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Research Article

A Mechanism For Women Safety With Help Of Iot And Smart Devices

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Abstract: Day by day the girl, sister, mother etc., were facing the lot of challenges in the outside environment in protecting themselves. They were facing many challenges daily basis. Due to secure them by the help of Internet of things (IoT) we have brought up an wearable gadget for making them more secure so that by help of that device they can alert them to the nearest police station, known people, they can trace their location etc., we have brought up this technique whenever they can make use of this device whenever they feel unsafe. We have implemented our work with the help of Microcontroller named STM32F407VG which is a 64 bit Micro-Controller, WI-FI, BLE. Here by help of various geo-graphical devices which are linked to the device can easily identify the location of the person.

Key words: BLE, Micro-Controller, tracking, data, devices.

Introduction

Ladies are the foundation of any economy principally molding the eventual fate of the country. She who prior remained at home to go to her homegrown obligations is currently keeping up work and home all the while, partaking during the time spent monetary improvement on an equivalent balance with men. [1]

The Government of India, satisfying a longstanding need for sexual orientation equality in the labor force, has supported an alteration in The Factories Act 1948 to permit lady's representatives to work in nightshifts. The correction proposes that nightshift for ladies will be permitted just if the business guarantees wellbeing, satisfactory shields in the processing plant as respects word related security and wellbeing, equivalent freedom for ladies laborers, sufficient assurance of their pride, honor, and transportation from the manufacturing plant premises to the closest mark of their home are met.[2]

Nightshifts have been in presence for quite a while, anyway for India it was as of late through a correction to the Factories Act 1948 that it was permitted under the law for ladies to work nightshifts. Ladies are taking part in practically every one of the circles of financial movement. From town to city, we can see number of ladies laborers and business visionaries contributing towards the public pay of the country. Piece of clothing units as of now utilize 60% of the lady's labor force, and with development in this industry, the number will go up hugely. Up until this point, the IT area were utilizing ladies for late-night work hours yet had no legitimate commitment to give the above wellbeing measures. [3]

There is no denying the way that ladies in India have gained an impressive headway in just about seventy years of Independence, however, they actually need to battle against numerous impediments and social disasters in the male-overwhelmed society. Numerous malicious and manly powers actually win in the advanced Indian culture that opposes the forward walk of its ladies people.

With the beginning of IT&BT industry, ladies work in night shifts. It is the obligation of the firm to give office transportation to such workers. Presently a days despite the fact that the organizations give the offices to transportation, however the security of the ladies isn't completely guaranteed as one of the episode happened in the year 2007 at Pune where a young lady working in the call place was mercilessly assaulted by two of her taxi drivers relegated by the organization, not just this we have gone [4] over a large number of similar occurrences in the new occasions where the wellbeing of the ladies can't be completely guaranteed with the taxi offices given by the organizations.

One and only answer to problem is for women to be given a portable safety device that feels them secure. In our project we have developed smart gadget works with IoT technologies which not only assists women in escaping dangerous situations, but also ensures that they receive justice by recording the image of the perpetrator if one exists. The only answer to the problem is for women to be given a portable safety device that secures their privacy. This project focus in developing the smart device depends on IoT [5] technologies which do not assists women in escaping dangerous circumstances, but also assures that women receive justice with the help of taking photos of perpetrator at the event of harassment does occur.

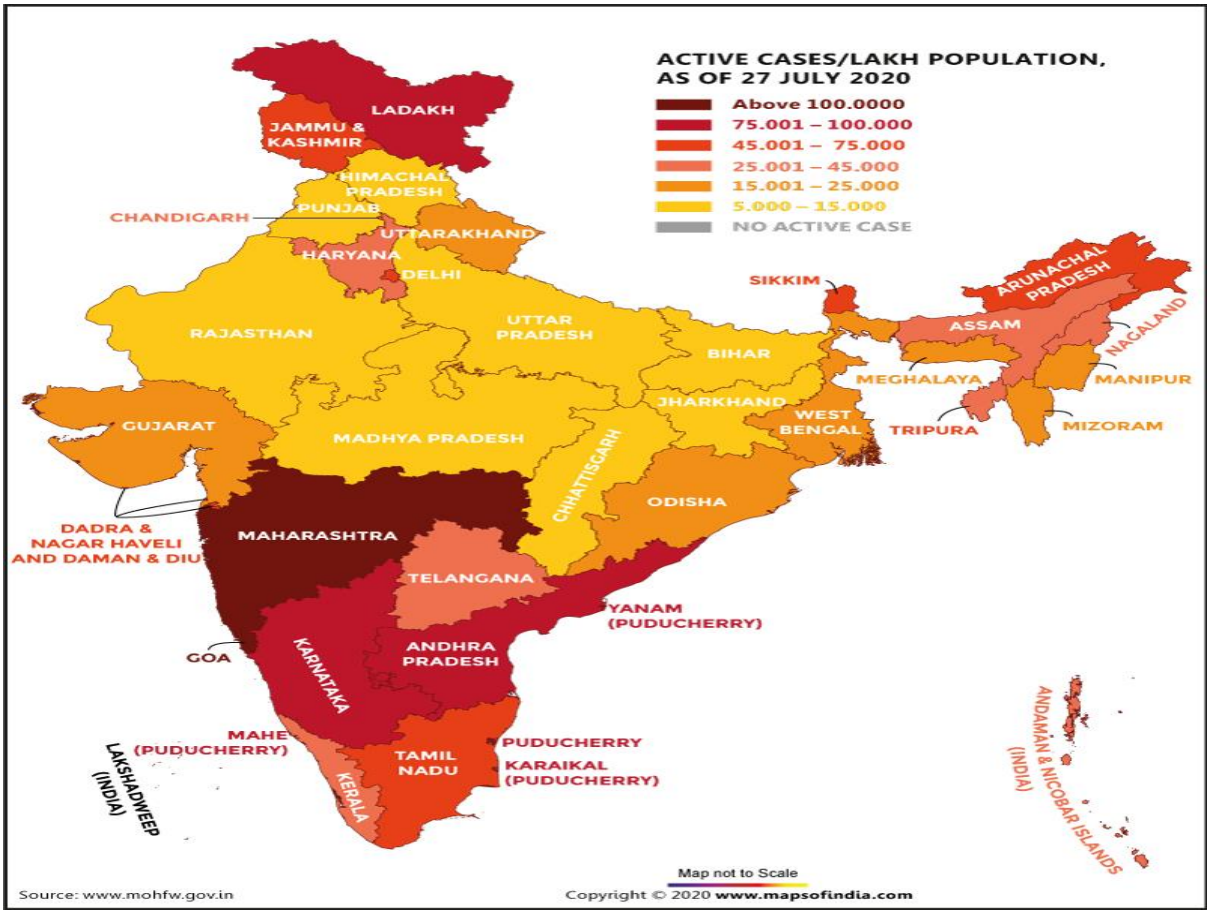

Figure 1: Rape Cases around India

Literature Review

This section discusses about the literature regarding: Design of human global positioning framework for indoor cell phone client's utilizing BLE, human global positioning framework plan for indoor and open air cell phone client's utilizing Wi-Fi, plan of human discovery and global positioning framework either with or without utilizing the cell phone of a client yet by utilizing PIR sensor and BLE with STM32F407VG microcontroller and setting mindful energy-preserving calculation for CHTS. [6]

Ronao and Cho (2016) detailed human movement acknowledgment utilizing cell phone sensors, for example, accelerometer and spinner with the guide of the accompanying exercises like strolling, strolling higher up, strolling first floor, sitting, standing, and lying.

Sun et al. (2016) featured a cell phone based electrochemical biosensor stage for Point of Care (POC) diagnostics and for following the wellbeing of people. This sensor gadget is executed with the assistance of a low-power potentiostat. [7]

Li et al. (2016) as of late announced a crossover route calculation utilizing off-the-rack sensors accessible in purchaser compact gadgets and existing Wi-Fi foundations. The calculation was tried with Samsung Galaxy S3 and S4 cell phones in two indoor conditions and under four movement conditions. [8]

Segundo et al. (2016) introduced human movement acknowledgment and division framework dependent on secret Markov models. For recognizing and sectioning six distinct exercises like strolling, strolling higher up, strolling down steps, sitting, standing and lying six fold cross validation were used. [9]

Alya et al. (2016) has shown interest in smartphone based lane detection sensor for the purpose of location based services especially in advanced driver assistance systems i.e. in driverless cars, predicating driver’s intent, etc. for its advantages. [10]

Sathishkumar & Rajini (2015) detected human movement utilizing the PIR sensors. In this model, the framework triggers an alert to recognize the presence of an individual in a particular time period, and at the same time it communicates the data in regards to the number of people are interloper by means of message to the SMS through Global System for Mobile communication (GSM) Modem. [11]

Nef et al. (2015) reported a Human Activity Daily Living (ADL) acknowledgment utilizing a PIR sensor present in a brilliant home. Extensive information were acquired uniquely in specific rooms like the washroom, TV room, and lounge which incorporates either ADL (or self-care) identified with the Instrumental ADL. [12]

Gaglio et al. (2015) recognized human activity with kinetic information sensed by using Red, Green, Blue plus Depth (RGB-D) camera with following activities that are classified by K-means clustering, SVM and hidden Markov models. Yun & Lee (2014) followed the above said activities which are classified by Bayesian Network, Multi-Layer Perceptron (MLP), Naive Bayes (NB) along Support Vector Machine (SVM) algorithm. [13]

Tucker et al. (2015) mainly aimed to develop a new method of nonwearable multimodal sensor with a working principle depends on multiple shades over an gait. It is especially used in medication protocols and in most of the healthcare industry where medication non-adherence acts as a major concern. In most cases, related with neurological diseases, medication regimens can be assessed by observing movement patterns. [14]

Jin et al. (2016) proposed an Energy-Efficient Content-Based Routing (EECBR) convention for the IoT fundamentally to limit energy utilization. The primary extent of the paper is to read steering conventions for distribute/buy in orders that incorporate fulfilled and setting based directing.

Renchan (2016) was accounted for by remote sensor networks comprise of an enormous number of sensor hubs, which are equipped for detecting, assembling, handling, and sending information. They tend to gather information on the objective climate and can send the information to Bases Station (BS) sensor hubs utilizing remote correspondence procedures.

Saraswat et al. (2015) examined the Mobile Ad-hoc Network (MANET) directing convention in lattice climate. The creator looks at and examined the best convention among Ad-hoc On-request Distance Vector (AODV), Dynamic Source Distance Vector (DSDV), and Dynamic Source Routing (DSR) directing conventions as far as versatility, utilizing the different exhibition metric, for example, bundle conveyance proportion, normal start to finish deferral and parcel misfortune. [15]

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Gia et al. (2015) as report by IoT dependent system mechanism supported by reliability, scalability, fault-tolerances in healthcare monitoring applications. The system is constructed using 6LoWPAN energy efficient communication for the purpose of increased network life time. In the system, fault tolerance was accomplished in taking the copy of data over the system and nodes. [17]

Yilmaz et al. (2014) reported how much efficiently energy is utilizing for analysis as well as reduction of a Wireless Sensor Networks (WSN). This system depends in the multipath data routing system which is mainly used for shortest path to ensure energy efficient information routing while other backup paths are used as an another possible route for data processing mechanism. [18]

Sivasankar et al. (2011) determined the Energy Efficient Delay Time Routing (EEDTR) algorithm, which differs from the existing methods in the following way. The neighbor node will introduce a delay in sending the RREQ packet, which is inversely proportional to its remaining energy level. [19]

Chen et al. (2012) created Context-Awareness in Sea Computing Routing (CASCR) mechanism for IoT, using context-awareness based energy efficient routing algorithm that have longer lifetime than the cngeneric protocols. [20]

Proposed Work

Introduction to IoT, Sensors and Micro-controllers

Web of Things empowered Smartphone client identification and planning of a proper global positioning framework is a significant testing task in the field of normal body region sensors. The outside sensors like SPO2 (Saturation of Peripheral Oxygen) circulatory strain, Motion, Electromyography (EMG), Electrocardiogram (ECG), clinical super sensor, and so on, are generally utilized up until this point (Abidoye et al. 2011), while outside fixed reconnaissance camera and Closed Circuit Television (CCTV) are exceptionally delicate to distinguish the area around the city in different spots (Sanoob et al. 2016). Since following, and breaking down the information by utilizing the outer sensor is a monotonous and tedious errand and as well as beating its equipment cost, in the proposed research work a Context-mindful Human Tracking System (CHTS) has been intended to be utilized in cell phones.

Indoor and outdoor smartphone user direction detection and identification mechanism was one of the challenging domains in sensor networks. In present thesis work, these challenges in detecting the smartphone user's direction were overcome by implementing various technologies like Bluetooth Low Energy (BLE), Wi-Fi and Pyroelectric Infrared (PIR) sensor by STM32F407VG microcontroller that relates to IoT.

These days, the utilization of cell phones is seen to be colossally high. In this way the utilization of the programmed frameworks for a wide range of IoT-empowered item applications has been expanded in the business sectors which help to identify and follow the human area in an indoor or open air association

(Mahmoud and Mohamad 2016). The analyst starts spurred to foster a savvy framework to discover the area of the cell phone clients with the assistance of web of things innovation.

Web of Things (IoT) is a quickly developing innovation and pervasive in everyday life because of its improved use in the pervasiveness of brilliant cell phones, for example, cell phones, tablets, journals, individual computerized partners (PDA), and so on These gadgets have become a piece of everybody's life in this computerized world and have been used in different settings, as detailed in (Saeedi 2013).

Concerning this setting of exploration, the right now accessible gigantic scope of difficulties must be centered around top to bottom to make a savvy world. Which advanced and virtual arrangement of organizations unites along with a genuine climate to establish an awesome keen association climate. The principle point of the IoT-empowered things is "associated anyplace whenever" which has been obviously addressed. Web of things is the organization of actual gadget/protests that are installed with hardware, programming, and sensors which are then associated with various innovation to detect and send information among things, things to human, human to things, and human to human (Vermesan and Friess et al. 2014).

Over the most recent couple of years, cell phones with highlights like detecting, preparing, and correspondence capacities have drawn in research networks to complete the exploration business related to its different highlights application, for example, to identify and follow the client's exercises signals, positions on various settings through cell phone, to sit back trip data to travelers with expected toll and excursion length, to label computerized picture consequently on various settings by ensing clients in a cell phone, and so on, Internet of things gives admittance to worldwide clients and subsequently clients use IoT to make business, contribute content, produce and buy administrations. These all around the world associated advances like Ethernet, BLE, Wi-Fi, Zigbee, Z-waves, and so forth, assume a fundamental part in IoT applications as announced by (Gubbi et al. 2013).

The current postulation work centers around most recent CHTS based IoT innovation in which cell phone sensors has been utilized to identify client exercises like sitting, standing and strolling as for various setting and cell phone put in various situations on client's body. The bearings global positioning framework can be accomplished by utilizing different low force effective innovations like Bluetooth Low Energy (BLE), Wireless Fidelity (Wi-Fi), Pyroelectric Infrared (PIR) sensor with STM32F407VG microcontroller which has a place with the web of things. At last, the exhibition of the proposed framework is estimated by different grouping calculations to assess the measurements of the framework.

The new exploration centers fundamentally around human global positioning frameworks dependent on BLE, Wi-Fi, innovation achieved by cell phone sensor, and PIR sensor with STM32F407VG microcontroller. These frameworks were carried out by utilizing star geography in IoT.

Literature survey related to user’s activity recognition by making use of external support like sensors (placed either on fixed walls or entrances or celling or at any places in an organization environments) and wearable inertial sensors (placed in different positions using user’s body) (Attal et al. 2015) was discussed. In addition, these systems reported in the literature have some limitations like a high cost requirement, essential uses of some external sensors for the user’s activity signals detection, not showing much importance for the detection of direction of the user’s activity and finally inefficient communication between both users and systems.

In order to overcome these limitations, recently, in the present research work the systems which use smartphone sensors with different wireless technology supported by internet of things likewise BLE, Wi-Fi, PIR sensor and BLE with STM32F407VG microcontroller have been given much more attention specifically to detect the direction of the user activity. As a consequence, it would be possible to obtain energy conserving algorithm, which play a vital role in creating optimized battery mode operation that can be applied in the proposed systems to have a certain added advantages to the system under consideration.

The future extent of the human global positioning framework includes the advancement of different remote low force and minimal expense imaginative innovation which was upheld by IoT, for example, BLE, Adaptive Network Topology (ANT), ANT+, ZigBee, Radio Frequency for Consumer Electronics (RF4CE), Wi-Fi, Nike+, Infrared Data Association (IrDA), Near-Field Communication (NFC), IPv6, Low-power Wireless Personal Area Network(6LowPAN), and so on

These frameworks can be executed effectively in a continuous climate by utilizing broadcast, star, lattice, checking, and highlight point network geography with the assistance of the gadgets that are utilized in an everyday life, for example, cell phones, wellbeing and wellness gadgets, home computerization, Heater, Ventilator, and Air Conditioner (HVAC), controller framework, Human Interface Devices (HID), brilliant meters, installment, and numerous others to make the human global positioning framework to be more proficient and appropriate for different conditions in future.

Proposed Methodology

Presently, Smartphone user direction detection and tracking system is a major challenge in Wireless sensor networks. These challenges in detecting the smartphone user’s direction can be overcome by implementing

various mechanisms like BLE, Wi-Fi and PIR sensor with STM32F407VG microcontroller that belong to IoT. Context-aware Energy Conserving Algorithm (CECA) is applied to all the above mentioned technologies for the purpose of optimizing battery power.

In the first methodology, a set of smartphone using BLE at IoT will consider. Orientation sensor detects an correct position in user and their activity as well as BLE send the detected signal for tracking device by the help of star topology. Also, the activity signal will capture by help of Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) toolkit.

In the second methodology, a combination of smartphone accelerometer, gyroscope, orientation sensor and Wi-Fi in IoT will consider. In this case, the users activity signals transmitted by Wi-Fi will be captured using Java Framework interface tool developed.

In the third methodology, an integration of PIR sensor, BLE and STM32F407VG microcontroller will consider for the detection of user's activity signals with or without a smartphone due to its low cost for implementation and maintenan

Finally, Context-aware Energy Conservation Algorithm (CECA) for IoT technologies will be designed which can be applied to different QoS parameter, to be specific like Inter-Meeting Time (IMT) and will be used to determine whether the smartphone users are within or outside the transmission range. Result will be conclude after the completion of simulation.

Results

IoT was an emerging mechanism that connects the devices linked by the software, sensors as well as network connectivity that makes the information which is available in several networks. The outcome of this work depends on the three different systems proposed for design and develops using various IoT technologies such as BLE, Wi-Fi along PIR sensor by STM32F407VG Micro-Controller.

Experimental results can be obtained once the analysis is done with the captured signals. By results we can observe the inferred to the developed system has achieved the best performance.

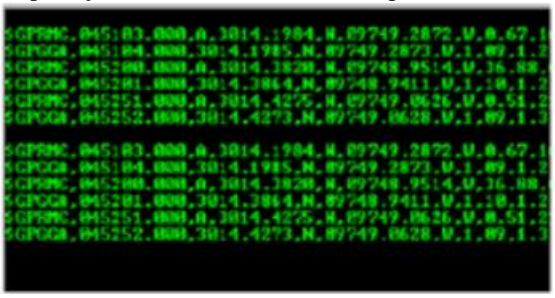

Figure 2: Tracking correct location with the help of GPS

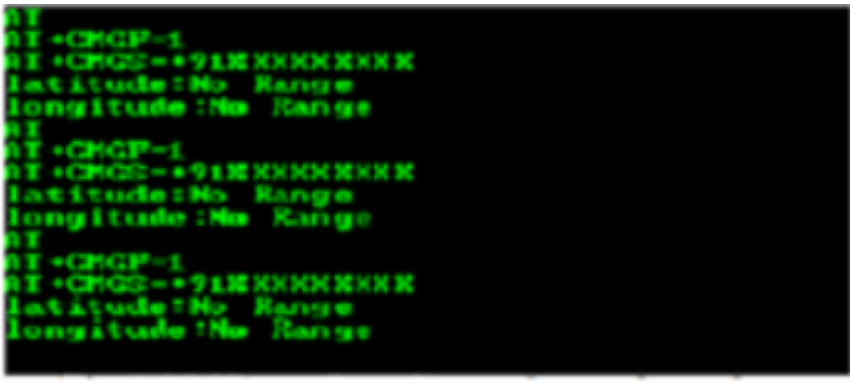

Figure 3: Forwading messages to registered mobile Devices

Figure 4: Location Identified on LCD

The work's major goal is to give protection and security to women who are in danger. When a woman feels insecure, she presses the button. When the button is pressed, the microcontroller receives the instructions, as well as GPS calculates person's accurate location. The GSM mechanism will send text message having exact location information for microcontroller's and adjacent police station's phones. Every 1 second, GSM will send SMS to the registered mobile phones. Figure 5.2 depicts the SMS sent to the registered mobile phone numbers. Fig.5.3 shows the display message on the LCD. The designed IoT architecture will identify the person correct location as well as update the location at site. Microcontroller that activate device's buzzer, alerting surrounding individuals that someone is in danger and allowing them to respond. The neuro-simulator, which administers electric shock to the attacker, is also turned on by the microcontroller.

Conclusion And Future Work

Many apps have been built in the existing system, including mobile apps such as "HELP ME ON MOBILE." Also being developed are *91# codes. Women should call or send a message if there is an emergency to that code.STM32F407VG microcontroller and many sensors such as the heartbeat sensor, flex sensor, tilt sensor, and vibration sensor are used in proposed work to monitor the status of women. If an emergency occurs, the message and position are immediately transmitted to the nearest police station and relatives. To receive assistance with the existing system, you just have to click once. Women may find themselves in situations where a single click is not possible. Women may be at a stage when they are unable to communicate with one another. Body sensors assist her in automatically detecting at that moment. We have designed the safe gadget for women to carry it when they were moving out. The alert button can be created in any of the ornament such as watch, chain ear ring etc., but they have designed smart chain. So that it may not know to unknown persons where she is carrying out that device. Even though the people were taking those women to one place to other by GPS location with the help of device can identify the exact location. So the person can be secured.

In future we are planning to make few improvements in this gadget by bringing some of the improvements in terms of better results in less time, robustness of the data with data encryption standards.

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