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IOT Vigilant Guard Your Watchful Robot Companion For Video Surveillance

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Abstract - An innovative monitoring system combines robots, Internet of Things (IoT) tech, and artificial intelligence (AI) for secure surveillance across industries and hazardous environments. The system features a robot with cameras, sensors, and connectivity modules for remote- monitoring and control, boosting security. Through IoT, it provides live video access and uses face recognition for identity verification. Moreover, AI and machine learning detect and track motion, improving intruder detection and prompt response to threats. This comprehe-nsive approach offers valuable applications in home- security monitoring and industrial surveillance.

Key Words *– IOT, Surveillance, AI, Remote Monitoring, Security.*

1.INTRODUCTION

Smart surveillance refers to an advanced security monitoring system that integrates modern technologies, such as the Internet of Things (IoT), artificial intelligence (AI), and machine learning (ML), to enhance surveillance capabilities. This system combines various hardware components, software applications, and network infrastructure to provide more efficient and effective monitoring and response to security threats.

Video Surveillance Robots leverage IoT technology to enhance their functionality and effectiveness. Through internet connectivity, these robots can transmit video streams and other sensor data to a centralized control center, enabling real-time monitoring and analysis.

IoT integration allows for seamless communication between the robot and other connected devices, such as smartphones or security systems. This enables security personnel to have remote access to the robot's video feed and control its movements, making it easier to respond to potential security threats or incidents promptly.

A Video Surveillance Robot is a robotic device equipped with advanced video capture capabilities, designed to enhance security and monitoring systems. It combines elements of robotics, real-time video streaming, and IoT (Internet of Things) technology to provide efficient and effective surveillance in various environments.

The robot is typically equipped with a camera or multiple cameras that can capture high-quality video footage in real-time. It is remotely controlled or operates autonomously, allowing it to navigate through different terrains and locations, making it an ideal choice for monitoring large areas or hard-to-reach areas.

2.ALGORITHM

1] Step 1: The surveillance robot patrols the border, capturing video footage using onboard cameras.

2] Step 2: Face detection algorithm is applied to the captured video input to detect faces along the border.

3] Step 3: The detected faces are preprocessed to enhance image quality and uniformity, using techniques like Histogram equalization to adjust for lighting conditions.

4] Step 4: The preprocessed images are resized to a specific output size to optimize processing.

5] Step 5: Feature extraction is performed on the resized images to extract relevant facial features using methods like Eigenface-based approach or discrete cosine transform.

6] Step 6: Extracted features are compared with the database of known criminals and suspects stored in the data-center.

7] Step 7: If a match is found between the extracted features and the database, an alert message is generated and sent to the nearest border patrol authorities or concerned agencies.

8] Step 8: The surveillance robot continues its patrol along the border, repeating the process to identify and alert authorities of any potential threats.

3.BLOCK DIAGRAM

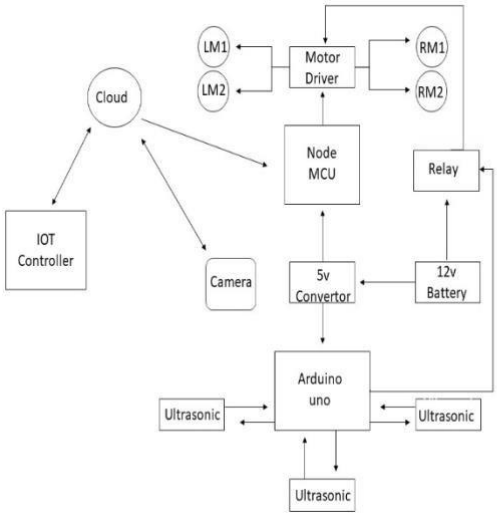

Fig 1: Block Diagram Of Robot

4.PROPOSED METHODOLOGY

1] Deployment: Deploy the surveillance robot equipped with cameras, sensors, and connectivity modules along the border for continuous monitoring.

2] Data Collection: The robot patrols the border, capturing video footage of the surrounding area using its onboard cameras.

3] Face Detection: Apply a face detection algorithm to the captured video to identify faces present along the border.

4] Preprocessing: Enhance the quality of detected faces by preprocessing the images to adjust for varying lighting conditions and improve uniformity.

5] Feature Extraction: Extract relevant facial features from the preprocessed images using techniques such as Eigenfacebased approach or discrete cosine transform.

6] Database Matching: Compare the extracted features with the database of known criminals and suspects stored in the data-center to identify any matches.

7] Alert Generation: If a match is found, generate an alert message and transmit it to the nearest border patrol authorities or concerned agencies, providing details of the identified individual.

8] Patrol Continuation: The surveillance robot continues its patrol along the border, repeating the process to detect and alert authorities of any potential threats.

By employing this algorithm and methodology, the border can be effectively monitored and potential security threats can be identified and addressed in a timely manner.

5.CIRCUIT DIAGRAM

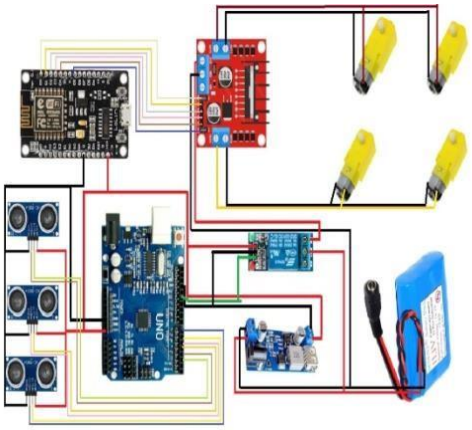

Fig 2. Circuit simulation of robot

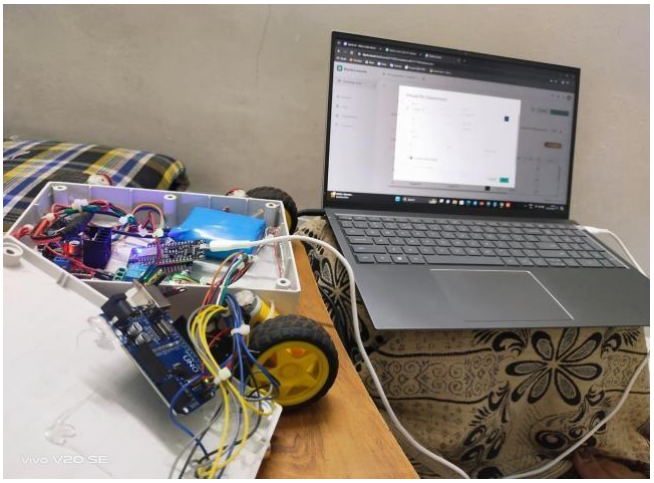

Fig.3 upload code into NodeMCU

Fig 4 : Video Surveillance Robot Using IOT

6.CONCLUSION

The development of a video surveillance robot using IoT holds significant potential for enhancing security and monitoring capabilities in various environments. By leveraging IoT technology, the integration of cameras, sensors, and remote connectivity enables real-time surveillance and proactive response to security threats. Additionally, the versatility and scalability of IoT platforms allow for customization and adaptation to specific needs and environments. However, challenges such as ensuring data privacy, addressing cybersecurity concerns, and optimizing the reliability and efficiency of the system must be carefully considered and addressed during development and deployment. Overall, the fusion of robotics and IoT presents exciting opportunities for advancing surveillance capabilities and enhancing safety and security across different sectors.

ACKNOWLEDGEMENT

A video surveillance robot using IoT could employ various components such as cameras, sensors, actuators, and a microcontroller or single-board computer. The cameras would capture video footage, which could be streamed or stored in the cloud for remote access. Sensors like motion detectors or proximity sensors could detect movement or obstacles, allowing the robot to navigate its environment effectively. Actuators such as motors or servos could control the movement of the robot. The microcontroller or singleboard computer would serve as the brain, processing data from sensors, controlling actuators, and potentially running algorithms for tasks like object detection or tracking. Additionally, IoT connectivity would enable remote monitoring and control of the robot via a smartphone app or web interface.

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