

**IoT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION**

**P.S.R.RENGASAMY COLLEGE OF ENGINEERING FOR WOMEN**

**AN IBM REPORT**

**SUBMITTED BY,**

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**CHAPTER 1**

**INTRODUCTION**

**1.1 PROJECT OVERVIEW**

IoT systems are useful within a system to do deeper automation, analysis, and integration. IoT contributes to technology by advances in software, hardware and Internet of Things (IoT) plays a major role in every day to day life. The major difference between IoT and embedded system is that a dedicated protocol/software is embedded in the chip in case of embedded system, whereas, IoT devices are smart devices, which are able to take decisions by sensing the environment around the device. The development of sensors technology, availability of internet connected devices; data analysis algorithms make IoT devices to act smart in emergency situations without human interventions. So, IoT devices are applied in different fields such as agmodern tools. It even uses existing and upcoming technology in the fields of sensing, networking and robotics. IoT brings global changes by its advanced elements in the social, economic, and political impact of the users.

Child and women safety is a challenging problem nowadays due to antisocial elements in the society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the safety among children and women. Smart phones are playing major role for ensuring the safety, where some mobile based applications provide alert systems. During the emergency, mobile apps alert the control room of nearby police station or caretakers of children. The literature shows that location tracking devices are available in the market, but it does not provide the complete solution to the problem. The solution to this problem is to design an IoT device, which senses the child’s location and environment and during emergency, it should send the alert to the parents automatically.

**1.2 PURPOSE**

In fact, IoT has been applied in domains such as smart home, smart city, smart factory, supply chain, retail, agriculture, lifestyle, transportation, emergency, health care, environment, energy, culture and tourism [4] [32]. However, it is seldom used to monitor child’s safety in Malaysia. Actually, there is a need to use IoT-based child security system since the safety of children has become a major concern [14]. In fact, crimes on children keep increasing despite actions have been taken by the government. Revealed by [9], the overall percentage of child abasements worldwide is about 80% nowadays, out of which 74% are girls and the remaining are boys. For every 40 seconds, a child is gone missing in the world. Due to that, parents are worried for their children and perhaps, a hard challenge for them to guarantee safety of their children when they are out. To cope with the issue, the system is proposed with these objectives:  Enable tracking of the child’s location and capturing of data remotely such as temperature, pulse, respiratory rate, quality of sleep and many more.  To show the child's actual data with reference values.  Enable sending of notification if the child is out of location or when the device realizes abnormal conditions/situations.  To trigger the alarm and enable automatic video recording whenever the emergency button is pressed. Then, emergency notification along with real-time video will be sent to and display in the parents' mobile apps.  Develop a prototype of IoT wearable smart band connected to parents’ mobile apps so that they can monitor the actual condition of children at anytime

and anyplace.

**CHAPTER-2**

**LITERATURE SURVEY**

**2.1 SMART SAFETY JACKET FOR SMALLBABY**

Aim of the project is to develop a system especially for ensuring safety for small baby within the home environment when mother/guardian is busy with their stuff. This project has wide range of features and functionality kinds of dsuch as security, different etection's like position, fire and gas leakage, temperature of concern baby and its movement. This will help mother/guardian to assure that baby is safe and secure by avoiding minor fall and kidnapping act.In this modern world we have many cases related to child safety and this problems are due to tha lack of child care. The numbers of nuclear family are increasing today mainly these child related problem are in nuclear family.

**2.2 DESIGN AND DEVELOPMENT OF AN IOT BASED WEARABLE DEVICE FOR THE SAFETY AND SECURITY OF WOMEN AND GIRL CHILDREN**

This work field is all about to notice dangerous situation automatically without pressing any button, safeguard victim from criminal acts this can’t send message and GPS tracking not only when connected to internet, this can use nearby devices help like free Wi-Fi and Bluetooth signals. This field of work helps a lot of women about their safety and protecting

**2.3 RFID-BASED SYSTEM FOR SCHOOL CHILDREN TRANSPORTATION SAFETY ENHANCEMENT**

This paper is mainly streamed towards child safety solutions by developing a gadget which can be tracked via its GPS locations and also a panic button on gadget is provided to alert the parent via GSM module calling for help. Parental android app is developed to manage and track the device anytime. Smart gadget device is always connected to parental phone which can receive and make phone calls and also receive SMS on gadget via GSM module, also a wireless technology is implemented on device which is useful to bound the device within a region of monitoring range, if device is moving out of monitoring range then an alert will be triggered on binding gadget, this helps you keep a virtual eye on child. Health monitoring system on gadget checking for parameters like heart beat/pulse rate and temperature is included which can be monitored on parental app. Gadget also monitors whether it is plugged on hand or not using contact switch and alert the parent as soon as it is unplugged.

**2.4 SMART IOT DEVICE FOR CHILD SAFETY AND TRACKING**

This research is conducted to propose a child security smart band utilizing IoT technology. Online questionnaire and semi-structured interview are methodologies used to collect data. The online questionnaire gains feedbacks by sending questions electronically, where answers need to be submitted online. In the semi structured interview, researcher meets and asks respondents some predetermined questions while other being asked are not planned in advanced. Through information obtained, a smart band have been proposed to monitor the safety of children. By this, parents know what is happening remotely and can take actions if something goes wrong. The future improvements of this device will be adding functions and software to make it works like a phone such as messaging, gallery, Google, YouTube, meanwhile, adding more child security features so that child safety is guaranteed.

**2.5 WEARABLE SAFETY DEVICE FOR CHILDREN**

Attacks on children have been on the rise at an unprecedented rate in recent years, with victims finding themselves in perilous situations with little chances of contacting their families. The main goal of this project is to create a smart wearable device for children that uses advanced technology to ensure their safety. As a result, this strategy is perceived as sending an SMS from the children\'s wearable to their parents or guardians. This project employs cutting-edge technology to protect the youngster through the use of a GSM module, ensuring that the child does not feel abandoned while dealing with such social issues. An Arduino Nano, GSM, GPS, temperature sensor, heartbeat sensor, and a panic button will be included in the wearable. The heartbeat sensor detects the child\'s heart rate and delivers it to the guardian on a regular basis. If the child falls suddenly, the accelerometer detects it and alerts the parents. As a result, the parent has a sense of security.

**2.6 IOT BASED CHILD SAFETY DEVICE**

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. This project development uses the Arduino Uno microcontroller board based on ATmega328P.The function of receiving SMS(message) or MAIL and calls are all due to the internet connection to Arduino UNO by NODE Mcu. The supplementary modules are employed which will provide the present situation of the child via message/MAIL. The external alert systems included here is to indicate the distress condition is SOS Light indicator and Alarm Buzzer to produce sound, both are programmed in Arduino UNO board.

**2.7 SMART WEARABLE DEVICE FOR CHILD SAFETY USING IOT**

The motivation for this wearable comes from the increasing need for safety for children in present times as there canbe scenarios of the child getting lost in the major crowded areas. This paper focusses on

the key aspect that lostchildren can be helped by the people around the child and can play a significant role in the child's safety untilreunited with the parents. Therefore, it is intended to use the SMS as the communication type between the parentandchild's wearable device, as this has fewer chances of failing when compared to Wi-Fi and Bluetooth. Theplatform on which this project will be running on is the Arduino Uno microcontroller board based on theATmega328P, and the functions of sending and receiving SMS, which is provided by the Arduino GSM Moduleusing the GSM network. Also, additional modules employed which will provide the current location of the child tothe parents via SMS. The second measure added is SOS Light indicator that will be programmed with Arduino UNOboard to display the SOS signal whenever the parent wants. In the scenario, a lost child can be located by the parentcould send a predefined keyword as an SMS to the wearable device which would reply by sending location to theparent mobile. Additionally, the wearable equipped with a distress alarm buzzer which sets to active by sending anSMS keyword "BUZZ" to the wearable. Hence the buzzer is louder and can be heard by the parent from very

considerable distance. . The major drawback for the Vital band is that it uses Bluetooth as the mode ofcommunication between child and the parent. Therefore, the wearable device proposed will be communicating withthe parent via SMS through GSM which would ensure that there is a secure communication link. Also,customization of the wearable can be possible as per our needs by reprogramming the Arduino system.

**2.8 IOT- BASED CHILD SAFETY MONITORING SYSTEM**

Nowadays, crime rate associated with children keeps increasing due to which draws peoples’ attention regarding child

safety. This research is conducted to propose a child security smart band utilizing IoT technology. Online questionnaireand semi-structured interview are methodologies used to collect data. The online questionnaire gains feedbacks bysending questions electronically, where answers need to be submitted online. In the semi structured interview, researchermeets and asks respondents some predetermined questions while other being asked are not planned in advanced.Through information obtained, a smart band have been proposed to monitor the safety of children. By this, parents knowwhat is happening remotely and can take actions if something goes wrong. The future improvements of this device willbe adding functions and software to make it works like a phone such as messaging, gallery, Google, YouTube,meanwhile, adding more child security features so that child safety is guaranteed.

**2.9 IOT BASED SMART GADGET FOR CHILD SAFETY AND TRACKING**

The internet of things (IoT) refers to the set of devices andsystem that stay interconnected with real-world sensor and the internet. During years’ Child safety is under threat and it isvery important to provide a technology-based solution whichwill help them under panic situations and monitor them using asmart gadget. The proposed system is equipped with GSM andGPS modules for sending and receiving call and SMS betweensafety gadget andparental phone, the proposed system also

consists of Wi-Fi module used to implement IoT and send allthe monitoring parameters to the cloud for android appmonitoring on parental phone. Android application can be usedto track the current location of safety gadget using its locationcoordinates on parental phone android app and also via SMSrequest from parent phone to safety gadget. Panic alert systemis used during panic situations and automatic SMS alert andphone call is triggered from safety gadget tothe parental phone

seeking for help and also monitored for plug and unplug fromhand, as soon the gadget is unplugged from hand a SMS istriggered to parental phone and the alert parameteris also updated to the cloud.

**2.10 CHILD SAFETY WEARABLE DEVICE USING IOT SENSORS**

Child safety is a major concern in any to the vulnerability of a child and consequently ,higher rates of crimes against children. With this issue on our hands, a smart wearable Internet of Thingssensor network for monitoring the environment of a child can be developed to help parents ensure the safety of their children. It must also necessarily include amechanism for tracking the child. An advantage of this wearable device is that, according to its design, it can be accessed from any mobile device and does not mandatea lot of technical knowledge from the user to operate. The purpose of this device is to facilitate the guardian or parents in locating their child with ease and ensuring its well-being. The basic mechanism of this system involves monitoring the environment through sensor nodes, acquiring real-time data and transmitting this data to a cloud server. The data can be accessed byusers through a web-based interface present on this cloud server. The wearable also functions to send alerts to the user through a mobile application in case an emergency condition is detected by it. The design of this model involves developing a medium for communication between the parent/guardian and the child’s wearable device. The child’s location is tracked using GSM mobile communication to specify thelocation of the child in real-time. We have surveyed relevant papers and have discussed about the different methodologies that have been used to achieve similar but different results. We later also compare thepapers using their advantages and disadvantages andwe try to bring out the uses from their results.

**CHAPTER-3**

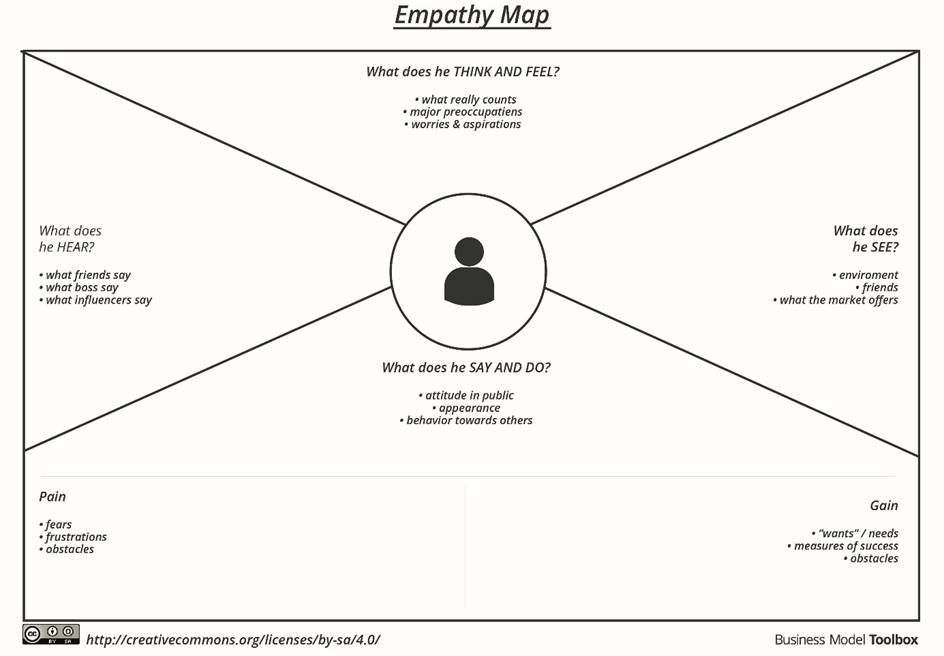
**IDEATION AND PROPOSED SOLUTION**

**3.1 EMPATHY MAP CANVAS**

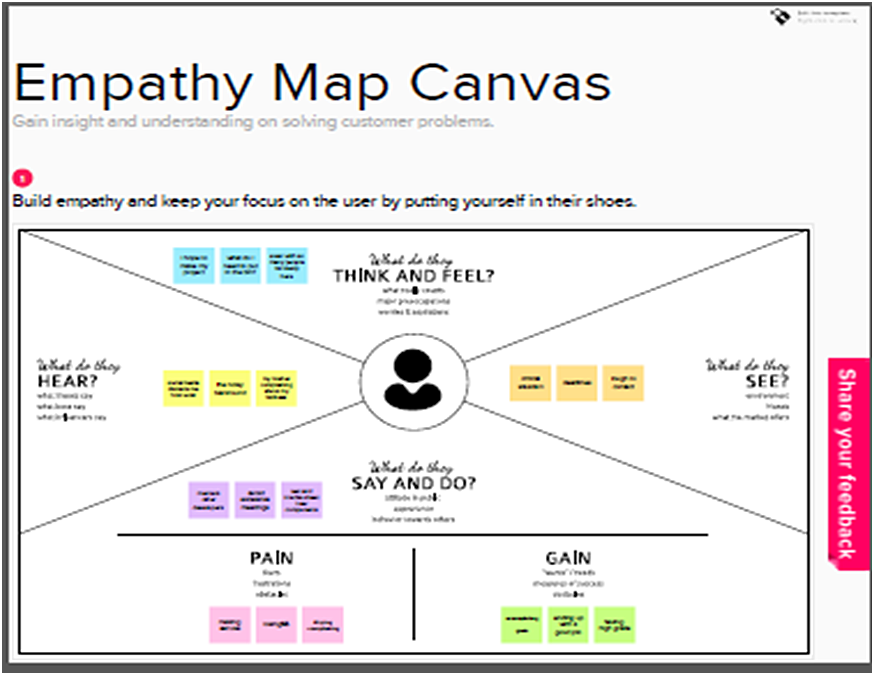
An empathy map is a simple, easy-to-digest visual that captures knowledge about a user’s behaviours and attitudes.

It is a useful tool to helps teams better understand their users.Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user’s perspective along with his or her goals and challenges.

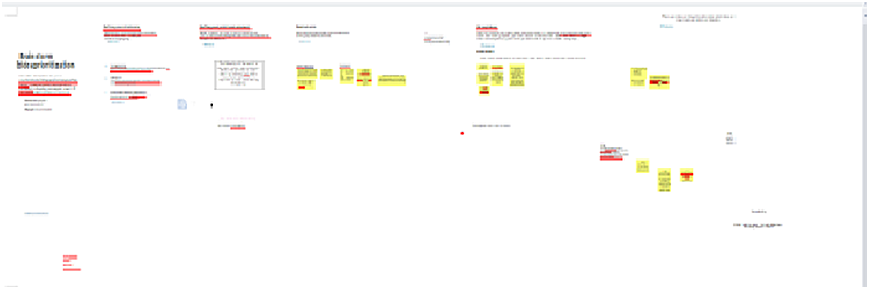
**Example:**



**Example:** Safety gadget for child safety monitoring and notification



**3.2 IDEATION AND BRAINSTORMING**

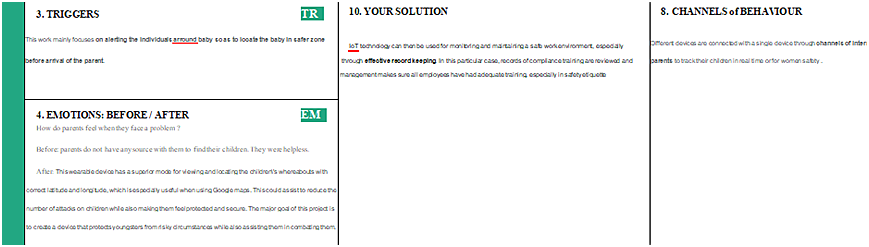


**3.3 PROPOSED SOLUTION**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **PARAMETER** | **DESCRIPTION** |
|  | Problem Statement (Problem to be solved) | The child needs to be monitored even when the parents are distracted. A momentary lack in parental supervision should be combated with an appropriate IT solution in context. The child needs to stay generally within the line of sight. It is necessary for the proposed system to alert the parents when the child walks too far away and outside the „circle of safety‟ (generally the parents‟ line of vision), even if the parents are distracted. If the child does go missing, the aid of technology can increase efficiency and decrease the time necessary to locate the child. The child needs to be located, only at the will of the authorized persons (the parents). Once there is data available about the location of the missing child, this data needs to be displayed as information that the parents can easily understand and use. |
|  | Idea / Solution description | Some previous studies have been included for designing the IOT-based child security smart band. It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured and crime rate will be reduced. |
|  | Novelty / Uniqueness | The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during emergency. The parameters such as touch, temperature &heartbeat of the child are used for parametric analysis and results are plotted for the same |
|  | Social Impact / Customer Satisfaction | The device has IOT monitoring and a GSM module that allows the child to be monitored at all times. It also has numerous sensors that are connected to a CPU and are used to detect exact signals such as heart rate, temperature, and other dangers and alert the parents. |
|  | Scalability of the Solution | The aim of this device is to provide safety to the child by allowing the parent to locate the child and view their surroundings. This device can be used to monitor the temperature and motion of the child**.** |
|  | Business Model (Revenue Model) | Every parent’s biggest concern is their child’s wellbeing and thus we are here with useful gadgets to ensure kid’s safety .Regrettably your children will remain unsafe throughout their growing years until they know how to protect themselves. Till the time they are old enough to take care of themselves, you can use various gadgets as you deem appropriate to safeguard them. |

**3.4 PROBLEM SOLUTION FIT**





**CHAPTER 4**

**REQUIREMENT ANALYSIS**

**FUNCTIONAL REQUIREMENTS**

|  |  |  |
| --- | --- | --- |
| ***FRNo.*** | ***FunctionalRequirement(Epic)*** | ***SubRequirement(Story/Sub-Task)*** |
| *FR-1* | *UserRegistration* | *Parents have to register in the specified app.* |
| *FR-2* | *UserConfirmation* | *ConfirmationviaEmail*  *ConfirmationviaOĽP* |
| *FR-3* | *User Details* | *Parents and their Children have to register on the specified app for the emergency situations* |
| *FR-4* | *UserNotification* | *In the emergency situation if the children click the emergency button in their safety gadget their parents will get the notification by means of alarm sound.* |

**NON FUNCTIONAL REQUIREMENTS**

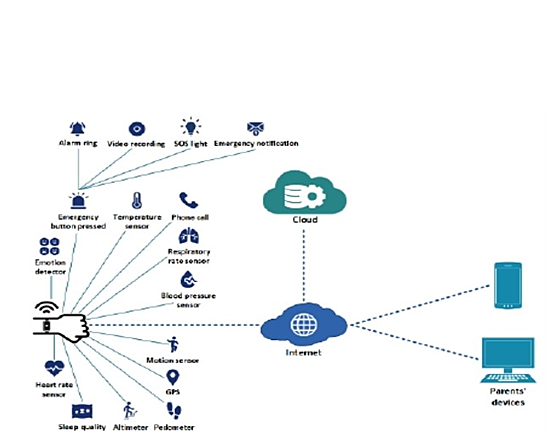
|  |  |  |
| --- | --- | --- |
| ***FRNo.*** | ***Non-FunctionalRequirement*** | ***Description*** |
| *NFR-1* | ***Usability*** | The device has IOT monitoring and a GSM module that allows the child to be monitored at all times. It also has numerous sensors that are connected to a CPU and are used **to detect exact signals such as heart rate, temperature, and Other dangers and alert the parents.** |

|  |  |  |
| --- | --- | --- |
| *NFR-2* | ***Security*** | Parents will secure their children all the time even when they were apart from their children. They will secure their children by means of the safety gadget. |
| *NFR-3* | ***Reliability*** | This wearable device **has a superior mode for viewing and locating the children’s whereabouts with correct latitude and longitude**, which is especially useful. |
| *NFR-4* | ***Performance*** | The main goal of this project is to create a smart wearable device for children that uses advanced technology to ensure their safety. As a result, this strategy is perceived as sending an SMS from the children\'s wearable to their parents or guardians. This project employs cutting-edge technology to protect the youngster through the use of a GSM module, ensuring that the child does not feel abandoned while dealing with such social issues. An arduino Nano, GSM, GPS, temperature sensor, heartbeat sensor, and a panic button will be included in the wearable. The heartbeat sensor detects the child\'s heart rate and delivers it to the guardian on a regular basis. |
| *NFR-5* | ***Availability*** | Parents are often faced with a wide number of choices for products for their children, from essential safety items such as car seats to optional, but potentially useful, health items such as pedometers.  Two of the major questions parents must weigh are durability and cost. Children only use or need most products for a limited amount of time, and many are available cheaper on the second hand market. |

**CHAPTER 5**

**PROJECT DESIGN**

**5.1 DATA FLOW DIAGRAM**

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information.

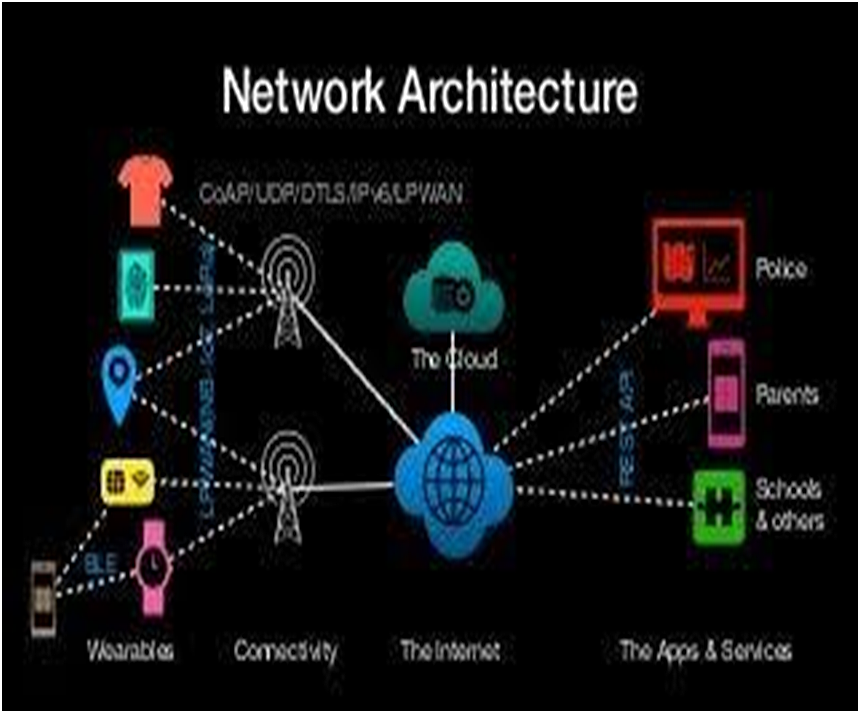
**Example:** (Simplified Diagram )

**5.2 SOLUTION ARCHITECTURE**

Solution architecture is a complex process – with many sub-processes – that bridgesthegapbetweenbusinessproblemsandtechnologysolutions.Itsgoalsareto:

* Findthebesttechsolutiontosolveexistingbusinessproblems.
* Describe the structure, characteristics, behavior, and other aspects of thesoftwareto project stakeholders.
* Definefeatures,developmentphases,andsolutionrequirements.
* Provide specifications according to which the solution is defined, managed,anddelivered.

# Example-SolutionArchitectureDiagram:



# Example-SolutionArchitectureDiagram

# **5.3 USER STORIES**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User Type** | **Functional Requirement (Epic)** | **User Story Number** | **User Story / Task** | **Acceptance criteria** | **Priority** | **Release** |
| Customer (Mobile user/smart watch user) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account / dashboard | High | Sprint-1 |
|  |  | USN-2 | As a user, I will receive confirmation email once I have registered for the application | I can receive confirmation email & click confirm | High | Sprint-1 |
|  |  | USN-3 | As a user, I can register for the application through Facebook | I can register & access the dashboard with Facebook Login | Low | Sprint-2 |
|  |  | USN-4 | As a user, I can register for the application through Gmail |  | Medium | Sprint-1 |
|  | Login | USN-5 | As a user, I can log into the application by entering email & password |  | High | Sprint-1 |
|  | Dashboard |  |  |  |  |  |
| Customer (Web user) |  |  |  |  |  |  |
| Customer Care Executive |  |  |  |  |  |  |
| Administrator |  |  |  |  |  |  |

**CHAPTER 6**

**PROJECT PLANNING AND SCHEDULING**

**6.1 SPRINT PLANNING AND ESTIMATION**

IBM Watson IoT platform acts as the mediator to connect the web application to IoT devices, so create the IBM Watson IoT platform

* The device has IOT monitoring and a GSM module that allows a child to be monitor at all times

* Every parents biggest concern is their child's well being

* We are here with useful gadgets to ensure kids safety

* The aim of this device is to provide safety to the child by allowing the parent to locate the child and view their surroundings

* This device can be used to monitor the temperature and motion of the child

* It also has numerous sensors that are connected to a CPU and are used to detect signals.

**6.2 SPRINT DELIVERY SCHEDULE**

* Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform.
* Develop a python script to publish random sensor data such as temperature, moisture, soil and humidity to the IBM IoT platform
* After developing python code, commands are received just print the statements which represent the control of the devices.
* The device has IOT monitoring and a GSM module that allows the child to be monitored at all times. It also has numerous sensors that are connected to a CPU and are used to detect exact signals such as heart rate, temperature.
* Parents will secure their children all the time even when they were apart from their children. They will secure their children by means of the safety gadget.

**6.3 REPORTS FROM JIRA**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Functional Requirement (Epic)** | **User Story Number** | **User Story / Task** | **Story Points** | **Priority** | **Team Members** |
| Sprint-1 |  | US-1 | Create the IBM Cloud services which are being used in this project. | 6 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  M.Pandiselvi@Pavithra |
| Sprint-1 |  | US-2 | Configure the IBM Cloud services which are being used in completing this project. | 4 | Medium | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  M.Pandiselvi@Pavithra |
| Sprint-2 |  | US-3 | IBM Watson IoT platform acts as the mediator to connect the web application to IoT devices, so create the IBM Watson IoT platform. | 5 | Medium | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-2 |  | US-4 | In order to connect the IoT device to the IBM cloud, create a device in the IBM Watson IoT platform and get the device credentials. | 5 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-3 |  | US-1 | Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform. | 10 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-3 |  | US-2 | Create a Node-RED service. | 10 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-3 |  | US-1 | Develop a python script to publish random sensor data such as temperature, moisture, soil and humidity to the IBM IoT platform | 7 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-3 |  | US-2 | After developing python code, commands are received just print the statements which represent the control of the devices. | 5 | Medium | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-4 |  | US-3 | Publish Data to The IBM Cloud | 8 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-4 |  | US-1 | Create Web UI in Node- Red | 10 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |
| Sprint-4 |  | US-2 | Configure the Node-RED flow to receive data from the IBM IoT platform and also use Cloudant DB nodes to store the received sensor data in the cloudant DB | 10 | High | S.Ramya Krishna  J.PriyaDharshini  K.Abarna  [M.Pandiselvi@Pavithra](mailto:M.Pandiselvi@Pavithra) |

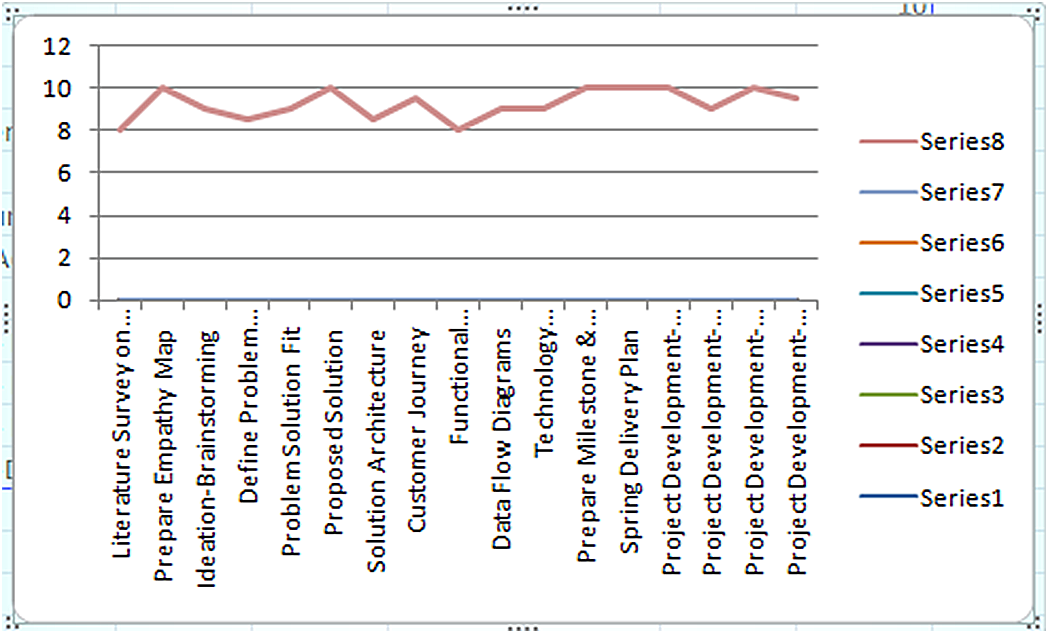
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Total Story Points** | **Duration** | **Sprint Start Date** | **Sprint End Date (Planned)** | **Story Points Completed (as on Planned End Date)** | **Sprint Release Date (Actual)** |
| Sprint-1 | 20 | 3 Days | 31 Oct 2022 | 02 Nov 2022 | 20 | 02 Nov 2022 |
| Sprint-2 | 20 | 3 Days | 02 Nov 2022 | 05 Nov 2022 | 20 | 05 Nov 2022 |
| Sprint-3 | 20 | 3 Days | 05 Nov 2022 | 08 Nov 2022 | 20 | 08 Nov 2022 |
| Sprint-4 | 20 | 3 Days | 11 Nov 2022 | 14 Nov 2022 | 20 | 14 Nov 2022 |

**Velocity:**

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let’s calculate the team’s average velocity (AV) per iteration unit (story points per day)

**Burndown Chart:**

A burndown chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burndown charts can be applied to any project containing measurable progress overtime.



**CHAPTER 7**

**CODING AND SOLUTIONING**

**7.1 Feature 1**

**Abstarct**

This paper is based on IOT (Internet of Things). As we know in presenter a everything is based on digital technology. Human being is going to connect each other by using mobile network. This paper proposes an SMS based solution to reduced parents insecurity and schools to track children’s in real time.This Different devices are connected with a single device through. The concerned device is connected to mobile via SMS. The device can be used by stockholders to track children and get real time data. The main Advantage of the proposed system is send location by using mobile network (GSM). Here a prototype model (device) is created which is hardware based. The comprises ARDUINO UNO as microcontroller,along with GPS and module.This device will also have the facility of different status of children by measuring thespeed of hand movement of children.

**Problem Statement**

* More family’s spent their time for work and social duties but since Children are giftof GOD they need care of family
* The current situation of our country is not confortable for monitoring children in school.
* With the absence of child monitoring system it is hard to monitor the where about of children.
* The poor performance of family’s and school to monitor the children’s byCollaboration.
* The use of manual system to connect family’s and there students most of time teachers or other persons are intermediate between the students and family. In our country families and their children have no direct contact in school when they need to contact their children if the families came to school.
* Lack of child monitoring in school affect the child’s behavior. Under age children may be premature in the way they act and places to be. Most of human behavior is shaped in childhood stage, in order to get morally acceptable behavior child monitoring system is necessary.
* Children are prone to many accidents. Safety of children is very critical since children cannot protect themselves.

**Feature 2**

**Specific objective**

* **** To track and get exact location of children
*  It increase the interaction of family’s with their children
*  They whole day information about children
*  To store and retrieve the necessary data on the families mobile phone using real time sensors
* **** Child has the ability to connect different sensors
*  Family’s Feeling safe about children
*  Allows a parent to more easily locate the troubled child

**Software tools required**

Software tools used for this system development are all free as stated below.

Table : software tools required

**List no SW Tools required specification price**

1 Operating system Window 10 Free

2 IDE Arduino 1.8.5 Free

**Methodology**

Based on the problem statement the project is proposed to develop smart agriculture:

Gathering information: previously there were approaches that were

implemented to solve child monitoring system. Many schools and families

use different types of approaches to locate and monitor children.

 Modeling: Based on the information we have gathered through interviewing

the problems of the current monitoring system in our context designed the

flow chart, system design and ER diagram for the project.

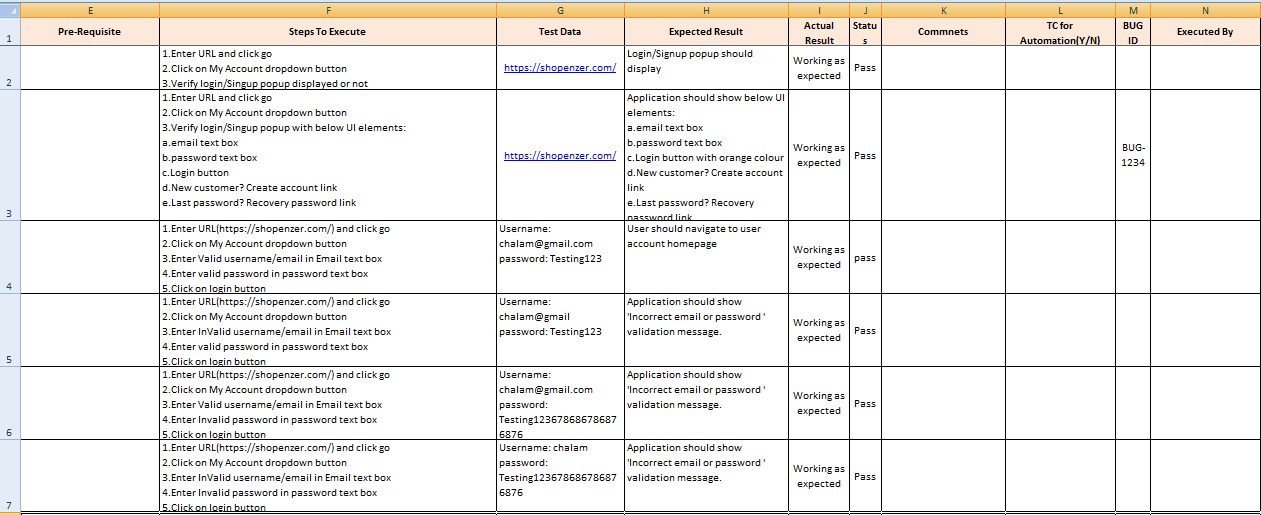
Software: the software implementation with Arduino software.

Evaluation and Conclusion: Based on the proposed system conclusion

**CHAPTER 8**

**TESTING**

**8.1.Test Cases**



**8.2. User Acceptance Testing**

8.2.1 PURPOSE OF DOCUMENT:

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

# 8.2.2 DETECT ANALYSIS:

Thisreportshowsthenumberofresolved or closed bugs at each severity level, and how they were resolved

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resolution** | **Severity1** | **Severity2** | **Severity3** | **Severity4** | **Subtotal** |
| By Design | 12 | 4 | 1 | 4 | 22 |
| Duplicate | 1 | 0 | 2 | 0 | 3 |
| External | 3 | 3 | 0 | 2 | 5 |
| Fixed | 14 | 2 | 5 | 23 | 33 |
| Not Reproduced | 0 | 0 | 1 | 0 | 1 |
| Skipped | 0 | 0 | 2 | 1 | 2 |
| Won'tFix | 0 | 5 | 3 | 3 | 4 |
| Totals | 30 | 14 | 14 | 33 | 70 |

8.2.3 TEST CASE ANALYSIS

Thisreportshowsthenumberoftestcasesthathavepassed,failed,anduntested

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section** | **TotalCases** | **Not Tested** | **Fail** | **Pass** |
| PrintEngine | 8 | 0 | 0 | 8 |
| ClientApplication | 12 | 0 | 0 | 12 |
| Security | 4 | 0 | 0 | 4 |
| OutsourceShipping | 2 | 0 | 0 | 2 |
| ExceptionReporting | 5 | 0 | 0 | 5 |
| FinalReportOutput | 4 | 0 | 0 | 4 |
| VersionControl | 2 | 0 | 0 | 2 |

**CHAPTER 9**

**9.1. Performance Metrics**

## 

## *SimilarSystem*



**Figure1**GatorSmartWatch

Gator, a kid’s smartwatch from Gator Group Co. Itcomes with a SIM card and the free app is available on Play Store and Apple App Store [19]. Gator supportscalling features up to 13 different numbers, enables two way voice messages from the app and watch. The location tracking is based on GPS tracking when children are outdoors and Wi-Fi tracking when vcildren are indoors. Notification will also be sent to parents.

when children leave the geofences.Pedometer sensor is included and the SOS alarm is supported which automatically calls 3 emergency contacts when pressedfor 3 seconds. Other than that, school mode is availablefor setting up schedules to prevent callings during theschool time.Not only that, Gator is splash proofing,enables remote voice monitoring and records historical routes.



### Figure2 Safety gadget

Safety gadget, a waterproof watch phone for childrenbranded safety gadget which includes pedometer, alarm clockand stopwatch. It possesses an app available at Playstoreand Appstore. With GPS and multiple services, Safety gadget shows children’s’ location and supports the setup of safetyzones. Meanwhile, it contains a SIMcard and acts like a phone enables voicecalls from 10 pre-saved contacts. Similar to a phone, Safety gadget can send and receiveve

text messages, emojis, images and voicemessages. It is also equipped with the SOS button that children can press to notify emergency contacts of theirlocation. Beyond that, Wi-Fi and Bluetooth are availablein Safety gadget. It also supports the schedule function inwhich school schedules can be specified during which watch will only display time .

The table below shows comparison between systems:

**Table1:**Comparison between Gator Smart Watch,Safety gadget and the proposed system.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Gator | SafetyGadget | ProposedSystem |
| Wifi | ✓ | ✓ | ✓ |
| PhoneCalls | ✓ | ✓ | ✓ |
| Waterproof | X | ✓ | ✓ |
| Camera | X | ✓ | ✓ |
| Video Record | X | X | ✓ |
| TextMessages | X | ✓ | X |
| Schedule | ✓ | ✓ | X |
| GPS | ✓ | ✓ | ✓ |
| SafetyZones | ✓ | ✓ | ✓ |
| Emergency  Button | ✓ | ✓ | ✓ |
| SOSLight | X | X | ✓ |
| Altimeter | X | X | ✓ |
| BloodPressure  Sensor | X | X | ✓ |
| EmotionDetector | X | X | ✓ |
| HeartRate  Sensor | X | X | ✓ |
| MotionSensor | X | X | ✓ |
| Pedometer | ✓ | ✓ | ✓ |
| Respiratory  Sensor | X | X | ✓ |
| SleepQuality  Sensor | X | X | ✓ |
| Temperature  Sensor | X | X | ✓ |

Based on the table, Gator and Safety gadget does not support much sensors like the proposed system to obtain children's data regarding their actual conditions. Thus, if abnormal situations occurred Gator and safety gadget may not be able to realize quickly, easily and inform parents at once. Due to that, parents are less informed about children’s conditions and in case the child is in danger, actions are not able to be taken immediately.

Furthermore, both systems do not record video and sendit to parents during an emergency situation. Besides, SOS light function is not available in both systems but supported by the proposed system which will light up when the emergency button is pressed.Infact,Gator and Safety gadget are emphasize dinintroducing mobile products for kids who are too young to use mobile phones. Because of that, they are less focusing on thechild security aspect. On the other hand, the proposed system is more focuse don tracking children’s conditions that are suitable for child safety purposes

**CHAPTER 10**

**ADVANTAGES**

With IoT monitoring, you can analyze dynamic systems and process billions of events and alerts. IoT monitoring also enables you to bridge the gap between devices and business by collecting and analyzing diverse IoT data at web-scale across connected devices, customers and applications.

We can monitor the child 24/7 in real time through the help of this live streaming which makes parents feel that they are beside their children ensuring children's safety. In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS, GSM, and Raspberry Pi.

Nowadays, crime rate associated with children keeps increasing due to which draws peoples’ attention regarding child safety. This research is conducted to propose a child security smart band utilizing IoT technology. Online questionnaire and semi-structured interview are methodologies used to collect data. The online questionnaire gains feedbacks by sending questions electronically, where answers need to be submitted online. In the semi structured interview, researcher meets and asks respondents some predetermined questions while other being asked are not planned in advanced. Through information obtained, a smart band have been proposed to monitor the safety of children. By this, parents know what is happening remotely and can take actions if something goes wrong. The future improvements of this device will be adding functions and software to make it works like a phone such AS messaging, gallery, Google, YouTube, meanwhile, adding more child security features so that child safety is guaranteed.

**DISADVANTAGES**

**Privacy Of Data**

Privacy is the biggest challenge with IOT as all the connected devices transfer data in the real time. Personal data can be hacked if this end to end connection is not secure.

**Accuracy**

Accuracy issues may come due to handling such massive data in real time.

**Security and Privacy Concerns**

Most IOT devices lack end to end secure and adherence to data security protocols and standards. Ambigibility around regulations makes data more suscpectable to ciber criminlas that can hack into systems to steal sensitivity health information.

Keeping the data gathered and transmitted by IOT devices safe is challenging as they envolve and expand in use.

**Technical Complexity**

**Connectivity And Power Dependancy**

**Integration**

**High Cost**

**CHAPTER 11**

**CONCLUSION**

The word Future resembles the word Children. As Dr. A.P.J Abdul Kalam’s words “Youngsters are the future pillars of one’s nation", today's children are tomorrow's youngsters, preserving their dreams and life for a better future is necessary. Therefore, each and every parent should take care of their own children, without letting them to fall into the dark world of abusements, which entirely ruin them physically, mentally and emotionally destroying our future. Hence, considering the importance of our future, our project makes it easy for parents to track their children and to visually monitor them on regular basis, which makes them ensure the safety of their children and reduces the rate of incidents of child abuse.

**CHAPTER 12**

**FUTURE SCOPE**

The device has IoT monitoring and a GSM module that allows the child to be monitored at all times. It also has numerous sensors that are connected to a CPU and are used to detect exact signals such as heart rate, temperature, and other dangers and alert the parents.

IoT technology can then be used for monitoring and maintaining a safe work environment, especially through effective record keeping. In this particular case, records of compliance training are reviewed and management makes sure all employees have had adequate training, especially in safety etiquette.

The future of IoT has the potential to be limitless. Advances to the industrial internet will be accelerated through increased network agility, integrated artificial intelligence (AI) and the capacity to deploy, automate, orchestrate and secure diverse use cases at hyperscale.

The growth of the industry has accelerated along with its capabilities — the number of IoT devices by 2030 is expected to be over 24 billion. We expect to see developments in 5G, artificial intelligence, and advanced analytics take the industry to new levels.

Market research firm Juniper Research pegged the global market as nearly doubling in four years, expanding from $31 billion in 2022 to $61 billion in 2026. Juniper Research identified cellular low-power wide-area (LPWA) offerings and 5G as the key technologies driving this growth.

It aids in the provision of specialized healthcare to patients, doctors, and researchers. Smart diagnosis, wearable devices for tracking health, patient engagement, and several other services are available.

**SOURCE CODE:**

import json  
import wiotp.sdk.device  
import time  
  
myConfig={  
 "identity":{  
 "orgId":"pjdqoc",  
 "typeId":"nodeMCU",  
 "deviceId":"12345"  
 },  
 "auth":{  
 "token":"12345678"  
 }  
 }  
client=wiotp.sdk.device.DeviceClient(config=myconfig,logHandless=None)  
client.connect()  
while True:  
 name="smartbridge"  
 latitude=17.4219272  
 longtitude=78.5488783  
 myData={"name":name,"lat":latitude,"lon":longtitude}  
 client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onpublish=None)  
 print("Data published to IBM IOT platform: ",myData)  
 time.sleep(5)  
  
  
client.disconnect()

**PROJECT DEMO LINK: https://youtube.com/watch?v=rEDR76sUtkE&feature=share**

**GITHUB LINK:** <https://github.com/IBM-EPBL/IBM-Project-44581-1660725369>