IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION

Naliya Thiran Project Report

IBM-Project-7160-1658848699

TEAM ID : PNT2022TMID08691

A project report submitted by

SRI RATHANVIGNESH S	(727619BEC003)
PON BALAJI S	(727619BEC005)
VIJAY P	(727619BEC083)
HARIPRASAD J	(727619BEC093)

In partial fulfillment for the award of degree

of
degree of bachelor of engineering
in
ELECTRONICS AND COMMUNICATION ENGINEERING

Dr.Mahalingam College of Engineeering and Technology
Pollachi-642003

Table of Content

Abstract

The current number of working mothers has greatly increased. Subsequently, baby care has become a daily challenge for many families. Thus, most parents send their babies to their grandparents' house or to baby care houses. However, the parents cannot continuously monitor their babies' conditions either in normal or abnormal situations. Therefore, an Internet of Things-based Baby Monitoring System (IoT-BBMS) is proposed as an efficient and low-cost IoT-based system for monitoring in real time. We also proposed a new algorithm for our system that plays a key role in providing better baby care whileparents are away. The overall percentage of child missing nowadays in the world is about 80%, out of which 74% are girl children and the rest are boys.Children are the backbone of one's nation, if the future of children was affected, it would impact the entire growth of that nation. Due to the emotional and mental stability of the children gets affected which in turn ruins their career and future.These innocent children are not responsible for what happens to them. So, parents are responsible for taking care of their own children.But, due to economic condition and aims to focus on their child's future and career, parents are forced to crave for money. Hence, it becomes difficult to cling on to their children all the time.

In our system, we provide an environment where this problem can be resolved in an efficient manner.It makes parents to easily monitor their children in real time just like staying beside them as well as focusing on their own career without any manual intervention.

CHAPTER-1

1 INTRODUCTION

1.1PROJECT OVERVIEW

At present, female participation in the work force in the industrialized nations has greatly increased, thereby affecting infantcare in many families. Both parents are required to work due to the high cost of living. However, they still need to look after their babies, thereby increasing workload and stress, especially of the mother. Workingparents cannot alwayscare for their babies. They either send their babiesto their parentsor hire a baby caregiver while they are working. Some parents worry about the safety of their babies in the care of others. Thus, they go home to check on their babies during their free time, such as lunch or tea break. A baby monitoring system that can monitor the babies' condition real time is proposed to solve theseproblems. A baby monitoring system consisting of a video camera and microphone without limitations of coverage. It can send data and immediately notify the parents about urgentsituations, thereby shortening the time neededto handle such scenarios. Generally, babies cry because they are hungry, tired, unwell, or need their diaperchanged. Sudden InfantDeath Syndrome (SIDS)is also known as crib death,because many babieswho die of SIDS, are found in their cribs.It occurs to infants youngerthan 12 months old. Most SIDS deaths occur in infants younger than 6 months old [1]. Professionals still do not know the causes of SIDS, but risk can be reducedby letting the baby sleep on a firm surface(crib mattress). In addition, the baby should not sleep on a pillow or another a soft surface. The researchers do not know why sleeping on such surfaces increase the risk of SIDS, but they warn that it could be dangerous [2]. For instance, in 2003, a showed that placing an infant to sleep on soft bedding rather than on firm bedding appeared to pose five times the risk of SIDS [3]. Moreover, overheating should be avoidedduring sleep. Babiesshould be kept warm duringsleep, but the sound should not be extremelywarm. In winteror cold weather, the risk of SIDS increases, becausethe parents overdresstheir babies or place them under heavierblanket, thereby overheating them [4]. Therefore, if the room sound is comfortable for an adult, then it is also appropriate for the baby.

CHAPTER 2
LITERATURE SURVEY

2.1.EXISTING PROBLEM

Connor, StephenB., Timothy J. Quill, and James R. Jacobs. "Accuracy of drug infusionpumps under computer control." Biomedical Engineering, IEEE Transactions on 39.9 (1992): 980- 982.

Infusion rates demanded of the infusion pump in many computer-controlled drug delivery applications are made to change at intervals much shorter than those encountered under routine clinicaluse. The purposeof this study was to validate the volumetric accuracyof three commercially available infusion pumps operating in a demandingcomputer-controlled application. In independent 2-h evaluations, the infusion rate demanded of each pump changed as often as every 5, 10, or 15 s using an algorithm for computer-controlled pharmacokinetic model- driven intravenous infusion. Accuracy of the infusiondevices was determined gravimetrically. At all measurement times, each of the infusion pumps was accurate to within approximately +or-5% of the expected volumetric output under each of the infusion rate intervals tested. Flow rate accuracy of +or-5% is equal to the nominal expected accuracy of these infusion pumps in conventional clinical use.

Goepel, Ernst. "Theink drop sensor-ameans of makingink-jet printers more reliable."

An ink-dropsensor has been developed for use in ink-jet printersso that the function of the multi nozzle print head can be checked before printing starts or cyclically during printing. If the sensor detects that one or more nozzles have failed, the print head can be restored to correct operation in a service station. This process, which is completely automatic and requires no intervention on the part of the user, increases the reliability of the ink-jet printer. The sensor principle utilizes the electrical conductivity of the ink. When ink droplets from any nozzle in the print head are ejected onto comb like electrodes, conductive links are established between the prongs of these electrode combs, and changes in resistance can be measuredat the sensor terminals. These changes in resistance are then converted in a signal-conditioning circuitinto digital voltage signals. The author also discusses modifiedversions of the sensor suitablefor special applications such as measuringthe flight time ofink droplets and determining print position errors.

Sankaranarayanan, Sriram, et al. "A model-based approach to synthesizing insulin infusion pump

usage parameters for diabetic patients." Communication, Control, and Computing (Allerton), 2012 50th Annual Allerton Conference on. IEEE, 2012.

We presenta model-based approachto synthesizing insulininfusion pump usage parameters against varying meal scenarios and physiological conditions. Insulin infusion pumps are commonly used by type-1 diabetic patients to control their blood glucose levels. The amounts of insulin to be infused are calculated based on parameters such as insulin-to-carbohydrate ratios and correction factors that need to be calibrated carefully for each patient. Frequent and careful calibration of these parameters is essential for avoiding complications such as hypoglycaemia and hyperglycaemia. In this paper, we propose to synthesize optimal parameters for meal bolus calculation startingfrom models of the patient's insulin-glucose regulatory system and the infusion pump. Various off-the-shelf global optimization techniques are used to searchfor parameter valuesthat minimize a penalty function defined over the predicted glucose sensor readings. The penalty function “rewards” glucose levels that lie within the prescribed ranges and “penalizes” the occurrence of hypoglycaemia and hyperglycemia. We evaluate our approach using a model of the insulin-glucose regulatory system proposed by Dalla Man et al. using this model; we compare various strategies for optimizing pump usage parameters for a virtual population of in-silico patients.

Testing of Droplet-Based Microelectrofluidic Systems Fei Su, Sule Ozev, and Krishnendu Chakrabarty

Composite Microsystems that integratemechanical and fluidiccomponents are fast emerging as the next generation of system-on-chip designs.As these systemsbecome widespread in safety-critical biomedical applications, dependability emergesas a critical performance parameter. In this paper,we present a cost effectiveconcurrent test methodology for droplet-based Microelectrofluidic systems.We present a classification of catastrophic and parametric faults in

such systems and show how faults can be detected by electro statically controlling and tracking droplet motion.We then present tolerance analysisbased on Monte-Carlo simulations to characterize the impact of parameter variations on system performance. To the best of our knowledge, this constitutes the first attemptto define a fault model and to develop a test methodology for droplet-based micro electro fluidicsystems.

Das, Alok K., Anup K. Mandal,and Sadhan Banerjee."Measurement of liquid droplet parameters using optical fiber." Light wave Technology

The measurement of liquid dropletparameters such as size, number,concentration, viscosity, and refractive index is reported. The droplets are sprayed either from a pressure nozzle or a gas atomizing nozzle. The parameters are measured by detecting the clad mode power in the leaky ray zone of a three-region fiber by a new clad-probing technique, using normal core-clad fiber. The refractive index of the liquid is close to that of cladding. We present a classification of catastrophic and parametric faultsin such systemsand show how faults can be detectedby electro statically controlling and tracking droplet motion. We then present tolerance analysis based on Monte-Carlo simulations to characterize the impact of parameter variations on system performance. To the best of our knowledge, this constitutes the first attemptto define a fault modeland to develop a test methodology for droplet-based Microelectrofluidic systems. Taking the loss characteristics into account, the variation of output power with the deposition of droplets on the fiber is analyzed and compared with experimental results.The measurement sensitivity for different probing conditions is shown experimentally and verified by theoretical analysis. The change in bound power with the number of liquid droplets depositing on unclad fiber.

2.2 REFERENCES

1. UN, “WorldPopulation Aging 2013,” 2013, pp. 8–10.
2. R. Weinstein, “RFID: A technical overview and its application to the enterprise,” IEEE IT Prof., vol. 7, no. 3, pp. 27–33,May/Jun. 2005.
3. P. Gope, T. Hwang, “Untraceable Sensor Movement in Distributed IoT Infrastructure,” IEEE Sensors Journal,Vol. 15 (9), pp. 5340 – 5348, 2015.
4. P. Gope, T. Hwang, “A Realistic Lightweight Authentication Protocol Preserving Strong Anonymity for Securing RFID System,” Computers & Security (Elsevier Journal), Vol. 55, pp. 271–280, 2015.
5. P. Kumar,and H. Lee, “Security Issues in Healthcare Applications Using Wireless Medical Sensor Networks: A Survey.” Sensors(Basel, Switzerland) 12.1 (2012): pp. 55–91.
6. D. Malan, T. F. Jones, M. Welsh,S. Moulton, "CodeBlue: An Ad Hoc Sensor Network Infrastructure for Emergency Medical Care," Proceedings of the MobiSys 2004 Workshop on Applications of Mobile EmbeddedSystems (WAMES 2004); Boston,MA, USA. 6–9 June 2004.
7. K. Lorincz, D. J. Malan, T. R. F. Fulford-Jones, A. Nawoj, A. Clavel, V. Shayder, G. Mainland, M. Welsh, "Sensor Networks for Emergency Response: Challenges and Opportunities", Pervas.
8. A. Wood,G. Virone, T. Doan, Q. Cao, L. Selavo, Y. Wu, L. Fang, Z. He , S. Lin, J. Stankovic, "ALARM-NET: Wireless Sensor Networks for Assisted-Living and Residential Monitoring," Department of Computer Science,University of Virginia; Charlottesville, VA, USA: 2006. Technical ReportCS-2006-01;
9. S. Pai, M. Meingast, T. Roosta, S. Bermudez, S. Wicker, D. K. Mul ligan , S. Sastry, "Confidentiality in Sensor Networks: Transactional Information," IEEE Security and PrivacyMagazine. 2008
10. J.W.P. Ng, B.P.L Lo, O. Wells, M. Sloman, N. Peters, A. Darzi, C. Toumazou, G. Yang, "Ubiquitous Monitoring Environment for Wearable and Implantable Sensors(UbiMon)," Proceedings of 6th International Conference on Ubiquitous Computing (UbiComp’04); Nottingham, UK. 7–14 September 2004.
11. Office for Civil Rights, United State Department of Health and Human Services Medical Privacy. National Standards of Protect the Privacy of Personal-Health-Information.Availableonline: http://www.hhs.gov/ocr/privacy/hipaa/administrative/privacyrule/inde x.html (accessed on 15 June 2011).

12. R.Chakravorty, "A Programmable Service Architecture for Mo bile Medical Care," Proceedings of 4th Annual IEEE International Conference on Pervasive Computingand Communication Workshop(PERSOMW'06); Pisa, Italy. 13–17 March 2006.
13. J. Ko, J. H. Lim, Y. Chen, R. Musaloiu-E, A. Terzis, G. M. Masson, "Median: Medical EmergencyDetection in SensorNetworks," ACM Trans.Embed. Comput. Syst. vol. 10, pp. 1–29,2010.

2.3.PROBLEM STATEMENTDEFINITION

Under fast-paced life conditions, everyone is busy in theirprofessional life includingparents. Theyleave the house early in the morning and come back before dinner time. Even the mothers are working. Thus, they do not have sufficient time to take care of their babies. Not all parents could afford a nanny to help them with their children. Then, after working for long hours, the mothers still have to manage the house and take care of their babies simultaneously. Parentsmight not havethe time to soothe their baby to sleep or rock their baby back to sleep in the middle of the night. Studies aboutthe effect of rocking a baby have been carriedout and found that babies sleep betterwhile being rocked or swung lightly because the rhythmic movement mimics the gentle rocking they felt while in their mothers' womb. Most available automated cradles are designed to rock non-stop.However, the rockingmovement can make the baby nauseous and uncomfortable. Thus,allowing the automated cradle to rock the baby to sleep in the middleof the night is also a problem.Furthermore, some parents place their baby in a separate room. Therefore, parents could not hearthe baby crying and could not be there to ease their baby back to sleep in the middle of the night. Other parents may be occupied with house chores. Thus, because they cannot hear their baby crying, they cannot attend to them immediately. Sometimes, the baby only needs a little distractionto return to deep sleep. Several types of baby cradles are available in stores, but they are expensive,and not everyonecan afford them.In addition, the existing automaticcradles in the literature havemany limitations in terms of functionality, cost, and communication technology support [12]–[15].To the best of our knowledge, no previous studieshave developed a smart cradlewith IoT support from scratch, similarto that in the presentstudy. To overcomethis problem, a new automaticIoT-based baby monitoring system (IoT-BBMS) is designed, allowingthe parents to access an accountto monitor the baby's condition anywhere and anytime.

CHAPTER -3

IDEATION & PROPOSED SOLUTION

3.1EMPATHY MAP

3.2Ideation & Brainstorming

3.2PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Cases of children missing has been increasing to minimize the crime and provide safety assurance to parent's certain safety measures are required like monitoring the location.
2.	Idea / Solution description	A smart band based on IOT technology that is capable of tracking the location and sending the information to relevant users.
3.	Novelty / Uniqueness	Including features such as geo fencing using the location from GPS for monitoring the moment of the children for safety purposes
4.	Social Impact / Customer Satisfaction	Improved safety index for children, freedom for children with special needs. Reducing crime rate by providing safety measures.
5.	Business Model (Revenue Model)	Product is mainly focused to attract parents as they provide a sense of safety. The product along with the cloud service subscription can be sold.
6.	Scalability of the Solution	As the product is offered with subscription service , further development in both software and hardware can be made

3.3PROBLEM SOLUTION FIT

<table>
<tr>
<td>1.CUSTOMER SEGMENT
Who is your customer?
i.e., working parents of 0-5 you. Kids Parents are the customer</td>
<td>6. CUSTOMER CONSTRAINTS
What constraints prevent your customers from taking action or limit their choices
of solutions? i.e., spending power, budget, no cash, network connection, available devices.
For predictive analytics to make the most impact on child protection practice and outcomes, it must embrace established criteria of validity, equity, reliability, and usefulness.</td>
<td>5. AVAILABLE SOLUTIONS
Which solutions are available to the customers when they face the problem
or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e., pen and paper
The most important reason for monitoring each child's development is to determine whether a child's development is on track. Looking for developmental milestones is important to understanding each child's development and behaviour.</td>
</tr>
<tr>
<td>2. JOBS-TO-BE-DONE / PROBLEMS
Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.
Overparenting tends to deprive children of bad and negative experiences, which are crucial to a child's emotional growth. One form of overparenting is excessive monitoring.</td>
<td>9. PROBLEM ROOT CAUSE
What is the real reason that this problem exists? What is the back
It's exactly what it sounds like—an exercise to determine the root cause for a failure or issue, so that the solution is based on the true problem, not just addressing the symptoms.</td>
<td>7. BEHAVIOUR
What does your customer do to address the problem and get the job done?
When children have frequent emotional outbursts, it can be a sign that they haven't yet developed the skills they need to cope with feelings like frustration, anxiety and anger. Handling big emotions in a healthy, mature way requires a variety of skills, including.</td>
</tr>
<tr>
<td>3. TRIGGERS
What triggers customers to act?
i.e., seeing their neighbour installing solar panels, reading about a more efficient solution in the news.
It's not the situation or the feeling that's the problem; it's how kids think about these things and what they say to themselves that causes problems. trigger</td>
<td>10. YOUR SOLUTION
If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.
▪ The most important reason for monitoring each child's development is to determine whether a child's development is on track. Looking for developmental milestones is important to understanding each child's development and behaviour.</td>
<td>8. CHANNELS of BEHAVIOUR
ONLINE
What kind of actions do customers take online? Extract online channels from #7
OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.
Understanding how children perceive and interact with the point of sale has been the focus of various studies in the past decade. It is well documented that children have preferences in terms of shopping destinations</td>
</tr>
</table>

CHAPTER 4

4.1REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENT

Then, we introduced a smart cradle that combines the concept of IoT with baby monitoring system. Subsequently, the selection of material for the smart cradle was carried out. All the hardware and materials used in buildingthis system, which were suitablefor a baby, were selected. The priority is to ensure the safety of the baby. The modelling phase is followed by the system design, determining the GUI of applications, and prototype phase. The systemdesign is separatedinto two phases, namely, the cradle design and control system design. A cradle prototype for the baby monitoring system was designed. In the controlsystem design, the types of electronic components were determined and purchased for implementation in the system. Then, coding was performed according to how the system was proposed. After the modelling phase, the designed baby monitoring systemwas then enhancedand optimized throughseveral tests to achieve the expected outcome. Subsequently, he system was installed on the cradle prototype for the testing phase before finalizing the smart cradle. When the testing failed due to some coding errors or other problems, the testing phase was repeated until the cradle achieved the expected outcome that satisfied the research objectives

The information regarding the components required in the baby cradle was decided to ensure that they can be installed without errors. We also surveyed available baby cradles that included a baby monitoring system in the market to gain some insights into the structure of the baby cradle. During this phase, the hardware and software components used in this study were selected. The hardware components included the following: • NodeMCU ESP8266 Wi-Fi Controller Board • 12V DC Power source • Four-channel 5 V relay module • Sound sensor module • Sound and humidity sensor • Mini fan • 12 V DC geared motor • Wireless security camera • Baby cradle The software components includethe following: • Nx Siemenssoftware.Fritzing software • Proteus Stimulation • Arduino IDE software • MQTT Protocol server After the selection process of the components, we designed and fabricated the baby cradle,into which IoT-BBMSwas subsequently installed.

4.2NON FUNCTIONAL REQUIREMENTS

Usability

The system shall allow the users to access the system with pc using web application. The system uses a web application as an interface. The system is user friendly which makes the system easy

Availability

The system is available 100% for the user and is used 24 hrs a day and 365 days a year. Thesystem shall be operational 24 hours a day and 7 days a week.

Scalability

Scalability is the measure of a system's ability to increaseor decrease in performanceand cost in response to changes in application and system processing demands.

Security

A security requirement is a statement of needed securityfunctionality that ensuresone of manydifferent securityproperties of softwareis being satisfied.

Performance

The information is refreshed depending upon whether some updates have occurred or not in the application. The system shall respond to the memberin not less than two seconds from thetime of the request submittal. The system shall be allowedto take more time when doing largeprocessing jobs. Responses to view information shall take no longer than 5 seconds to appearon the screen.

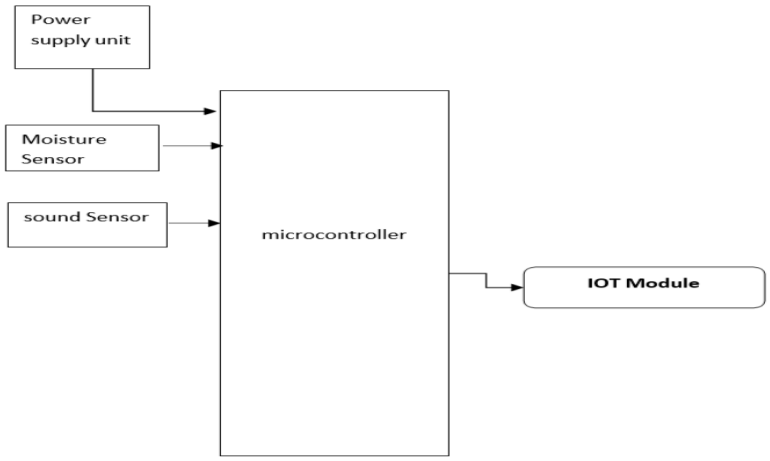
Reliability

The system has to be 100% reliabledue to the importance of data and the damagesthat can becaused by incorrect or incomplete data. The systemwill run 7 days a week. 24 hours a day.

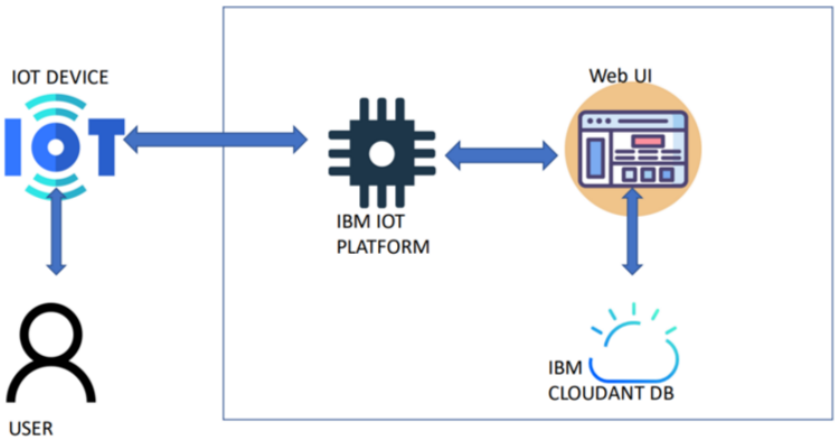
5 PROJECT DESIGN

5.1DATA FLOW DIAGRAMS

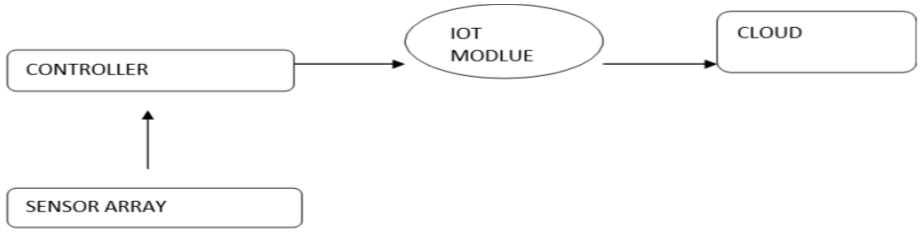
The Autonomous position detection and tracking system enhances the accuracy of locating friends and family member's positions by using GPS and standard web technology. This system includes a mobile client, a repository, a web client and a map service.



5.2 SOLUTION & TECHNICAL ARCHITECTURE



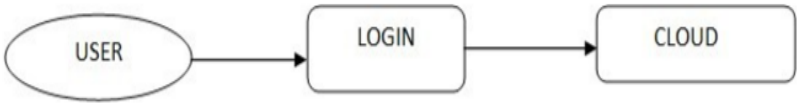
MODULE 1



The Internet of things refers to a type of networkto connect anything with theInternet based on stipulated protocolsthrough information sensingequipments to conductinformation exchange and communications in order to achieve smart recognitions, positioning, tracing, monitoring, and administration. In this paper we briefly discussed about what IOT is, how IOT enables different technologies, about its architecture, characteristics & applications, IOT functional view & what are the future challenges for IOT.

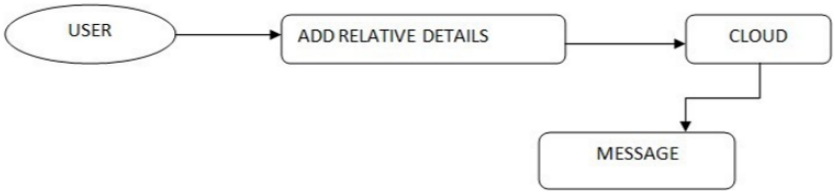
Internet of Things is a new revolution of the Internet.Objects make themselves recognizable and they obtain intelligence by making or enabling context related decisions thanks to the fact that they can communicate information about themselves. They can access informationthat has been aggregated by other things, or they can be components of complex services. This transformation is concomitant with the emergenceof cloud computingcapabilities and the transition of the Internettowards IPv6 with an almost unlimited addressing capacity

MODULE 2



Today we are going to build a registration system that keeps track of whichusers are admin and which are normal users. The normal users in our application are not allowed to access admin pages. All users (Admins as well as normal users) use the same form to login. After logging in,the normal users are redirected to the indexpage while the admin users are redirected to the adminpages.

MODULE 3



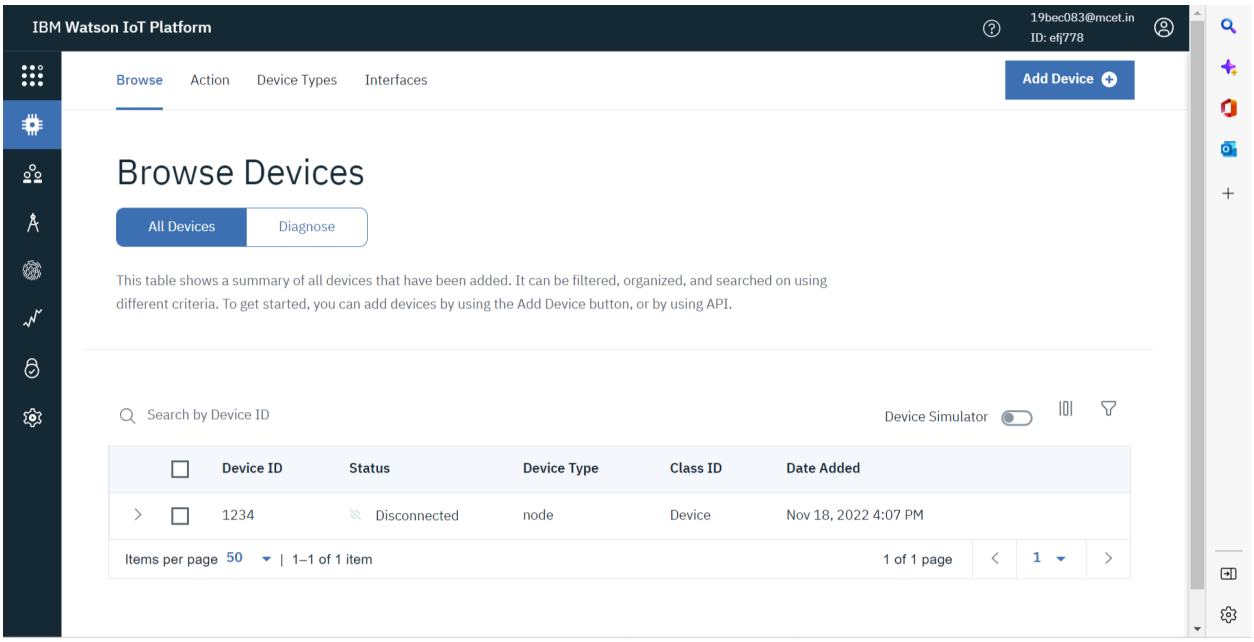
Smart phones are basic needs of our daily life. It’s like a small computer which gives you many facilities such as web browsing, downloading and many more but small data storage space and backup are major problem. On the other hand cloud computing providesefficient computational resources and secure data hosting services. But the data transmission amongtwo secure networks is performed over unsecured network.So need a design to secure data transfer.

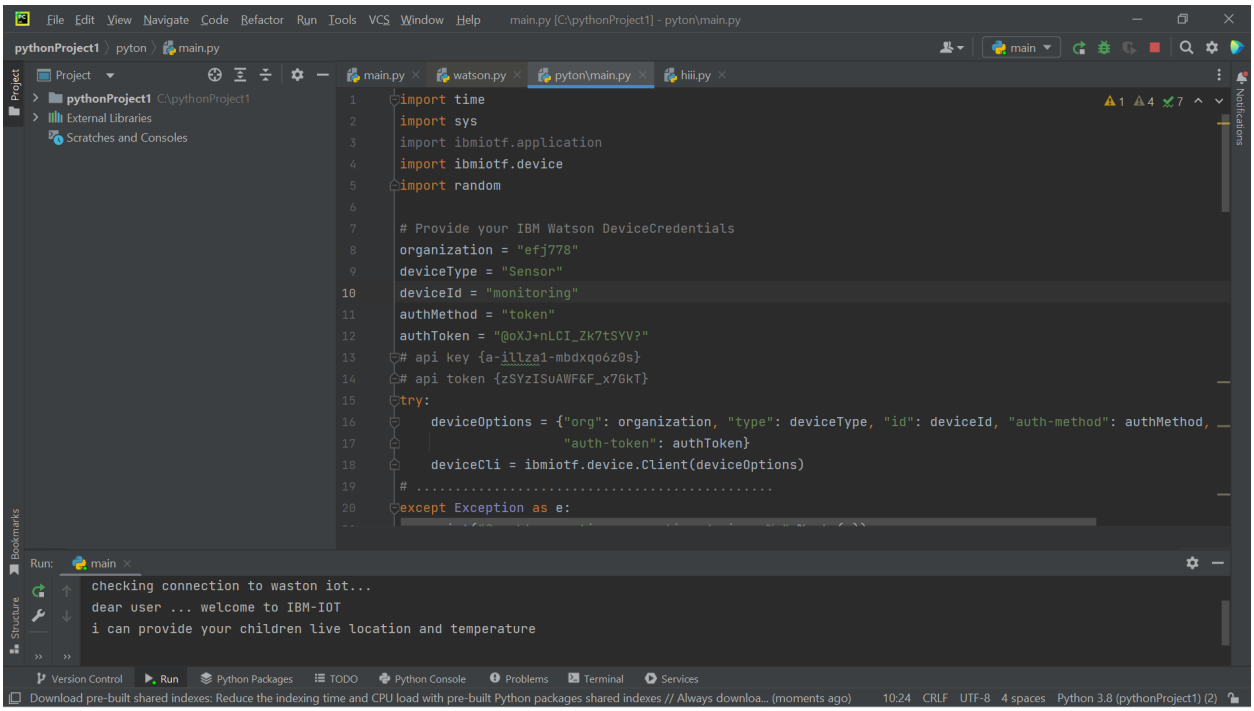
CHAPTER 6

Project Planning & Scheduling

6.1 Sprint Planning & Estimation

Sprint planning is an event in scrum that kicks off the sprint. The purpose of sprint planning is to define what can be delivered in the sprint and how that work will be achieved. Sprint planning is done in collaboration with the whole scrum team.

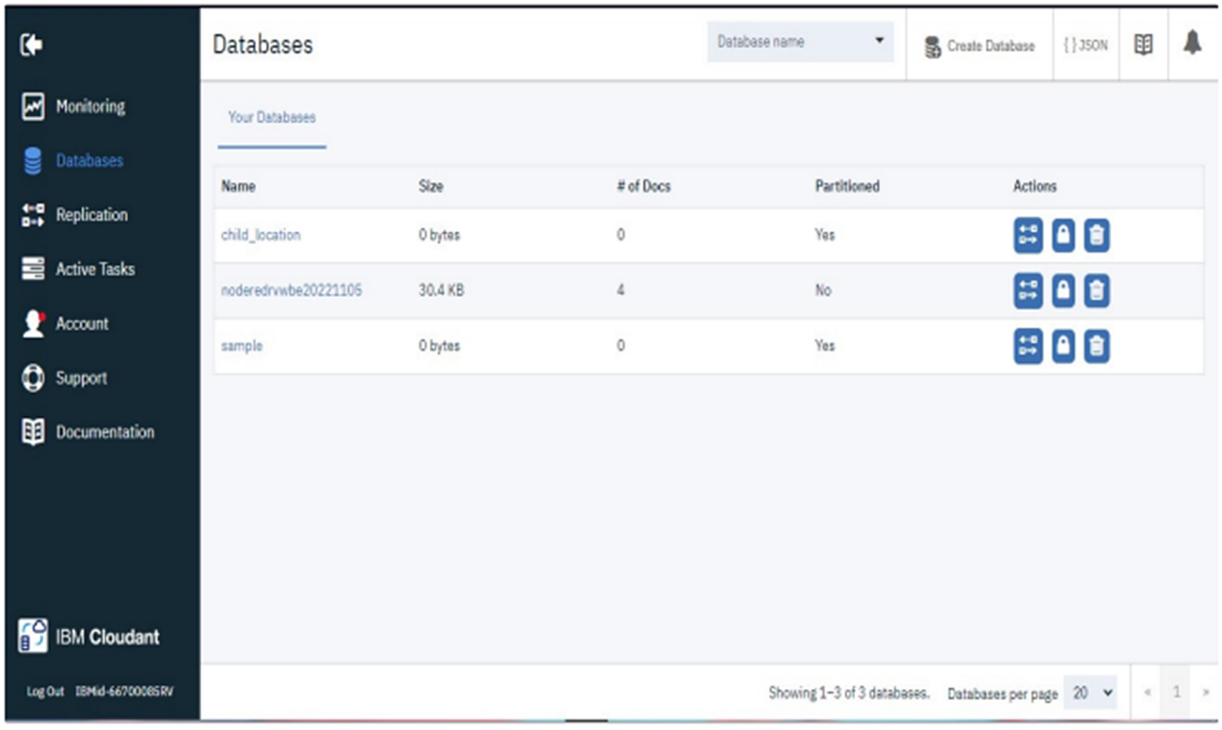




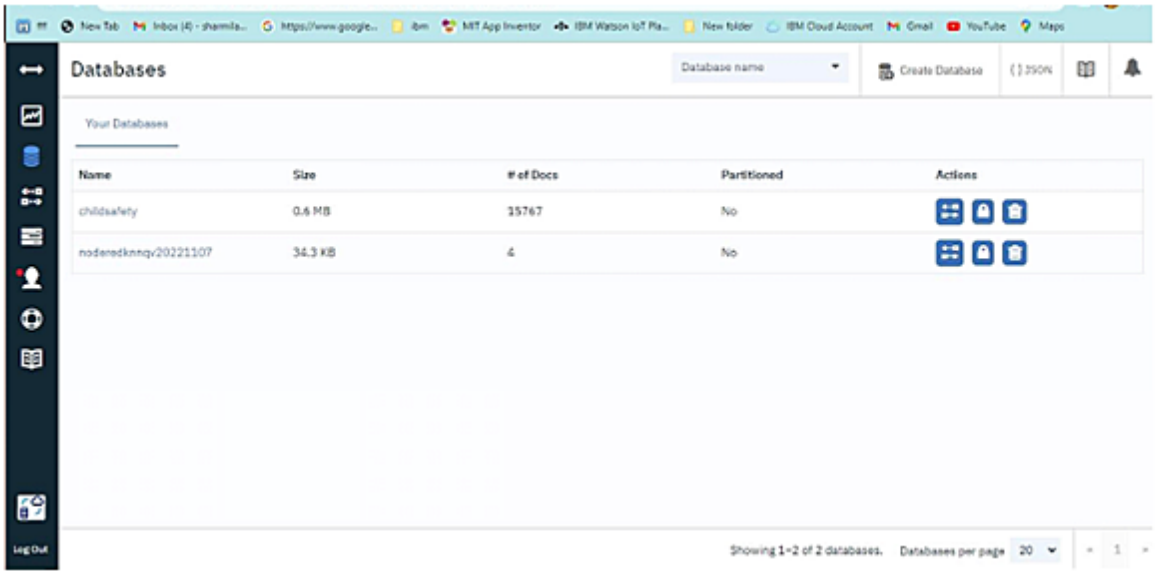
Implementing the node-red in IBM cloud

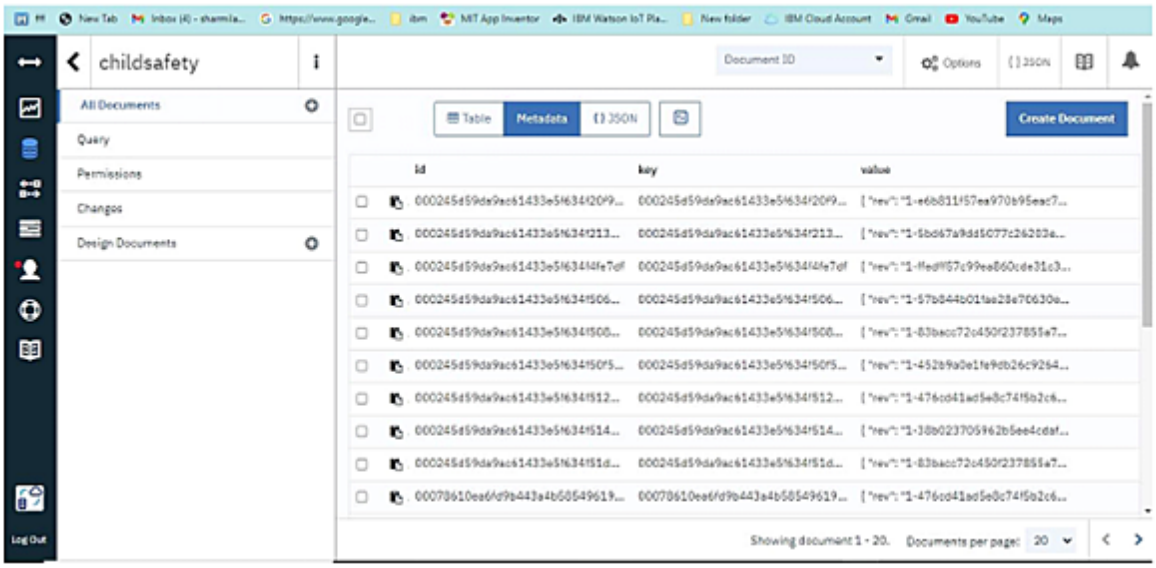
Designing the node-red workflow for our project

Launch the cloudant DB and create a database to store the location data

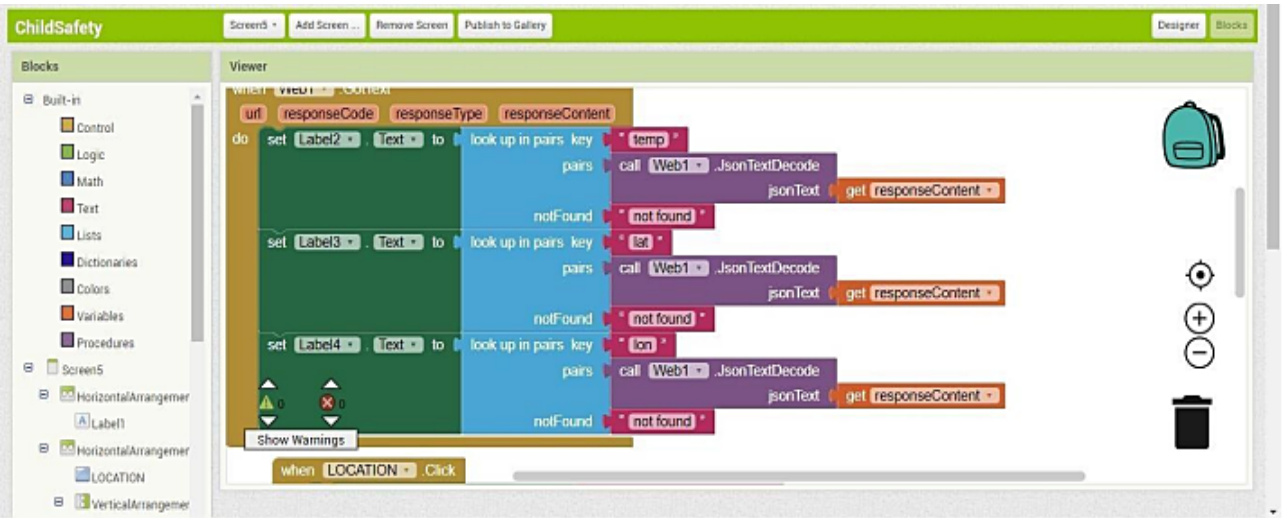


For our project we are creating a database called child_loaction.





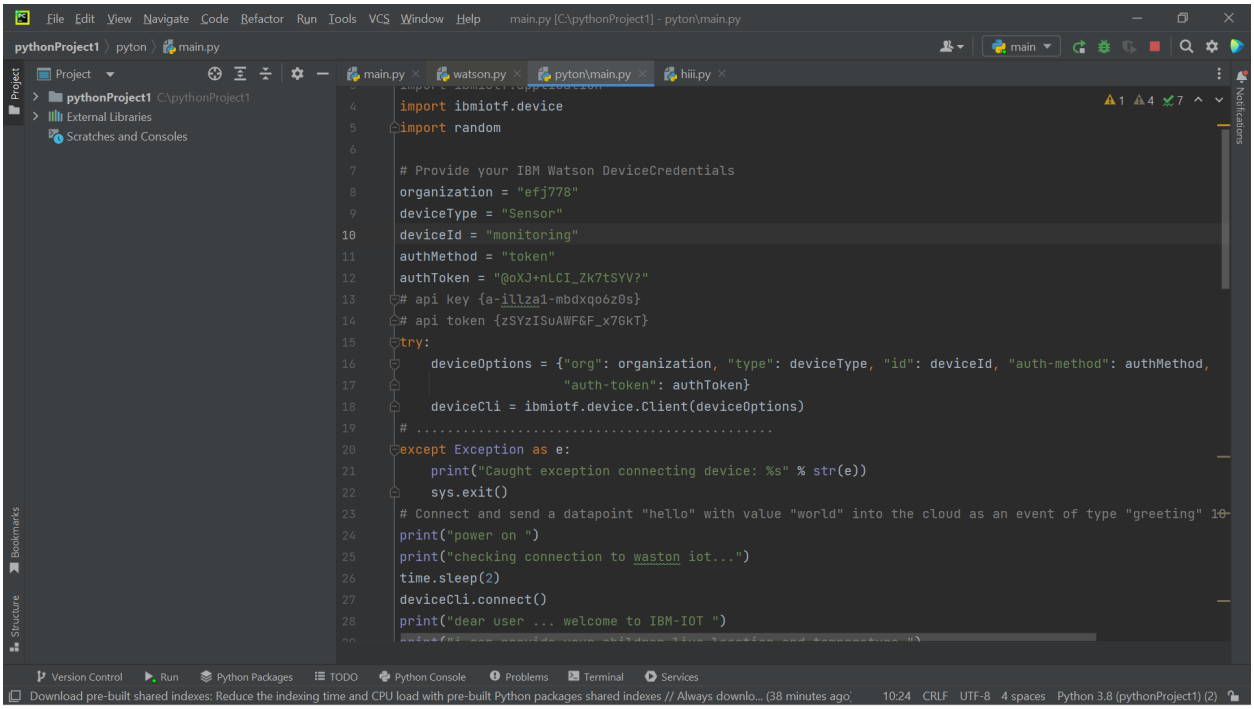
Connecting theNode-Red Service and MIT app With Web Uland Show the child location and notify



Chapter 7
7.CODING & SOLUTIONING

Cloud computing is the delivery of different services through the Internet, including data storage, servers, databases, networking, and software. Cloud storage has grown increasingly popular among individuals who need larger storage space and for businesses seeking an efficient off-site data back-up solution.

Cloud solutions, also known as cloud computing or cloud services, deliver IT resources on demand over the Internet. With cloud solutions, IT resources can scale up or down quickly to meet business demands. Cloud solutions enable rapid access to flexible and low-cost IT resources without large upfront investments in hardware or time-consuming installation and maintenance.



7.1 FEATURE

Child safety device is know for The LinkIt ONE board is an open source platform. It consists of inbuilt Wi-Fi, GSM, GPS and Bluetooth modules. The link it one board is similar to the arduino board and it is termed as all-in-one prototyping board for wearable's and IoT devices. The board consists of ARM7 EJ-S and the clock speed is 260MHz. A SIM and SD card slots are provided on the board itself. For the audio purpose a headset slot is also provided. The link it one is a robust development board for the hardware and also used for industrial applications. Different components such as Temperature sensor, Touch sensor, heartbeat sensor, GSM, GPS modules and serial camera are connected to the LinkIt ONE Board along with builtinGSM, GPS modules. Lithium ion battery is used as DC supply required to energize it. A rechargeable battery can also be used for the above purpose. Temperature sensor block is shown in figure 1; temperature is one of the most commonly measured variables and is therefore there are many ways of

sensing temperature.For measuring body temperature of the child LM35 temperature sensor is used. The touch sensor has three main components on the circuit board. The first component comprises of resistors, transistors, capacitors, inductors, and diodes whose area is measured physically and its analogue signal is sends to an amplifier. Depends upon the resistant value of the potentiometer the amplifier amplifies the signal and sends the signal to analogue output of the module.The third component is comparator, when the signal falls under a specific value it is used to switch the output. A serial camera is used for the purpose of taking snapshot of the area surrounding the child. A miniature TTL serial JPEG camera is used because it is the best one for the purpose of wearable type. The camera can snap the images of different sizes of pixels and those images are pre-compressed into JPEG images.The heartbeat sensor is used in the proposed system for measuring the pulse rate. There is a heartbeat pulse sensor which is combined to simple optical heart rate sensor with amplification and nullification circuitry making it is fast and easy to get reliable pulse reading.The GSM/GPRS block is activated with a SIM card on the board. GSM standard used here is GSM900. They mainly differ‘s based on bandwidth and RF carrier frequency. GSM network consists of mobile station, Base station subsystem network and operation subsystem. The GPS module is provided for identifying the location of the child. GPS module receives the signals from satellites which are located miles away. The latitude and longitude of the location can be identified by the GPS module. The Link it ONE board consists of micro SD/SIM combo. The device sends the monitored parameters data such as Temperature, touch and pulse rate to cloud. When there are any abnormalities in temperature or touch or pulse rate readings, a SMS is sent to the parent/caretaker mobile phone immediately. After sending SMS the serial camera captures the International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-8 June, 2019 1793 Published By: Blue Eyes Intelligence Engineering Retrieval Number H6836058719/19©BEIESP & Sciences Publication snapshot in real time and is stored in SD card. From the SD card through the GSM module an MMS is sent to the particular mobile phone.

7.2 DatabaseSchema

Child Health Monitoring Using Sensor Technology is a framework to support a unique health care for children. Using this framework the parents and other related persons who take care the child’s and keep intense monitoring on the children’s physical health condition from anywhere.This framework also can be used to reduce or prevent things that can be harmful for children’s health, grow, and development progress. The CHC (Child Health Care) will be provides many features and such as notification and monitoring system to a professional health care of school as well as parent, based on the children (student) record.This framework will improve the children’s health, grow and development progress.With the rapid development of urbanization and industrialization in China, more and more children are studying and living in cities, which presents some safety challenges. To help guardians better monitor their children, the authors present ChildGuard, a child safety system based on mobile devices. ChildGuard provides an in-path safety function that monitors the real-time movement of children walking on the road. It also provides a region safety function that sets designated areas in which children can play. Children can be warned about potential risks, and their guardians can be informed of location or activity abnormities. Experiments show that ChildGuard has higher positioning accuracy and better real-time communication than similar systems. This article is part of a special issue on cybersecurity.

- To help guardians better monitor their children, the authors present ChildGuard, a child safety system based on mobile devices. ChildGuard provides an in-pathE safety function that monitors the real-time movement of children walking on the road. It also provides a region safety function

that sets designated areas in which children can play.

Chapter 8
8.Testing
8.1 Test cases

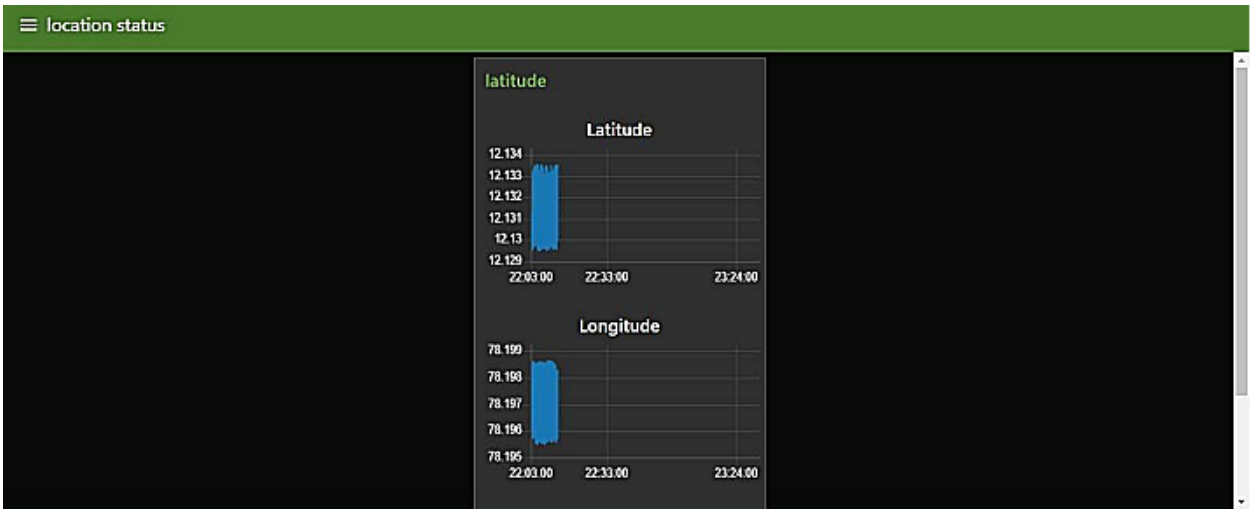
Today in introduce universe of advanced innovation and worldwide figuring each individual is associated with each other in number of ways. In current worldwide figuring world, the youngsters and ladies provocation, chain snatchings, hijacking, lewd activities, eve prodding, and so forth are expanded step by step, winding up more perilous and powerless. At the point when these risky circumstances happen there must be an inclining innovation to be agreeable to deal with. So we are proposing a framework that takes a shot at the debate of youngsters utilizing IOT. In this venture we proposed a gadget which is incorporated with different gadgets, containing wearable "Action Tracker Wrist Band" which is modified with all the required information which incorporates the conduct of human Health is fundamental need and it is human right to get quality Health Care. Nowadays India is facing many health issues because of less resource. This review paper presents the idea of solving health issues using latest technology, Internet of Things. It presents the architectural review of smart health care system using Internet of Things which is aimed to provide Quality Health Care to everyone. Using this system architecture, patients' body parameters can be measure in real time. Sensors collects patients body parameters and transfers that data to Arduino Uno which further transfer that data to cloud with the help of WiFi module. This data is stored into Thingspeak database server which manages data and provides accessibility. User can view this data with the help of Android App.This work mainly focuses on alerting the individuals arround baby so as to locate the baby in safer zone before arrival of the parent. Among all the available wearable devices focusing on the conditions to provide the locality, action and so forth of the child to the parents via wireless Wi-Fi and Bluetooth, Bluetooth and Wi-Fi (wireless fidelity)becomes a very inconsistent resource to the communication. Hence by the implementation of IOT technology it is planned to use SMS/MAIL as the method of communiqué between the parent and child wearable device.

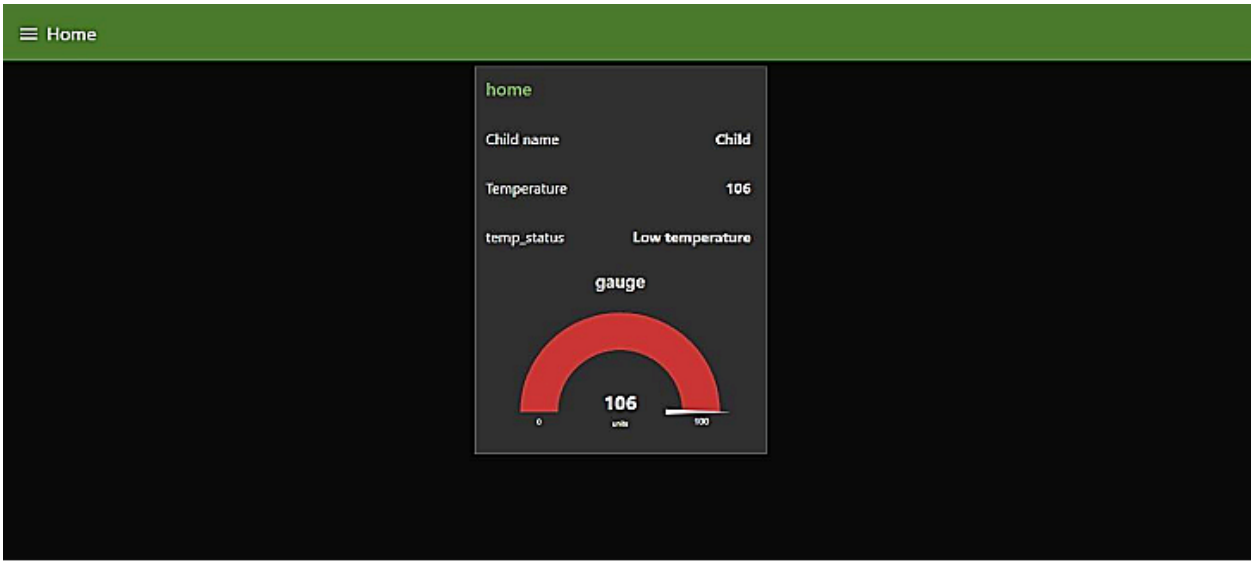
Chapter 9

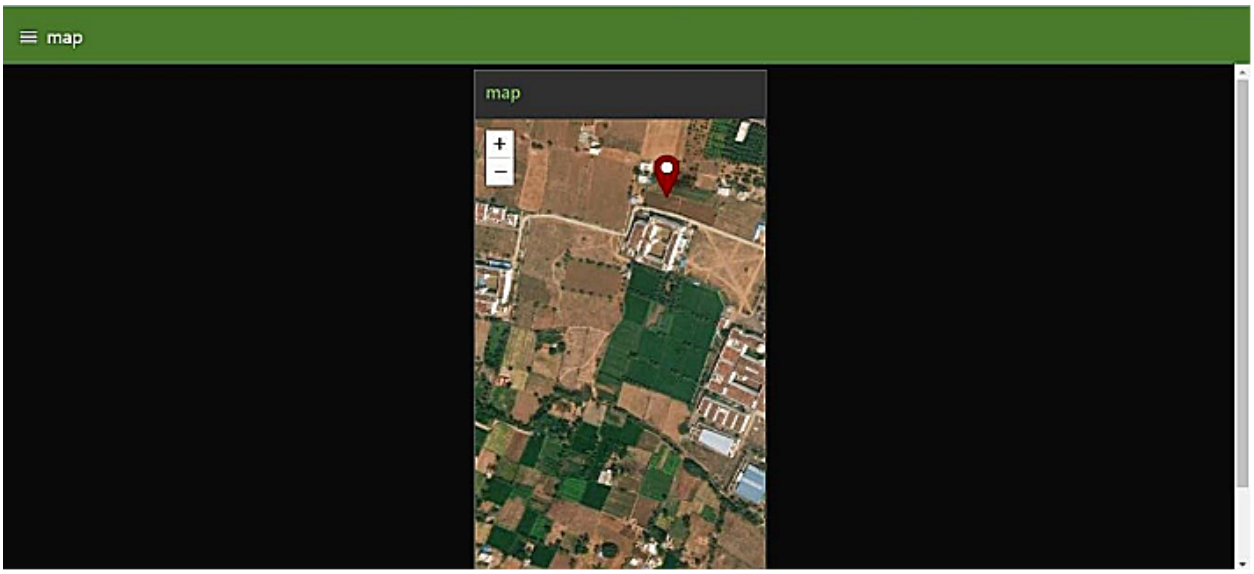
9.Results

9.1 performance metrics

Performance metrics are defined as figures and data representative of an organization's actions, abilities, and overall quality. Performance measurement is the process of collecting, analyzing and/or reporting information regarding the performance of an individual, group, organization, system or component . Definitions of performance measurement tend to be predicated upon an assumption about why the performance is being measured.







Chapter 10

10.Advantages and Disadvantages

Sometimes parents cannot reach a family-based arrangement about child maintenance. There might be no trust between you or other reasons that stop you agreeing child maintenance. Or you might prefer to involve the Child Maintenance Service (CMS) to assess and collect payments. CMS can also enforce a parent's payments.

Advantage:

- Using the Child Maintenance Service Direct Pay option is afree service
- This might be suitable if you have a strained relationship with the other parent. You may find it helpful for the Child Maintenance Service to collect and enforce the right level of maintenance to pay.
- If you don't know where the other parent is, or they don't want to accept responsibility,the Child Maintenance Service can try and trace them, assess payments, collect payments and enforce when they don't pay.
- The amount of child maintenance will be set by the Child Maintenance Service. They will provide parents with the relevant payment or collection schedules to advise them of their payment information.
- You can go back to a family-based arrangement in the future, if both parents agree.

Disdvantage:

- You have to share your details with the Child Maintenance Service. With a family-based arrangement, you only have to share your details with the other parent.
- When people have a family-based arrangement, this can get money to the receiving parent more quickly. Also it can be easier to resolve breakdowns in payment when a third party is not involved.

- There is a charge for the Child Maintenance Collect and Pay service.
- Due to the formal process and the paperwork involved with Child Maintenance Service arrangements, it can take time to update these arrangements, for example when your circumstances change.
- The more ‘legal’ things become, the harder it can be sometimes on your child andyour relationship with the other parent.

Chapter 11

11.Conclusion

This research demonstrates Smart IoT device for child safety and tracking helping the parents to locate and monitor their children. If any abnormal values are read by the sensor then an SMS is sent to the parents mobile and an MMS . The future scope of the work is to implement the IoT device which ensures the complete solution for child safety problems.

Chapter 12

12.Future scope

In our system, we use the Internet of Things, GPS, GSM, and Raspberry Pi to automatically monitor the youngster in real time. When we utilize a web camera and GPS to actively monitor, this system needs networkconnections, satellite communication, and a high-speed data connection. It is challenging to keep an eye out for any network problems or satellite connection problems. Additionally, there is a lag when streaming videos through the server. The Zigbee concept or accessing the system without the internet and employing high-speed server transmission can therefore be used in the future to solve these problems.

Chapter 13

13.APPENDIX
Source Code:

```
import time

import sys
import ibmiotf.application
import ibmiotf.device
import random



# Provide your IBM Watson DeviceCredentials
organization = "efj778"
deviceType = "Sensor"
deviceId = "monitoring"
authMethod = "token"
authToken = "@oXJ+nLCI_Zk7tSYV?"
# api key {a-illza1-mbdxqo6z0s}
# api token {zSYzISuAWF&F_x7GkT}
try:
    deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod,
                     "auth-token": authToken}
    deviceCli = ibmiotf.device.Client(deviceOptions)
# ..............................................
except Exception as e:
    print("Caught exception connecting device: %s" % str(e))
    sys.exit()
# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10
times
print("power on ")
print("checking connection to waston iot...")
time.sleep(2)
deviceCli.connect()
print("dear user ... welcome to IBM-IOT ")
print("i can provide your children live location and temperature ")
print()
name = str(input("enter your child name:"))
```

```
while True:
    temperature = random.randint(20, 50)  # random temperature for your child
latitude = random.uniform(10.781377, 10.78643)  # random latitude for your child
longitude = random.uniform(79.129113, 79.134014)  # random longitude for your child
a = "Child inside the geofence"
b = " Child outside the geofence"
c = "High temperature"
d = "Low temperature"
x = {'your_child_Zone': a}
y = {'your_child_Zone': b}
z = {'temp_condition': c}
w = {'temp_condition': d}


data = {'temp': temperature, 'lat': latitude, 'lon': longitude, 'name': name}




# print data
def myOnPublishCallback():
    print("Published Temperature = %s C" % temperature, "latitude = %s %%" % latitude, "longitude = %s
%%" % longitude,
          "to IBM Watson")
    print("\n")



success = deviceCli.publishEvent("IoTSensorgpsdata", "json", data, qos=0,
on_publish=myOnPublishCallback)
if latitude >= 10.78200 and latitude <= 10.786000 and longitude >= 79.130000 and longitude <=
79.133000:
    deviceCli.publishEvent("IoTSensorgpsdata", "json", data=x, qos=0,
on_publish=myOnPublishCallback)
    print(x)
    print("\n")
else:
    deviceCli.publishEvent("IoTSensorgpsdata", "json", data=y, qos=0,
```

```
on_publish=myOnPublishCallback)
    print(y)
    print("\n")


if (temperature > 35):
    deviceCli.publishEvent("IoTSensorgpsdata", "json", data=z, qos=0,
on_publish=myOnPublishCallback)
    print(c)
    print("\n")
else:
    deviceCli.publishEvent("IoTSensorgpsdata", "json", data=w, qos=0,
on_publish=myOnPublishCallback)
    print(d)
    print("\n")


if not success:
    print("Not connected to IoTF")
    print("\n")
    time.sleep(3)
# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

13.1Github:

https://github.com/IBM-EPBL/IBM-Project-7160-1658848699

13.2Project Demo link:

https://drive.google.com/file/d/10jAgveb0GNEvm2ldbBqgx4P-SCr4FroU/view?usp=share_link