advancement part, this correspondence procedure is begun from the system capable identify the kids organize and send it to the client web server.

Raspberry Pi is the principle controller of this system. Over all the system is easy to use and it permits to follow the youngster whenever anyplace in any climate condition. Home computerization is one of huge zone of Internet of Things (IOT) gives enormous advantages and furthermore give tad weaknesses. PIR sensor, Temperature sensor, Smoke or gas locator sensor, and Heater and water level sensor all sensors together make legitimate comprehension about how deal with the system. Researchers presents the utilization of IOT for Smart Home Automation system which incorporates a Raspberry Pi as a handling unit for information which is extricated from different sub-systems like, Temperature detecting system, Automatic light system, Cooling system, and Gas recognition system, Water level detecting system, Motion identification system and Lights on and off system [7].

With ease raspberry pi module actualize the clever procedures through ARM1176JZFS processor and associated choices and checking through the web. Getting to interconnected gadgets utilizing web through TCP/IP idea is most made sure about and proficiency way. It might rely upon estimating sensors information, controlling home machine, checking live status of gadgets. This examination presents technique for creating implanted web server system which utilizes SOC stage that can remotely obtain and control information for those individuals having the incapacities like elderlies, outwardly impeded, hearing hindered [8]. This venture utilizes equipment as Raspberry and TCP/IP, which gives high data transmission, economy and similarity. TCP/IP permits the distinctive processing gadgets to get to the site page which gives more prominent security, the client can peruse website page from various territory utilizing the home region arrange/web.

Researchers present a gadget which will suit the egg bring forth technique without the typical procedure. Notwithstanding that, an observing system has likewise been grown with the goal that the client can have constant gets to the gadget. In particular, its motivation is to make a domain where the egg brooding procedure happens in an all the more precise and safe way. This system at last has figured out how to give an ideal situation to the egg-incubating process. It empowers to control the warmth, dampness and mugginess of the hatchery and pivot/turn the egg plate for like clockwork. In any case, if there is in any event one issue in a hub, sits cause for entire system.

The exploration 'Brilliant Helmet' is an Intelligent Safety system for Motorcyclist utilizing Raspberry-Pi. It extricates moving articles and groups them as a cruiser or other moving items. From the saw bikes it recognizes cruiser riders and confirms that they are wearing protective caps or not. The system groups the head as wearing a protective cap or not utilizing KNN dependent on highlights got from 4 parts of sectioned head district. The advantages of presenting this system is improving security and diminish mishaps, particularly lethal to the motorcyclist, lessening outstanding task at hand of Traffic Policemen. And furthermore the system is low expensive and less unpredictability. Yet, its presentation can be restricted at a few climate conditions and furthermore this system is produced for Small zone[4]–[6].

Another system dependent on Zig Bee media transmission work remote system and Raspberry Pi control card is acknowledged for a total remote administration of a confine high proficiency road lightning system. The system utilizes gadgets and sensors to deal with the single road light post and to send data by a Zig Bee TLC system to a focal light post furnished with a Raspberry-Pi control Card ready to gather and expand data. The system as the name designates "Android based

home mechanization" Controls Home machines through Android gadget utilizing Wi-Fi as correspondence convention and Raspberry Pi as server system.

A tale design for a home mechanization system is proposed utilizing the generally new correspondence innovations. An easy to use interface for the android gadget permits the client to speak with the Raspberry Pi server. This system is adaptable and smart, versatile and have a wide scope of abilities. Likewise, its declines the establishment cost and exertion, giving security and verification, and the extra sellers can be effectively added to the system.

METHODOLOGY

This part talks about every period of model approach which has been utilized for the advancement of Raspbian Magic Mirror, methods of undertakings in each stage and materials delivered at each period of System Development Lifecycle.

Planning

The setting up the venture contract, WBS and the Gantt outline speak to proposed venture plan for advancement of the enchantment reflect by arranging time and booking the time term of the examination is viewed as the initial step to actualize this system. Setting up the spending comes as the subsequent stage of the arranging where its gives a money related system to the examination and dealing with a sensible use inside a booked timeframe is the principle focus of the undertaking. What's more, the subsequent stage is the achievability investigation. The primary motivation to do a possibility concentrate in the start of the venture is to see whether this undertaking is actually attainable and furthermore monetarily gainful inside the assessed cost

Analysis

Requirement social event, and investigation step have been apportioned a lot of days, since it shapes all the improvement steps and every single expected processor will rely upon it. It has fundamental two methodologies as essential and auxiliary information. Where in essential information, explicit polls that shows the objectives of the system were made and appropriated inside an example of sixty populace to get their reactions to make end with that.

The underlying example size was 70 and after the poll was led the reaction check was from 66 people. The dissected information shows that because of guardians' bustling public activity style it has influenced the Child conduct, Social way of life, Collaboration, Physical wellbeing, Technology factors and the time the board of checking the youngsters by the guardians. The optional information comprises of the data, determinations and the constraints that would be assembled by experiencing the previous research papers that has done through a similar research stream. By that it would enable the exploration to gathering to show signs of improvement thought to execute the system by maintaining a strategic distance from the previous issues that examination bunches have being confronted [7]–[9].

As per that, gathering and dissecting information has been a critical and significant period of this venture since it assisted with narrowing down the prerequisites and expand the necessities limited. Through the poll the task group has having the option to perceive the objective clients, the client desires from the application. The application will be intended to a particular gathering of guardians with vital assets required from the application. Recourses change from budgetary to non-money related factors, for example, instruction, living condition, and way of life.

It is sheltered to anticipate that the application should be a triumph since generally speaking investigation of the assembled information furnishes positive outcomes on having clients with the need of such application and willing clients to acknowledge such assistance.

Design

Designing the system comes as the following stage where it anticipates do the planning of the system which incorporates Mirror's structure, User interface plan and Mobile application plan. Structuring these three primary segments act a significant job in light of the fact that an appealing mirror causes clients to draw in towards it making it open to the promoting level. What's more, UIs and the portable application must be eye contacting.

Implementation

Once the system configuration is gotten the usage stage starts as the most time apportioned stage. It comprises of two primary segments, for example, equipment usage and programming execution. At the equipment usage, the physical mirror body is planned with the Two-way reflect, LED Monitor and the Raspberry Pi Circuit. Coding the program is done at the product execution where it again named frond end programming and back end programming. Database is additionally actualized and coordinated to a similar system inside this stage.

Software Platforms and Languages:

- Application Running on Raspberry Pi: Electron System which is utilized JavaScript, HTML5 and Node JS.
- Mobile Application: Android System utilizing Java Language.
- Web Application: Angular JS.
- Database: Mongo DB that is utilizing Non-Structured question language.

Testing

Testing is the last stage that assists with assessing the nature of the program and furthermore for improving it, by recognizing deformities and issues. Likewise, it confirms and approve that the program has meets its necessities. Testing is done in three different ways with the end goal that unit testing, joining testing and system testing separately. Unit testing goes under discovery strategy technique and the individual units/segments of a product are tried. In the mix testing singular programming modules are consolidated and tried as a gathering. Programming testing where a total and incorporated programming is tried. It assesses the system's consistence with the predefined necessities [10].

RESULTS AND DISCUSSION

This part examines the outcomes and their conversation that the examination group accomplished from the exploration venture. The significant ramifications of the examination discoveries, paying little mind to the measurable noteworthiness of this exploration are talked about underneath. Further, Identifying the imperfection and confinement of this task can be valuable for future scientists so as to proceed with their examination.



Fig 1: Smart Mirror Overview

The motivation behind this task was to build up a Smart Mirror which is completely practical observing system for guardians, where causes the guardians to remind/support (plan for the day) their youngsters in considers and extracurricular exercises and get them to work by sending notice. It will be exceptionally simple for the parent to screen their youngsters while they are in the work. The system comprises of two regions, for example, Smart Mirror and the android application as illustrated in figure 1. The essential object of the Mirror is to see the assignment (update) which is send by the guardians and to send an answer to the parent by the voice order whether the errand is done or not. What's more, the android application will be utilized to send undertakings and screen the kids. It will make the youngster increasingly keen on doing their home works and everyday exercises.

Principle goal of this venture was to introduce a system which is completely useful and covers hues, structures, words, and to support kid's exercises. The utilization of the system could occur in any land region. In this way, the kid will perform effectively with intrigue and joy. The interfaces of the Mirror have structured explicitly for the youngsters. The system is easy to understand and the interfaces are beautiful and alluring. The capacities must be deliberately picked which permits clients to work with the system for quite a while. Applying required capacities were issue that happened during configuration stage. This was illuminated by conversation between colleagues.

There were numerous specialized issues that are looked by the examination group during the turn of events. The most basic issue was the system disappointment when testing the functionalities. It was overwhelmed by a legitimate WI-FI availability. And furthermore, the IP addresses were changed when the system has turned on in each time before the group has facilitated it in a server. The group has confronted numerous difficulties when building up the system, for example, to locate a two-route reflect in Sri Lanka. Thusly, group has requested it from e cove to defeat it. The improvement of the mirror could have a lot of simple if the screen of the mirror is contact screen one. The Reliability of the system relies upon the exactness pace of the system. As per the experiments done, the principle functionalities worked appropriately. There were just barely any deformities discovered when testing the functionalities. In any case, the group has figured out how to illuminate the imperfections up to some level. In the last assessment the precision pace of the system is around 90 % and the 10% is depend on the system signal quality.

CONCLUSION

It is an all-around acknowledged truth that bringing up a youngster is an incredibly dependable errand. One of the serious issues looked by guardians/watchmen these days is checking their youngsters while they are away grinding away. The Raspbian Magic Mirror system gave far reaching answer for the working guardians. The Smart mirror which is completely practical foreseeing system for guardians, to remind/support (plan for the day) their youngsters in contemplates and extracurricular exercises and get them to work by sending notice. The cultivated work will be check by sending a voice note through the mirror to their folks.

The keen mirror will show expansion subtleties, for example, climate, time, date, schedule with refreshes. Building up a versatile application to control the mirror. The group utilizes Raspberry Pi innovation, to actualize a mirror with the aim of empower a productive child rearing. At last, the undertaking effectively accomplished to satisfy all the destinations of this system and expectation this exploration would be of advantage. The examination group trusts that this investigation will be useful for the specialists who are keen on the subjects like youngsters observing system, following system just as systems that are identified with IOT. It will likewise give better thoughts and more information to execute comparative sort of ventures.

- During the improvement of this undertaking, coming up next are the impediments distinguished:
- To utilize the system clients must have an Android cell phone with the application introduced.
- If the Internet association is down, the system won't have the option to proceed with the availability and the information won't be put away in the database.
- Data exchange may disengage when the server goes down.

Because of the web issue, the information exchange from the portable application to the database and database to the mirror may get moderate. This paper proposed a genuine world Raspbian Magic Mirror plot which is actualizing in existing by the exploration group. In future, scientists with related region of intrigue can convey the proposed conspire and carryout expansion execution, for example, methodology the system with the other language. Applying to genuine setting will prompt exact adaptability in precise child rearing examining Raspbian Magic Mirror.

REFERENCES

- [1] B. L. Risteska Stojkoska and K. V. Trivodaliev, "A review of Internet of Things for smart home: Challenges and solutions," *Journal of Cleaner Production*, vol. 140. pp. 1454–1464, 2017, doi: 10.1016/j.jclepro.2016.10.006.
- [2] M. Alaa, A. A. Zaidan, B. B. Zaidan, M. Talal, and M. L. M. Kiah, "A review of smart home applications based on Internet of Things," *Journal of Network and Computer Applications*. 2017, doi: 10.1016/j.jnca.2017.08.017.
- [3] S. M. R. Islam, D. Kwak, M. H. Kabir, M. Hossain, and K. S. Kwak, "The internet of things for health care: A comprehensive survey," *IEEE Access*, 2015, doi: 10.1109/ACCESS.2015.2437951.
- [4] D. Singh, G. Tripathi, and A. J. Jara, "A survey of Internet-of-Things: Future vision, architecture, challenges and services," 2014, doi: 10.1109/WF-IoT.2014.6803174.
- [5] J. Jin, J. Gubbi, S. Marusic, and M. Palaniswami, "An information framework for creating a smart city through internet of things," *IEEE Internet Things J.*, 2014, doi: 10.1109/JIOT.2013.2296516.

- [6] J. Lin, W. Yu, N. Zhang, X. Yang, H. Zhang, and W. Zhao, "A Survey on Internet of Things: Architecture, Enabling Technologies, Security and Privacy, and Applications," *IEEE Internet Things J.*, 2017, doi: 10.1109/JIOT.2017.2683200.
- [7] W. Ejaz, M. Naeem, A. Shahid, A. Anpalagan, and M. Jo, "Efficient Energy Management for the Internet of Things in Smart Cities," *IEEE Commun. Mag.*, 2017, doi: 10.1109/MCOM.2017.1600218CM.
- [8] W. Yu *et al.*, "A Survey on the Edge Computing for the Internet of Things," *IEEE Access*. 2017, doi: 10.1109/ACCESS.2017.2778504.
- [9] M. M. Rathore, A. Ahmad, A. Paul, and S. Rho, "Urban planning and building smart cities based on the Internet of Things using Big Data analytics," *Comput. Networks*, 2016, doi: 10.1016/j.comnet.2015.12.023.
- [10] J. (2016). U. P. D. for M.-C. M. M. N. I. C. L. <https://doi.org/10.1109/LCOMM.2016.257169>. Han, Y., & Lee *et al.*, "Optimal Constellation Design for Indoor 2×2 MIMO Visible Light Communications," *IEEE Communications Letters*. 2016, doi: 10.1109/LCOMM.2015.2512601.

