Utilization of RSSI and Neuron Stimulator to Prevent Escapism of the Prisoners

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***Abstract*- The Proposed System aims at preventing escapism of the prisoners in the prison environment. To accomplish the above target, the prison environment is divided into three zones namely secured, intermediary and endangered. An RSSI (Received Signal Strength Identification) technology is implemented to estimate prisoner's distance within the boundary line depending upon signal strength. The RSSI module is placed internally in the prisoner's device that works on the principle of signal strength. If the prisoner is in the secured zone, then signal strength will be high. If suppose the prisoner reaches endangered zone, then signal strength will be low. When the signal strength is low, automatically an alarm alert is sent to the control room. The control room in turn activates neuron stimulator in prisoner's device. The neuron stimulator injects small range of current pulse into the prisoner's body which disables further movement of prisoner. Even if the prisoner tries to break the device, a buzzer alert is given though vibration sensor to the control room. If the prisoner tries to escape from the prison environment, then the exact location of prisoners can be estimated using GSM and GPS Technologies.**

***Index terms*- RSSI module, neuron stimulator, vibration sensor, GSM & GPS, Embedded C**

I.INTRODUCTION

Manual monitoring systems are not efficient in keeping track of prisoner's activities. In today's life monitoring prisoners in prison environment, tracking the movement of prisoners and security, needs assistive technology to replace the security guard work and prevent prisoner from escaping the prison. In this paper escapism in prison environment is detected using RSSI technology which is inbuilt in the device. It is the strong technology that ensures prisoners attendance inside the prison environment. As security officials are easily botched by prisoners by means of deviating the officials to move away from their positions, it is again an additional offence during imprisonment. RSSI technology overcomes the disadvantage of manual monitoring technique. Proposed system uses Wi-fi range to trace the prisoner's location. RSSI in the prisoner's device is used to track prisoner in both indoor and outdoor environments. This system, uses RSSI module to stalk the current location of convicts at all time. RSSI technology paves way for tracing inmates of the prison current location by using GSM and GPS technologies.

It has very fast response compared to others and it is economically feasible. It reduces man power and also the workload for prison officers. With this system the prisoners can be monitored with less number of jailers or even it can be monitored from different place with no jailors. They can safely monitor them from a different place because the officials will get an alarm if the prisoner tries to escape or break the device and they will get the current location of the prisoner even if he reaches certain distance away from the prison. As a result it becomes easy for the jailer to monitor the prisoners.

II. EXISTING SYSTEM

The current system is provided with a CCTV device to ensure prisoner's localization inside the jail by the prison officers. But monitoring through CCTV is not an effective method to prevent escapism of the prisoners. It may result in human errors and delays. At times, security officials are deviated by prisoner whose intention is to escape from prison environment In this method more number of officers are needed to

review the camera continuously. There is also a probability of the prisoner to break CCTV device which may lead to escapism. Previously there is an alert system that only intimates the officials about the escapism of the prisoners but does not pave way for prevention. The above procedure is a long process for intimation and it is not effective enough.

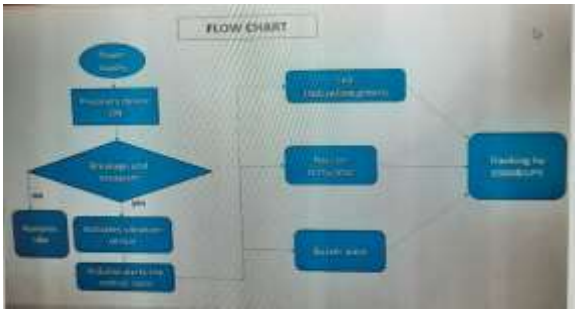
III. PROPOSED SYSTEM

In proposed system, a prisoner device is used which employees RSSI module. It helps in the detection of prisoner's distance based on WIFI technology which works under the principle of signal strength. In this system, RSSI module is placed indoor in a wireless network to determine when the amount of signal strength reaches high, above the threshold level.

FABRICATED KIT OF PROPOSED SYSTEM

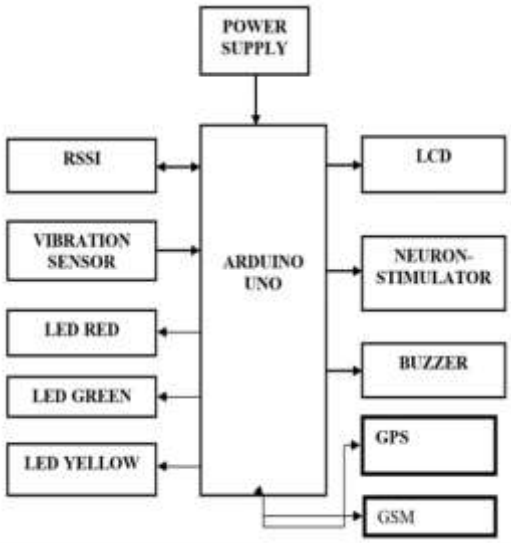
The distance range is divided into three zones namely secured, intermediary and endangered depending upon signal strength. The distance calculation helps in sending alert messages to the control room. In this system, if the prisoner tries to escape, accurate location can be estimated using GSM and GPS technology. Breakage of prisoner device can be prevented by stimulating current pulse to the prisoner with the help of neuron stimulator.

IV. FLOW CHART



1. Power Supply is switched ON.
2. Initially prisoner's device is set up and switched ON.
3. If suppose prisoner tries to escape an alert is given to the control room through buzzer.
4. And if the prisoner tries to break the device vibration sensor will be activated and neuron stimulator injects short current pulse to the prisoner.
5. Once the prisoner indulges in escaping, the distance can be estimated using RSSI technology.
6. Safe, intermediate and danger zone are categorized depending upon the distance moved by the prisoner.
7. And finally, the prisoner's location can be estimated using GSM and GPS.

V. BLOCK DIAGRAM



RSSI technology is a way of detecting prisoner's distance through strength of the signal. The proposed system, makes use of RSSI technology to detect whether the prisoner stays within the prison environment or not.. The main components of the kit are RSSI module and neuron stimulator. If the prisoner tries to escape from the prison environment an automatic buzzer alert is sent to the control room. The control room automatically sends a control to prisoner's device to activate neuron stimulator. The neuron stimulator injects a small range of current pulse into prisoner's body to prevent movement of the escaping prisoners. If any breakage of prisoner's

device is sensed, the vibration sensor automatically produces an alarm indicating that the prisoner attempts to escape. By any chance if the prisoner tries to escape from prison environment, then GPS and GSM technologies helps in tracking prisoner's location.

VI. HARDWARE COMPONENTS

- RSSI MODULE
- POWER SUPPLY
- MICROCONTROLLER
- GSM MODULE
- GPS MODULE
- LED Red , Yellow , Green
- LCD
- BUZZER
- VIBRATION SENSOR
- NEURON STIMULATOR

VI. SOFWARE COMPONENTS

- EMBEDDED C
- ARDUINO IDE

VII. PROJECT DESCRIPTION

(i) RSSI AND TRIZONAL IMPOSITION

RSSI Technology is a kind of localization technology that calculates distance of the prisoner based upon signal strength. Depending upon the geological borderline, the prison environment is divided into three zones namely; secured, intermediary and endangered zone. An RF transceiver is placed both on the prisoner's device and also in the control section. The main purpose of RF Transceiver is to send alerts to the control section, if the prisoner tries to escape from the secured zone.

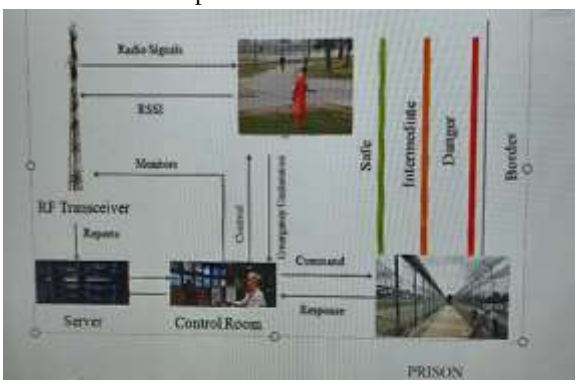
When the Signal strength is high, it means that the prisoner stays within the secured zone. When the received signal strength begins to deteriorate, then an alert is given to the control room indicating that the prisoner has entered the intermediary zone .When the received signal strength is low, then it means that the prisoner has reached the danger zone and a buzzer alert is given to the control room indicating that the prisoner is trying to escape.

All the recorded information are reported to the control room. Based on the monitored reports the security officials can take necessary measures.

(ii) BUZZER ALERT FOR WARNING

A buzzer is an audio signaling device that can be mechanical, piezoelectric and electrochemical. A buzzer alert is activated if the prisoner enters into the intermediary and endangered zones. If the prisoner is detected to be in the endangered zone then the security officials will be stated that the prisoner tries to escape from the prison boundary. So the officials take prompt measures, by injecting current pulse to prisoner' body through neuron stimulator placed in prisoner's device. Only a mild range of current pulse is injected in order to prevent escapism.

The control room intimates the guards to prevent the prisoners from escaping and eliminates illegal and unauthorized activities. The control room can monitor both indoor and outdoor prisoners. Thus the control section will have an entire control of all the prisoners whenever required and they can manage all of them from one place.



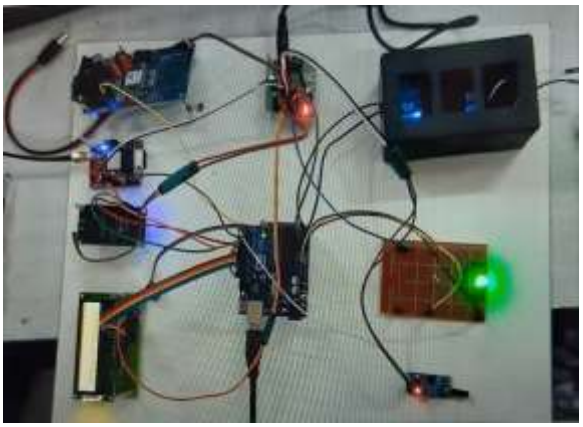
(iii)MANUAL CONTROL OF PRISONERS

If the prisoner tries to break the setup or device, an alert is sent to the control room through buzzer. And if the prisoner tries to escape from the prison environment, automatically neuron stimulator injects

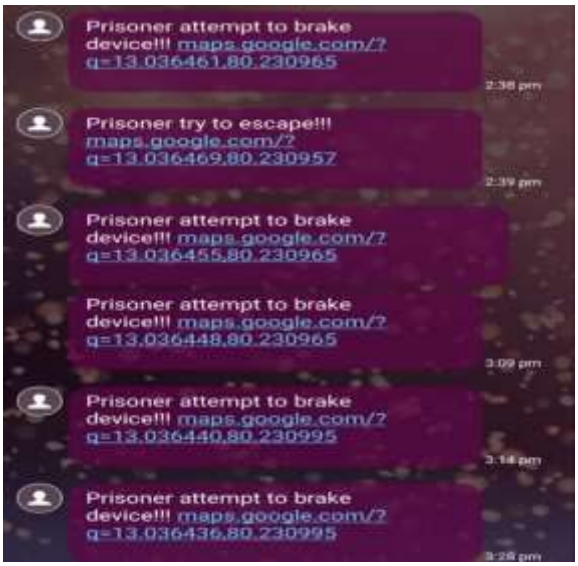
current pulse into the prisoner's body. As a result the prisoner's further movement is terminated. The prisoner's device is operated by the prison officers inside the control room. This technique prevents escapism of prisoners and allows them to move in secured zone without any problem. If in case of any flaw or if the prisoner tries to escape outside the prison environment, location can be tracked using GSM and GPS technologies.

On escaping, the system triggers the GSM Module and the message is sent to the responsible person. It also leads to the activation of neuron stimulator which releases current pulse and prevents the inmates of prison from escaping. This technique can be implemented in the fields of defense and also in military applications. It also finds application in rural areas.

VIII. RESULT



HARDWARE PART OF THE SYSTEM



SOFTWARE PART OF THE SYSTEM

IX. CONCLUSION

RSSI based system of tracking prisoner's location which has a greater advantage, that the prisoners can be monitored 24*7 from anywhere, anytime and anyplace.

This system reduces the work for security officials and ensures 100 percent prevention of escapism. It also provides a better livelihood to those officials who are responsible for monitoring the prisoners. With this system the prison can be monitored with less number of jailers or even it can be monitored from a different place with no jailers. Because they can safely monitor them from a different place and the jailer will get an alarm if the prisoner tries to escape or break the system and he will get the current location of the prisoner even if gets out of the prison. So it becomes an effective method for the jailer to monitor.

XI. FUTURE SCOPES

The present work has been composed to achieve future targets that includes

1. Military Applications.
2. Neglection of illegal and unauthorized transactions.

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