Smart House Security System

Problem Statement

Traditional house security methods such as locks and basic alarms are insufficient to prevent unauthorized access, especially when homeowners are away. There is a need for a smart, real-time, and automated security system to ensure round-the-clock safety and monitoring of the home.

Problem

Homeowners face increased risk of theft, intrusion, and property damage due to the lack of an intelligent and responsive security system. Many existing systems do not offer real-time alerts or remote monitoring, making it hard to respond quickly to potential threats.

Objectives

1. Monitor entry points (doors, windows) for unauthorized access.
2. Detect motion or unusual activity using sensors.
3. Provide real-time alerts to the owner via mobile notifications or SMS.
4. Enable live video feed from surveillance cameras.
5. Allow remote control of alarms and door locks.
6. Maintain logs of events for review.

Libraries Used

- OpenCV: Camera/video processing and face detection
- smtplib: Sending email alerts
- twilio: Sending SMS alerts

- RPi.GPIO: Interfacing with sensors on Raspberry Pi

- time, datetime: Logging and timestamping events

- flask: For simple web/app interface (optional)

- requests: For API calls to external services

Explanation

The smart house security system uses a combination of motion sensors, door/window contact sensors, and camera surveillance. When a sensor is triggered, a camera captures images or starts a video recording. An alert is immediately sent to the owner through SMS, email, or a mobile app. Logs are updated with the time and type of event. Optionally, the system can use face recognition to identify intruders vs. authorized persons and notify nearby police stations or security personnel via integrated APIs.

Advantages

- 24/7 monitoring and instant alerts

- Remote access and control from mobile or web

- Reduced risk of theft and intrusion

- Integration with smart home devices (lights, locks, etc.)

- Cost-effective compared to traditional security services

Limitations

- Requires stable internet for remote features

- May give false alarms due to pets or environmental factors

- Initial setup cost (sensors, cameras, microcontrollers)

- System vulnerability to hacking if not secured properly

- Regular maintenance of hardware/software needed