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# A System for Detection and Tracking of Human Movements

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**ABSTRACT:** In today's life, monitoring the prisoners in prison environment, tracking the movement of patients with mental illness, patients in hospital etc., needs assistive technology to replace the security guard work and prevent prisoner from escaping from prison. In this work, escape detection in prison environment is detected using Bluetooth tracking. As the security officials were easily botched by prisoners by means of distracting the officials to move away from their positions, it is again considered as additional offense to during his/her imprisonment. Internet of Things (IOT) is an enabling technology to connect different physical objects/sensors which monitor the environment. It allows the sensors to exchange the information with other sensors and allows to act accordingly.

**KEYWORDS:** Raspberry Pi, Bluetooth Module, Vibration Sensor, Speaker, Raspberry Pi camera.

## I. INTRODUCTION

In this project we proposed a wearable band for prisoner to monitor the movement of prisoner using Bluetooth signals and video transmission over local network. The proposed system consists of a Raspberry pi microcontroller, camera, vibration sensor, speaker, and inbuilt Bluetooth and wifi transmitters. This raspberry pi controller is connected with prison wifi. Camera attached with raspberry pi will send the video feedings to prison control room. Every area in prison has a Bluetooth transmitter. Raspberry pi can able to identify the location of the prison using detected Bluetooth module id. It will send this to control room continuously. Using these guards can easily identify the location of prisoner within the prison. Guards can also give voice commands to prisoners using speaker attached with raspberry pi.

## II. RELATED WORK

Due to impracticality of the Global Navigation Satellite System (GNSS) in the indoor locations, Wireless Network based systems (WNS) are widely used for the indoor locations estimation technique.

[1] Human activity recognition with 3D skeletal model has been used in a lot of application area. Representations of human based on 3D perception have been occurred different problems in activity recognition. In modern work with RGB- cameras, wearable sensors and illuminator array have been used to build the 3D human skeleton model in recognition system. These systems have been defined precise lightening condition, restricted range and great limitation in outdoor applications. To overcome this limitation, the system considered the real-time video sequences of the human movement to understand human behavior in indoor and outdoor environment. This method constructed human detection and motion tracking by using framewise displacement and recognition is based on skeletal model with deep learning framework. The model produced an efficient detection, tracking and recognition system for real-time human motion. The performance and correctness of the system is analyzed with a variety of videos to show results.

[2] The human-computer interaction (HCI) has a significant role in human lives for decades. One significant area include an assistive technology in medical system. An application such as patient monitoring is useful for both patients and caretakers. This work aims to assist patient with speaking problem to be in touch with other people without the need of using voice. This paper applies an arrangement of machine learning technique based on Haar-like features and a progress tracking method to spot direction of patient hand movement. Every moving direction is mapped to a given message. The message is also displayed on a screen and sent to caretaker through a notification. The investigational results show that the system provides rewarding outcomes in both recognition and movement tracking.

In this paper we have a Raspberry pi microcontroller and every prisoner have a Bluetooth module along with Raspberry Pi Camera and WI-FI. In this system, we can continuously monitor the prisoner by using Internet and we can command the prisoner by text to voice command.

### III. PROPOSED WORK

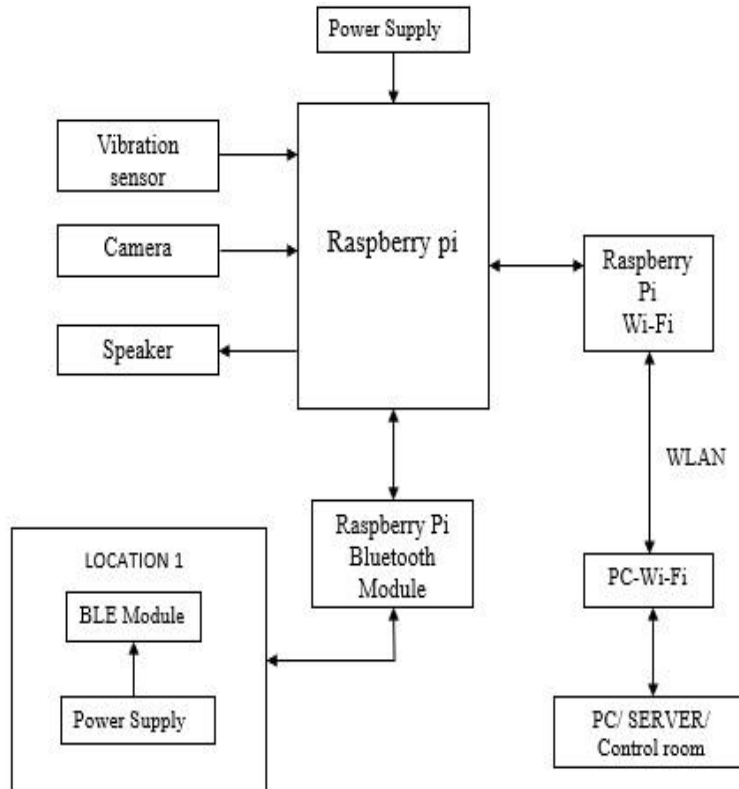


Fig.1. Proposed Block Diagram

In this paper we propose a wearable band for prisoner to monitor the movement of prisoner using Bluetooth module. The proposed system consists of a Raspberry pi microcontroller, camera, vibration sensor, speaker, and inbuilt Bluetooth and wifi transmitters. Basically Raspberry Pi have a Bluetooth and WI-FI module .Raspberry Pi Bluetooth is always connected to nearest Bluetooth module of different locations 1 or location 2 or other locations inside the campus of jail.

WI-FI module of Raspberry Pi is always connected to control room PC where the monitoring of live locations of Raspberry Pi signals using nearest Bluetooth module live locations. In this system, Camera is used to monitor the prisoner and the camera feed is sent through Raspberry Pi WI-FI to PC/SERVER. The main use of Vibration Sensor is if the prisoner tries to break the band, the vibration sensor immediately sends a signal to the control room and alert the authorities. When officer want to communicate with the Prisoners they can send the text to the prisoner. It will be converted as voice commands and played to the prisoner.

When the prisoner tries to escape, the signals from the Bluetooth Module from different locations will cutoff from the Raspberry Pi and Raspberry Pi will intimate to the control room immediately. The control room can continuously monitor the prisoner activity and track the location lively. The Raspberry Pi 3 B+ is a Broadcom BCM2837BO, Cortex-A53 with 64-bit SoC @1.4GHZ. It has 2.4GHZ and 5GHZ IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, Bluetooth. The HC-05 Bluetooth unit is a simple to use Bluetooth SPP module, developed for transparent wireless serial connection setup. This module provides the switching between master and slave mode which means it can use neither receiving nor transmitting data

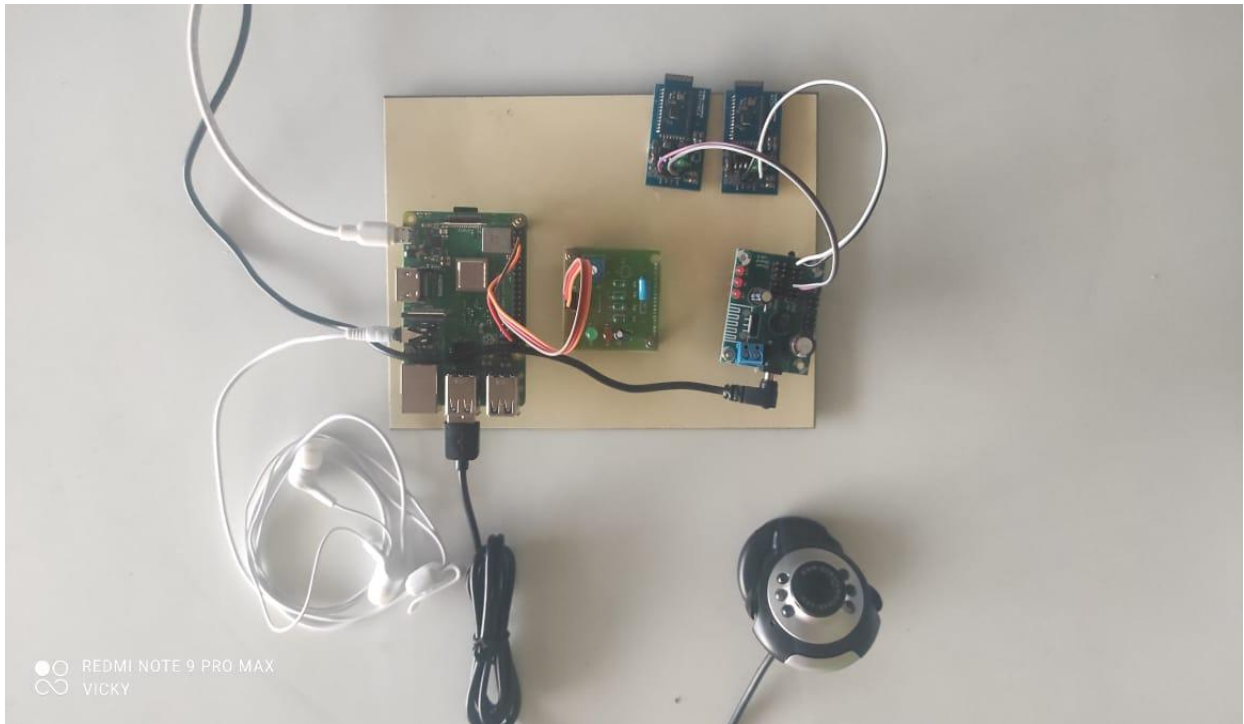


Fig.2. Implementation of the Human Tracking System

The work is implemented using the above mentioned hardware units, and working successfully in all conditions. The humans could be monitored from the control unit using the Bluetooth signal. If we want to communicate to them, we can talk remotely using the speaker built with the Bluetooth band.

#### IV. CONCLUSION AND FUTURE WORK

A system to monitor the prisoners through Bluetooth signal and wireless video transmission is developed using Raspberry module. We can use this work in many applications like monitoring the prisoners in prison environment, tracking the movement of patients with mental illness, patients in hospital. The persons can be communicated through the voice commands. We could develop this work in the networking field, increasing the number of devices.

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