PRISON MONITORING USING IBEACON AND ARDUINO MICROCONTROLLER

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ABSTRACT: **In this, we are going to monitoring the prisoner activities in the jail environments using the Arduino controller and heart beat sensor. Ibeacon/GPS is used for notifying prisoner to the Smartphone or computer devices and to find out current location of person passed on the jail and maintain the record in details of the prisoner for find the location and pointed the person, In many applications and methods ibeacon is used such as patient monitoring and store navigation, disaster recovery . Evidence of the prisoner obtainable is transmitted to the authorized user, future where location evaluation is performed by calculating times and speed of the person crossed on the road. Then, heart beat senor and ibeacon is attached with prisoner hand to monitor them. That prisoner's location and health status are monitoring in the receiver side. Position of Bluetooth transmitters' signal levels at certain point data will be stored is known base stations. All that information will be used for store about that person information in the nearest base station. When it comes to using more evidence of Ibeacon further it broadcast the information with low frequency.**

Index terms- **Monitoring, Ibeacon Transmitter, Location Tracking, Alerting, Buzzer, GPS.**

INTRODUCTION

Prison is an important place of custody and management of offenders. Any slip of concentration upon the prison security system would give enormous pressure on social security and serious consequences. The Internet of Things (IOT) provides a good chance for prison control by integrating all sensors deployed in the prison into a unified monitoring system. However, because the data format and data semantic of the monitoring systems are not unified, the integration of systems in different prisons is difficult. In this paper, we designed a semantic framework to promote the data integration and interoperation of different prison monitoring systems. At the same time, the framework provides different query and reasoning service interfaces for different high level applications and registry service. As a result, multiple heterogeneous sensor and stored data sources are integrated on-the-fly by using the semantic ontology data stored in knowledge base. With our framework, data interoperability, information search and retrieval and automatic inference can be realized.The problems of the security systems are in use mainly in three aspects: first, real-time video and clarity is not good, using timelapse video recording mode, and often the screen will appear shaking. Second, for the offender's health status, suicidal behaviour can not be found in a timely manner. Third, location problem, it could not always detect the specific location of criminals and could not discover the whereabouts of criminals when a jailbreak occurred. The current prison security monitoring system was also difficult to meet the security requirements of the prison, so there is an urgent need for a new technology in the prison surveillance system to address the problems which can not be solved by existing systems.

This design of the prison monitoring system based on Ibeacon, can monitor the vital signs of restrictions on criminals' relevant information, and use this information to analyze the physical condition, activities, status and location of inmates and pin point the correct person for identifier. Moreover, the system also could detect suicide or escaped of the inmates, and to pre-alarm or alarm at the same time. Wireless sensor network is a new technology without applying to prisons currently in the country, the application of the technology in the prison system is very valuable and significant.In order to monitor the action traces and health conditions of prisoners, in the design of prison monitoring system, the system structure, location and routing protocol are attached great significance.

1. THE STRUCTURE OF PRISON MONITORING

The structure is composed of sensor nodes, the cluster of sensor nodes, cluster head, cluster nodes and control nodes. Sensor node is the basic unit of the network, responsible for sensing and pre-treatment information, can be arbitrarily scattered in detected region, in order to constitute a form of self-organizing networks, to get each node location through GPS positioning and Ibeacon. Cluster is composed of the adjacent sensor nodes in the network, each node in the cluster transmitted the collected information (such as body temperature, pulse, the foot pressure) to the cluster head, cluster head through the data fusion then send the compressed data to the aggregation node. Aggregation node directly connected with the Internet or communications satellites, reached the server, to achieve communication between control nodes and sensors. Control node is the management centre of the whole network, mainly the data collected is calculated by the comprehensive information they need, and be able to manage the various sensor nodes. Wearing sensors for prison inmate, each sensor is uniquely identified for a criminal. After operation, sending the physical condition, activities and specific location of criminals to a cell phone or the monitoring centre to real-time forecasting, early warning.

1.1. EXISTING SYSTEM

In our existing system, the zigbee protocol is used for the data transferring. It will not transfer location to the receiver side. With the rapid development of security systems, the security system design has been put forward higher requestment. It introduces the wireless technology into prison security system. Modern prison management and wireless sensor network are analyzed; Focus on the overall system structure, as well as the hardware and software design of the system; The key technology of implementing the system is discussed. It can notice to the related working personnel in the prison to make the prison guard arrives on the scene for the first time to deal with the emergency. For that we are moving with ibeacon sensor. We can't transmit the location using the Zigbee protocol. Hardware implementation is not a easy process. No accuracy in process.The response time is very high. So makes time delay.

3. PROPOSED WORK

The Arduino (AT Mega328P) microcontroller and Ibeacon sensor is used for the location tracking of the prisoner in the jail environments. The prisoner's heart beat and health status is monitored by the heart beat sensor and vibration sensor and it is connected to the Arduino microcontroller. The received location send to the computer system to monitor the location using the graphs. Ibeacon will transfer the both location and data transmission. The vibration sensor is attached to the prisoners hand to monitor the status of the person. For testing we have to use the vibration motor.Both location and data transmission is possible with ibeacon sensor. It reduces the hardware implementation time and cost.High reliability.Health status of the prisoners will be monitored properly.

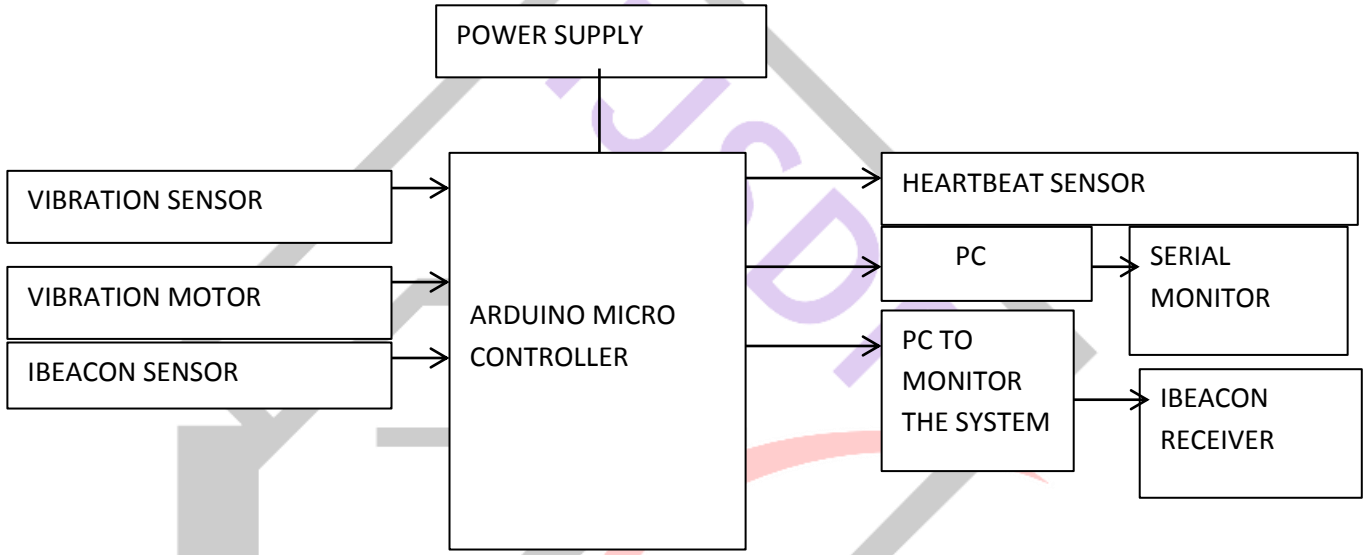

Figure:1 Block diagram

3.1. WORKING

The working is explained with an example. Suppose considering a prisoner. The actor is prisoner; the bracelet will tied on prisoner wrist to monitor him. If the prisoner is inside the campus the signal i.e. frequency will be in some range limit for that bracelet. The transmitter will transmit the signal that will be received by the receiver. The transmitter will be implemented on the bracelet and the receiver will be implemented on the server. For inside campus there will be some rang limit given which will indicate that the prisoner will be in jail. And if the prisoner tries to harm the bracelet the sever will generate an alarm even the message will be send to the police officer of jail on his mobile so accordingly the prisoner will be monitored without any CCTV Camera. Similarly, for outside campus if the prisoner tries to run out of jail i.e. tries to escape from jail. The frequency range will be break out and will generate the alarm and message will be sent to officer to indicate the prisoner location when he escapes. The GPS will be helpful to get the location of the prisoner if he/she tries to escape. In this case GPS plays an important role for outside campus monitoring.GPS (Global Positioning System): GPS is a space-based navigation system that provides location, time information, anywhere on or near the Earth. GPS system is made up of a Network of 24 satellites placed into orbit. In the topic of monitoring system for prisoner, GPS module is used for tracking the prisoner when he/she tries to escape the campus. GPS system is activated when the prisoner goes outside the campus then using GPS module the jailer will get the position of the prisoner with the help of the longitude and latitude so that can easily find out the prisoner. ARDUINO is used for receiving signal from GPS module which is implemented at transmitter side.

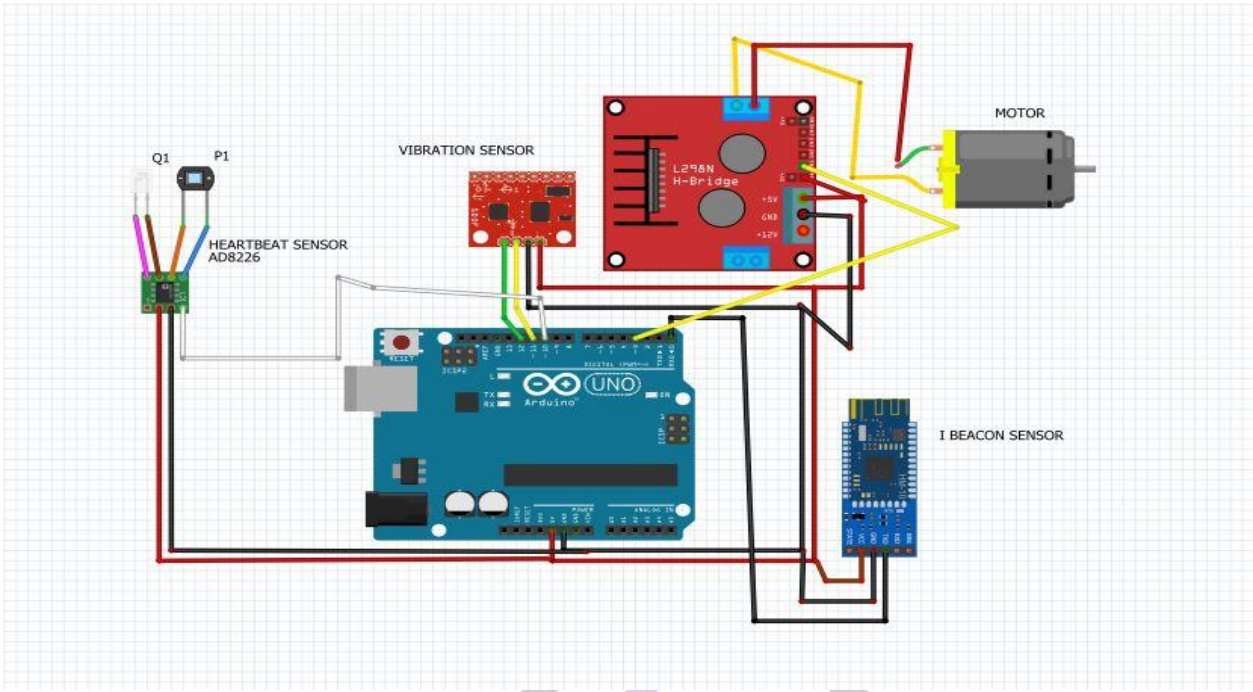

Figure: 2 Circuit diagram

3.2. MONITORING

3.2.1. IBEACON SENSOR

IBeacon is a protocol urban by Apple. Ibeacon will transfer the both location and data transmission. The vibration sensor is attached to the prisoners hand to monitor the status of the person. For testing we have to use the vibration motor.

3.2.2. VIBRATION SENSOR

Vibration sensor monitoring the module if any vibration are occur in that function ,if that vibration sensor monitoring the values for that vibrating level. Heartbeat sensor periodically monitor the heartbeat function in this sensor get the output on the body.it can be find heart beat normal and abnormal values. In this sensor have the different kind of functionality to perform high accuracy level to that heartbeat function.

3.3. TRACKING

Tracking module track the all sensor values in that module. In this tracking unit continuously tracking the heart beat sensor if there are correct values are maintained or any other changes occur in that measuring values. In this tracking unit continuously tracking the vibration sensor if there are correct values are maintained or any other changes occur in that measuring values.An iBeacon transmission can approximate the distance from the iBeacon. The distance (between transmitting iBeacon and receiving device) is categorized into 3 distinct ranges.

- Immediate: Within a few centimetres
- Near: Within a couple of meters
- Far: Greater than 10 meters away

3.4. AERT

This monitoring system important role is alert. If any abnormal values accrue in that heartbeat sensor , vibration sensor and I beacon sensor automatically buzzer will be on and produce sound.In this alert we can find out fault accrued area and find out health functionality. The data includes exact UUID, major, and minor values of ranged beacons, as well as proximity estimations.

4. CONCLUSION:

In this project we are going to monitor the convict person, using heartbeat sensor, as well as vibration sensor. When they trying to attempt suicide means it will send message to the particular person. GPS and ibeacon signal is used to find the exact position of the convict person.

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