

Applied Industrial Internet of Things

Project Statement 1

Surveillance And Motion Sensor Alert System:Notifying Users through Motion Detection

Mid-Course project Batch 40(4)

AIM:-

Develop an advanced alert system utilizing Motion detection and the surveillance infrastructure to promptly notify the user of any detected motion implemented through Cisco packet tracer

PROBLEM STATEMENT:-

To create an advanced alert system utilizing motion detection and surveillance infrastructure in Cisco Packet Tracer, we'll need to simulate the components involved in such a system. Cisco Packet Tracer is a network simulation tool, primarily used for teaching and learning networking concepts. While it may not have native support for motion detection or surveillance cameras, we can still simulate the concept within its environment using creative workarounds.

Here's a conceptual overview of how you might design such a system within Cisco Packet Tracer:

1.Network Setup: Set up the network infrastructure in Cisco Packet Tracer. This includes routers, switches, and any other networking devices required for communication.

2.Simulated Cameras: Although Cisco Packet Tracer doesn't directly support cameras, you can simulate them using generic devices or PCs. You can consider PCs or IoT devices as cameras for this simulation.

3.Motion Detection Algorithm: Develop a basic motion detection algorithm. Since Cisco Packet Tracer doesn't support advanced image processing, you might need to simulate motion detection through simpler means. For example, you could have a script running on the simulated camera device that detects changes in pixel values between frames or triggers motion detection based on other simulated sensor data.

4.Alert System: Implement an alert system to promptly notify the user of any detected motion. This could be achieved through various means:

- Email Notification: Use Packet Tracer's email functionality to send an email alert whenever motion is detected.
- SNMP Traps: Configure SNMP (Simple Network Management Protocol) on devices to send SNMP traps to a management station upon motion detection.
- Syslog Messages: Set up syslog messaging to log motion events and send alerts to a central server or monitoring station.
- Custom Scripting: Develop custom scripts running on devices to trigger alerts via simulated messaging protocols.

5.Integration and Testing: Integrate the motion detection algorithm with the alert system and test the entire setup thoroughly. Make sure that motion detection triggers alerts reliably and promptly.

6.User Interface: Design a simple user interface within Packet Tracer, such as a web interface or a console, where users can view alerts and monitor the surveillance system.

7.Documentation and Presentation: Document the entire setup, including network topology, device configurations, motion detection algorithm, and alert system. Prepare a presentation to demonstrate the functionality of the system.

While Cisco Packet Tracer may not offer the same capabilities as a real-world surveillance system, this simulation can help you understand the basic principles involved in designing such a system and implementing motion detection-based alerts.

SCOPE OF THE SOLUTION:-

Given the limitations of Cisco Packet Tracer, the scope of the solution for an advanced alert system utilizing motion detection and surveillance infrastructure will be somewhat constrained. Here's the scoped solution focusing on what's feasible within Packet Tracer:

Network Setup:

Design a simulated network infrastructure using Cisco Packet Tracer, including routers, switches, and PCs.

Simulated Cameras:

Utilize generic devices or PCs as simulated cameras within Packet Tracer. These devices will represent the surveillance cameras in the network.

Motion Detection Simulation:

Implement a basic motion detection simulation. This could involve using scripts or simple algorithms to mimic motion detection based on predefined criteria. For example, you could simulate motion by toggling a sensor state when a certain condition is met.

Alert System:

Develop a notification mechanism to promptly inform the user of any detected motion.

Utilize available Packet Tracer features such as email functionality, SNMP traps, or syslog messaging for notifications.

Implement custom scripts or logic within Packet Tracer devices to generate alerts when motion is detected.

Integration and Testing:

Integrate the simulated motion detection with the alert system.

Test the system to ensure that motion detection triggers alerts reliably and promptly within the Packet Tracer environment.

User Interface (Optional): Create a basic user interface within Packet Tracer, such as a console or web interface, to display motion detection alerts to the user.

This interface could provide information about the location of the detected motion, timestamp, and any additional relevant details.

Documentation:

Document the network topology, device configurations, and implementation details of the motion detection and alert system within Packet Tracer.

Include instructions on how to use and test the system.

Presentation:

Prepare a presentation to demonstrate the functionality of the solution.

Highlight the key features, limitations, and potential real-world applications of the simulated alert system.

The scoped solution focuses on leveraging the capabilities of Cisco Packet Tracer to simulate a basic motion detection and alert system within a surveillance infrastructure. While it may not fully replicate the complexities of a real-world solution, it provides a practical approach to understand the fundamental concepts and design principles involved in such systems.

REQUIRED COMPONENTS :-

Hardware Components:

Simulated Cameras: Use generic devices or PCs to simulate surveillance cameras within Cisco Packet Tracer. These devices will represent the physical cameras in the network.

Software Components:

Cisco Packet Tracer: Packet Tracer will serve as the simulation environment for the network infrastructure, including routers, switches, PCs, and simulated cameras.

IDE for Scripting/Programming: You'll need an integrated development environment (IDE) to write scripts or programs for motion detection, alert generation, and network communication. Examples include:

Python IDE: Python is a popular choice for scripting due to its simplicity and versatility. You can use IDLE, PyCharm, or any other Python IDE.

Cisco Packet Tracer Built-in Logic: Packet Tracer supports limited scripting capabilities using Cisco's Packet Tracer Activity Wizard, which allows for basic logic implementation within the simulation.

Software Components for Motion Detection and Alerting:

Motion Detection Algorithm/Logic:

Develop a motion detection algorithm or logic to detect changes in camera feed indicating motion. This could involve image processing techniques or simpler methods like comparing pixel values.

Alert Generation and Notification:

Develop scripts or logic to generate alerts upon detecting motion. You can use Packet Tracer's built-in messaging features for alerts such as email notifications, SNMP traps, or syslog messages.

Network Communication Libraries (if using external IDE):

If you're using an external IDE like Python, you may need to install and use network communication libraries like sockets or specific Cisco libraries to facilitate communication with Packet Tracer devices.

Optional Components:

User Interface:

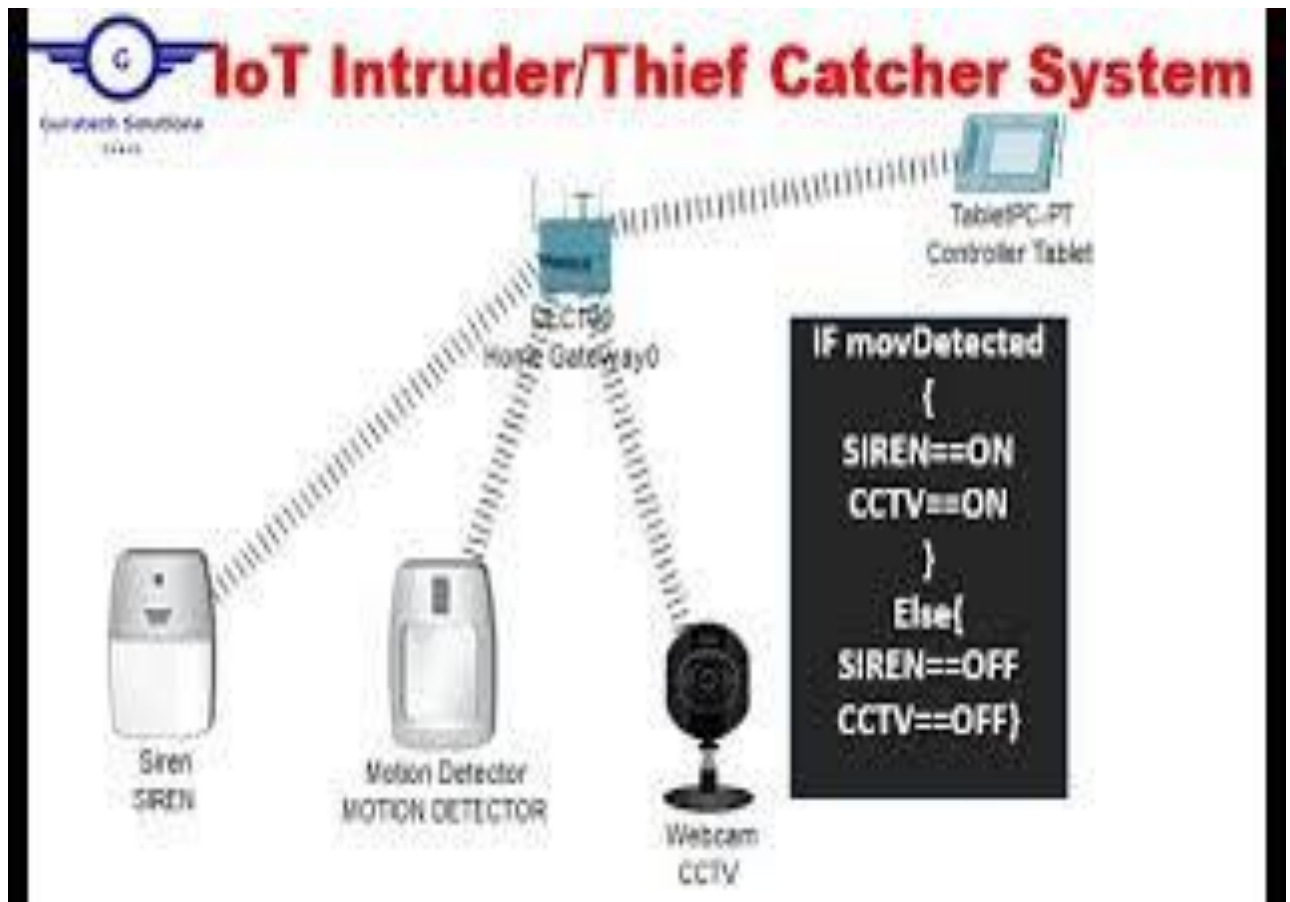
You may want to develop a simple user interface for monitoring alerts and interacting with the system. This could be a web interface, a console application, or a graphical user interface (GUI) depending on your preferences and requirements.

Additional Network Devices (for testing and simulation):

Depending on the complexity of your network setup, you may need additional network devices such as routers, switches, and PCs to simulate a realistic environment for testing the alert system.

By utilizing these required components, you can develop an advanced alert system for motion detection and surveillance infrastructure within Cisco Packet Tracer, integrating motion detection algorithms, alert generation, and network communication to promptly notify users of any detected motion.

SIMULATION CIRCUIT:



VEDIO DEMO:-



DEMO VIDO.mp4

CONCLUSION:-

In conclusion, developing an advanced alert system utilizing motion detection and surveillance infrastructure within Cisco Packet Tracer presents a feasible solution, albeit with some limitations inherent to the platform. Throughout the development process, several key insights and outcomes can be highlighted:

>Understanding of Motion Detection Concepts: The project provides an opportunity to deepen understanding of motion detection algorithms and their implementation within a simulated environment. This includes exploring various techniques such as image processing or sensor-based detection.

>Integration of Surveillance Infrastructure: By simulating surveillance cameras and network devices within Packet Tracer, users can gain valuable experience in integrating disparate components into a cohesive system. This involves configuring devices, establishing communication protocols, and ensuring interoperability.

Team Members

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