

# JAIL SECURITY SYSTEM

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**Abstract :** *The main aim of jail security system is to provide utmost security to any specific area. The jail security system presented here is enclosed with innovative concepts can be used for different applications ;the ultimate goal is to provide high level security to the jails .The same system can be used for other organizations high level security is required. The prototype module is constructed with three main concepts ,in which top priority is given for the autonomous vehicle which roams within the premises of jail that broadcast the live video to the monitoring station. The second concept is to guard the sensitive points here the sensitive points are defined as the points from where prisoners may escape. The third concept is to energize outdoor lights automatically during dark; these lights will be energized in the evening & are de-energized in the morning ,natural light is monitored continuously through an LDR*

**Index Terms -** Jail security, microcontroller , LDR ,IR sensors

## I. INTRODUCTION

In any prison environment it is extremely important to ensure that security level is being maintained all the time. As the crime rate increasing day by day, jails/prisons are crowded with prisoners; as there is no change in the strength of guards, strength of prisoner's is increasing every day; ultimately prisoners are trying to escape from the jails. In this regard sophisticated security-systems are essential to keep watch the prisoners continuously. Moreover most of the jailbirds are escaping during nights only, especially during mid nights, this is well known fact, and to avoid this kind of offense, here one security system is designed which guards the entire premises of jail during nights.

The security system designed here performs multiple functions and it is programmed to activate automatically during nights only, because this is the time for the prisoner to escape from the jail. Main features: a) Outdoor lights are turned ON automatically, b) Sensitive points are guarded with optical sensors, c) Interrupted area is displayed in jailor room through LCD, d) The wireless Video camera which is arranged over the autonomous vehicle will be activated automatically and moves with in the premises of jail and avoids collision with the objects, e) Since the camera is live broadcasting Video, the jailor can monitor the premises through the wireless video monitoring system arranged in his room (this system also activated automatically during dark), f) If any point is interrupted by the prisoner, alarm will be raised at jailor room, g) Since the vehicle can sense pits, it avoids falling into it and takes diversion automatically.

The wireless video camera arranged over the autonomous vehicle can live broadcast live video to the jailer room through wireless video monitoring system, for this purpose the vehicle is designed as rover. As we all know that the Rover functions are plenty, they can be utilized for many applications and performs many functions. The system can be called as autonomous, because the vehicle itself detecting objects and according to the position of the object the vehicle takes diversion either right turn or left turn automatically. Some times the vehicle travels in reverse direction also, this happens when the vehicle finds an object at its mid position. As the vehicle is equipped with sensors at different locations, position of the objects & pits information is gathered, based on this information the microcontroller drives the motors through 'H' bridge. These Motors drives the vehicle in different directions. The system contains natural light sensing device, by which out door lights are energized automatically. LDR is used for sensing the natural light; whenever the natural light disappears the trigger circuit designed with timer chip activates the outdoor lights automatically through relay. As the main subject is related CCTV (Closed Circuit Television), it can be said as video surveillance system. Use of CCTV in jail security systems can help the jailor to watch their prisoners.

## II. LITERATURE REVIEW

As prisons become more crowded and internal problems arise, it is important to keep control and stability inside and outside of the prison. Although there are many security measures that can be put into place, it is hard to say whether it is the physical design of the prison or the skilled officer that makes the difference in safety and security. Both play a major role in keeping things running smoothly inside and outside the perimeters. In addition top priority must be given for jail security through electronic devices, such that the movements of prisoners can be monitored continuously.[1]

Monitoring the prisoners through CCTV is the best method, with the help of this system jailor or concern authority can have a continuous vigilance over the prisoners. These days sophisticated video surveillance systems with video recording facility are available in the market, the data stored in the computer can be rewind for the evidence. If any prisoner creates violence in the jail, that can be recorded in the system, which can be revealed as string proof[2].

Now coming to the jail, jail is a correctional institution used to detain persons who are in the lawful custody of the state, including accused persons awaiting trial and those who have been convicted of a crime and are serving a sentence of less than one year. Jails are generally small penitentiaries run by individual counties and cities, though some jails in larger communities may be as large and hold as many inmates as regular prisons. As with prisons, some jails have different wings for certain types of offenders, and have work programs for inmates who demonstrate good behavior.[2]

"Prisoners are classified according to different risks they pose to fellow prisoners, personnel, and the community". There are different levels of categorization according to how much of a threat the offender is to society. Category 'A' prisoners are very dangerous to society, the police, and the state. The escape of these prisoners would be detrimental to the welfare of the community. Category 'B' prisoners do not need the highest security, but escape must be made difficult to achieve. Prisoners in Category 'C' cannot be trusted in open conditions, but they do not have the ability or resources to make a determined escape attempt. Category 'D' prisoners can be reasonably trusted to serve their sentence in open conditions. Allocation refers to the placement of a prisoner in a certain institution, which can include the local jail, a state penitentiary, or a federal prison.[3]

A remote surveillance monitoring system was designed to protect the company's personnel from hazards in remote places and the result has been viewed in Lab VIEW . A vision sensor to identify emergency vehicles over a road side with the Camera Closed Circuit Television (CCTV) was implemented recently. The CCTV captured the vehicle image by which the traffic light was controlled . The ethical and legal significance of using smart CCTV is also discussed . A novel model based on electronic monitoring was developed to improve the prison security. This was also useful in monitoring people under house arrest. The CCTV cameras are being employed in prisons efficiently to prevent mishaps such as self-harm/suicide. Its usage in detecting escapes, collecting evidence and to make better safety in prison is analyzed.[4]

### III. PROPOSED WORK

In this project we use a vehicle which is powered by a rechargeable battery to move within the premises of the jail .A wireless video camera will be connected to the the vehicle so that continuous monitoring of the jail in every area will be possible.The data recorded in the video camera will be transmitted to the tv set that is arranged in the jailors room.The vehicles movement will be controlled with the help of IR sensors to avoid any damage to the moving vehicle.

There are few places in the jail through which escaping of the criminal will be an easy task so in such locations IR sensors are placed if any person tries to escape from that location then an alarm goes on and the exact location from where the prisoner is trying to escape will be displayed in the LCD.

It is very easy for a prisoner to escape in low light or in the absence of light source to avoid such risks an LDR is also used to detect the presence of natural light in the absence of natural light the light source connected to the LDR will automatically glow making it difficult for the prisoner to escape. The reason for this research is to analyze how security systems are becoming popular these days and how useful it is to help us from any danger



Fig 1 :Rover used in the premises of the jail

The rover contains 5sets of IR sensors which detects any obstacle coming in its path.3 sets of IR sensors are used to detect any obstacle in the right, left and middle direction whereas the remaining 2 sets of IR sensors will be used to detect any pits. Whwnever there is any obstacle in its way then the IR sensor connected to the vehicle detect the obstacle and send information to the microcontroller which inturn control the direction of the vehicle.

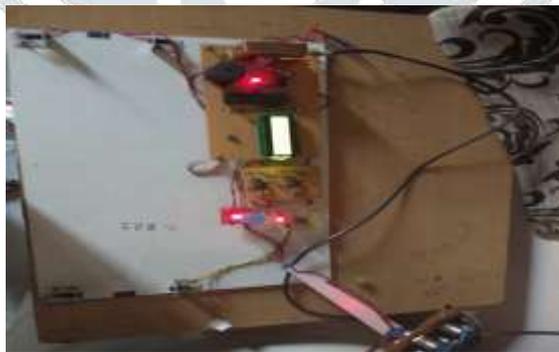


Fig 2 Jail setup

Fig 2 represents the Jail setup which consists of LDR and 2 sets of IR sensors along with an LCD.

Escaping from the prison will be an easy task in the absence of light source so here we use an LDR sensor to detect the presence of natural light .ldr will be connected to a 555timer which is inturn connected to a relay, as soon as there is no natural light LDR triggers the absence of natural light and sends the information to the 555 timer.the data send to the 555 timer will be responsible for switching ON of lights eith the help of a relay.In the sensitive areas present inside the jail IR sensor sets will be arranged and if any person tries to escape from that particular region then automatically the buzzer gets ON and also the location from which the person is trying to escape will be displayed in the LCD



Fig 3 normal condition

Fig 3 represents the display of the LCD when there is no interruption in the sensitive zones.

The sensitive zones will be taken as reference points and the condition at the reference point will be displayed



Fig 4 interrupted zone

Fig 4 represents the condition of LCD when an interruption takes place

#### IV. CONCLUSION

Various fields of technologies like wireless video network, embedded systems, autonomous Rover, LCD, etc. are included in this project work. Here a simple rover is designed to guard the premises of a prison. This rover is equipped with a wireless video camera such that it can telecast the live video to the jailor room. The main intention of this project work is to provide high level security to the premises of the prison; a systematic, step-by-step approach is implemented to enhance this project work. The following are the advantages.

1. Cost effective: The overall system is designed with very less hardware, multiple features are offered at a smaller amount.
2. Simple Technology: The entire system is designed with two ATMEL microcontrollers, one controller unit is used to drive the rover autonomously, and this controller is programmed to take self-decisions, thereby the vehicle can sense all sorts of objects on its way & avoid collision with the objects & move within the four walls of a specified area.
3. Auto scanning through video camera: The wireless video camera arranged over the rover rotates automatically for scanning the surrounding area. Whenever the rover finds an object on its way, it will be stopped there & the camera will be moved in both directions, after telecasting the live video it takes direction & will be moved in the forward direction.
4. Easy Operation: The operation is quite simple, since the entire system is automated, human involvement is avoided to some extent. As the rover roams autonomously, it doesn't have human control; hence it is supposed to be collected when required.
5. Economy: As the outdoor lights are controlled automatically, they are energized & de-energized at exact specific situations, thereby energy losses can be minimized, by which electricity bill amount can be reduced. Like wise many advantages are included in the system.

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