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System for Controlling Surveillance Cameras

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ABSTRACT –

Communication is primarily the act of transferring or exchanging information or data. In the context of the Internet of Things (IoT), this refers to the transfer or exchange of various things with one another. It is estimated that by 2020, there will be billions of devices connected to the internet, enabling this communication. The purpose of this paper is to propose a secure alert system using IoT technology, which requires minimal processing power. This system aims to monitor and send alerts when there are specific gestures or motions detected, by capturing and sending images to a cloud server. Additionally, IoT-based monitoring can be used remotely to observe activities and receive warnings based on gestures or other indications. The captured images are directly displayed on a cloud server. In cases where the cloud server is inaccessible, the records are stored locally on a Raspberry Pi, which is a credit card-sized computer. The image processing and control algorithms are handled by Open Source Computer Vision (Open-CV) software on the Raspberry Pi. The images are then sent to concerned individuals via email using a Wi-Fi module. The system utilizes a standard webcam for capturing images and relies on a Wi-Fi module, Raspberry Pi, and keyboard for its operation. Index

Key Terms—Web camera, Wi-Fi module, Raspberry Pi, Keyboard.

INTRODUCTION

Surveillance plays a crucial role in ensuring our safety, from small residential properties to large industrial complexes. The constant threat of burglary and theft necessitates the implementation of surveillance systems [1]. The Internet of Things (IoT) is a network of interconnected devices that operates on a continuous internet connection. It can be visualized as a network of physical objects that can be accessed through the internet. Raspberry Pi, an affordable computer the size of a credit card, has gained widespread usage in recent years. Surveillance, in essence, involves monitoring a space using electronic devices such as CCTV cameras [2]-[3]. IoT intelligently connects everyday objects to the internet, enabling communication between people and objects, as well as between objects themselves.

In the current socio-political climate, characterized by high tension, the demand for proof-based frameworks that prioritize quality is of utmost importance. This also applies to the use of shadowing camera solutions, which have become a fundamental tool for employers and agencies responsible for safeguarding our well-being and security. Presently, organizations are exploring advanced video analytics systems to gain insights into consumer behavior by utilizing video cameras and analytics software. This not only allows them to monitor customer behavior and record the traffic within a specific area network, large-scale network, or computer network without disrupting or interfering with the flow of traffic. Raw data packets within the network are continuously routed, with the option of packet encryption, to a high-capacity data recorder for the purpose of creating low-level recordings for archival purposes. These data packets can also be routed to one or more cyclic data recorders to generate temporary files that provide near real-time monitoring of the traffic. Authorized users can then interactively analyze these low-level traffic recordings using analysis tools and software routines to identify network attacks, internal or external security breaches, network issues, and other types of network events.

Nowadays, digital technologies have undergone a revolution where various entities and individuals are interconnected to facilitate the exchange of information. The primary goal is to provide benefits to people through internet services. In the realm of IoT, a multitude of objects such as sensors and devices are linked via the internet to share and gather data amongst themselves. This connectivity allows different devices to cooperate, communicate, and learn from one another's experiences akin to human interactions. Through IoT, billions of objects are intelligently connected across a wide range of applications. IoT is extensively utilized in diverse sectors including agriculture, healthcare, and smart cities. The integration of smart buildings and smart security is becoming increasingly prevalent due to the amalgamation of communication and monitoring infrastructure that includes smart devices like actuators, cameras, sensors, meters, and RFIDs. Presently, societies exhibit a heightened demand for security and surveillance due to the rapid advancements in embedded systems and increased security awareness. Ongoing research efforts are focused on enhancing the design of intelligent surveillance and security systems to bolster monitoring capabilities and security in remote locations.

LITERATURE SURVEY

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IoT has brought numerous benefits to individuals, large corporations, and everyday life. Integrating IoT into security systems can be particularly advantageous. The goal is to incorporate IoT into security infrastructure to detect movements. For example, when someone is away from home, they can monitor and receive alerts if any unusual activity takes place.

Sanjay, Meenu Vijarania, and Vivek Jaglan The current system model sends an alert notification to the owner via IoT in case an intruder attempts to break into or enter the home anonymously. Upon detecting the individual, a photo will be captured by the security camera and sent, along with the message, to the owner's email. However, if the person entering the house is recognized as a guest, the owner can unlock the door using their mobile phone instead of setting off security alarms.

Bandi Narasimha Rao,Reddy Sudheer,Mohan Aditya 2022
suggested system has the capability to relocate to different positions. Consequently, the system's cost is significantly reduced since it can cover a larger area with just one web camera. The robot's movement and image capturing can be achieved through the utilization of the python scripting language. In contrast, conventional CCTV cameras have limited applications as they are stationary and fixed to a specific location, resulting in a small coverage.

METHODOLOGY

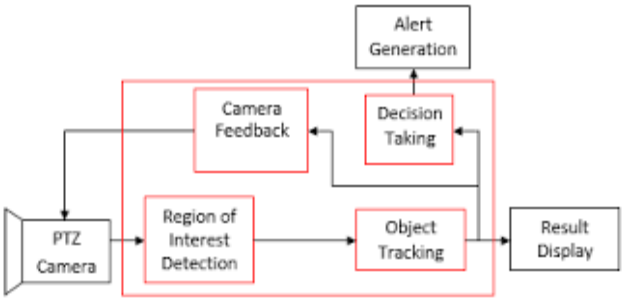

Fig 1: Block Diagram

The SD card slot is utilized for OS installation, booting, and long-term storage, with a total memory capacity of approximately 8GB. The micro USB power port supplies 700mA at 5A. The RCA video out is linked to the display if HDMI output is used, primarily for transmitting audio and video stereo audio. The Ethernet port is employed for Internet connectivity and facilitates software updates and installations. HDMI OUT (High Definition Multimedia Interface) is compatible with HDTVs and monitors featuring HDMI input.

for Raspberry Pi hardware. Raspbian is a free OS based on Debian specifically designed for Raspberry Pi. The Raspberry Pi is a powerful device that requires careful

handling, unlike Arduino devices. In this project, a 'python' script is utilized for motion detection. The Raspberry Pi can be utilized as a cost-effective security system, operating on the principles of IoT. Its affordability makes it a valuable tool for security purposes, allowing for the creation of customized security systems with multiple sensors at a fraction of the cost of traditional security systems.

ADVANTAGES

- **Enhanced Security**: Surveillance cameras act as a deterrent to criminal activity and serve as valuable evidence in the event of incidents.
- **Remote Monitoring:** Control systems enable real-time surveillance from any location with internet access, providing the convenience of monitoring from a distance.
- **Automation**: By integrating with AI, certain systems can automate monitoring tasks, minimizing the necessity for human intervention.
- **Improved Productivity**: Surveillance in workplaces can boost productivity by ensuring employees follow protocols and discouraging time-wasting activities.
- **Cost-Effectiveness:** Implementing surveillance measures helps prevent incidents, ultimately saving money by avoiding potential losses or damages.

APPLICATIONS

- **Public Safety**: Utilized in public areas, transportation centers, and urban environments to oversee and identify potential threats and respond to emergencies.
- **Retail:** Aids in the prevention of theft, tracks customer movement, and analyzes consumer behavior to enhance marketing strategies.

- **Industrial:** Supervises production procedures, guarantees workplace safety, and identifies any equipment malfunctions.
- **Traffic Management:** Regulates the flow of traffic, monitors intersections, and identifies traffic violations.
- **Home Security:** Offers homeowners a sense of security by remotely monitoring their property and deterring break-ins.

RESULT

The successful implementation of the proposed security observation system with IoT approach using Raspberry Pi has been completed. A fully developed system was tested to showcase its feasibility and effectiveness. The monitoring system consists of both hardware and software operations. The hardware was implemented using Raspberry Pi, while the software was programmed in both the Raspberry Pi and the user's computer to enable communication between the devices. Screenshots of the developed smart security surveillance system have been provided.

CONCLUSION AND FUTURE SCOPE

The suggested approach offers an affordable and energy-efficient solution for overseeing human presence and managing device operations remotely from any location worldwide. This feature proves beneficial for monitoring residential, industrial, or office settings in the user's absence. The system can be conveniently operated from any location by simply having knowledge of the IP address linked to the Raspberry Pi network, ensuring that the door is secured in the event of an intruder's presence

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