TunisianRepublic

Ministry of Higher Education
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Higher School of Communication of Tunis

Design Document:
Smart Home Surveillance

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1.1 Context of the Project

The project aims to enhance home security by incorporating a facial recognition system that facilitates automatic door unlocking. This functionality allows the system to recognize authorized individuals as they approach the door, enabling secure and convenient access control. When a registered face is detected, the door will automatically unlock, providing seamless entry for homeowners while ensuring that only authorized users gain access.

In addition to facial recognition, the project will implement advanced machine learning algorithms to detect and report any suspicious or abnormal human behavior in a designated area. This feature aims to prevent theft and enhance overall security by analyzing video feeds for unusual activities that may indicate potential threats. The system will send immediate alerts to homeowners or security personnel, allowing for prompt action.

By combining facial recognition with abnormal behavior detection, the project not only improves security but also enhances user convenience.

1.2 Problematic

Due to the inability to monitor certain areas 24/7, there is an increased risk of theft and unauthorized access. Traditional surveillance systems may not provide timely responses to potential threats, leaving vulnerabilities that criminals can exploit. This lack of real-time monitoring can result in delayed reactions to suspicious activities, further exacerbating the risk of theft and compromising the safety of individuals and property.

Our goal is to develop a comprehensive surveillance system that integrates facial recognition and abnormal behavior detection to enhance security significantly. When the system detects abnormal behavior, it will notify the responsible parties for timely intervention.

1.3 Use Case

These use case diagrams encapsulate the core functionalities of the smart home surveillance system, focusing on secure access control through facial recognition and proactive security measures through abnormal behavior detection.

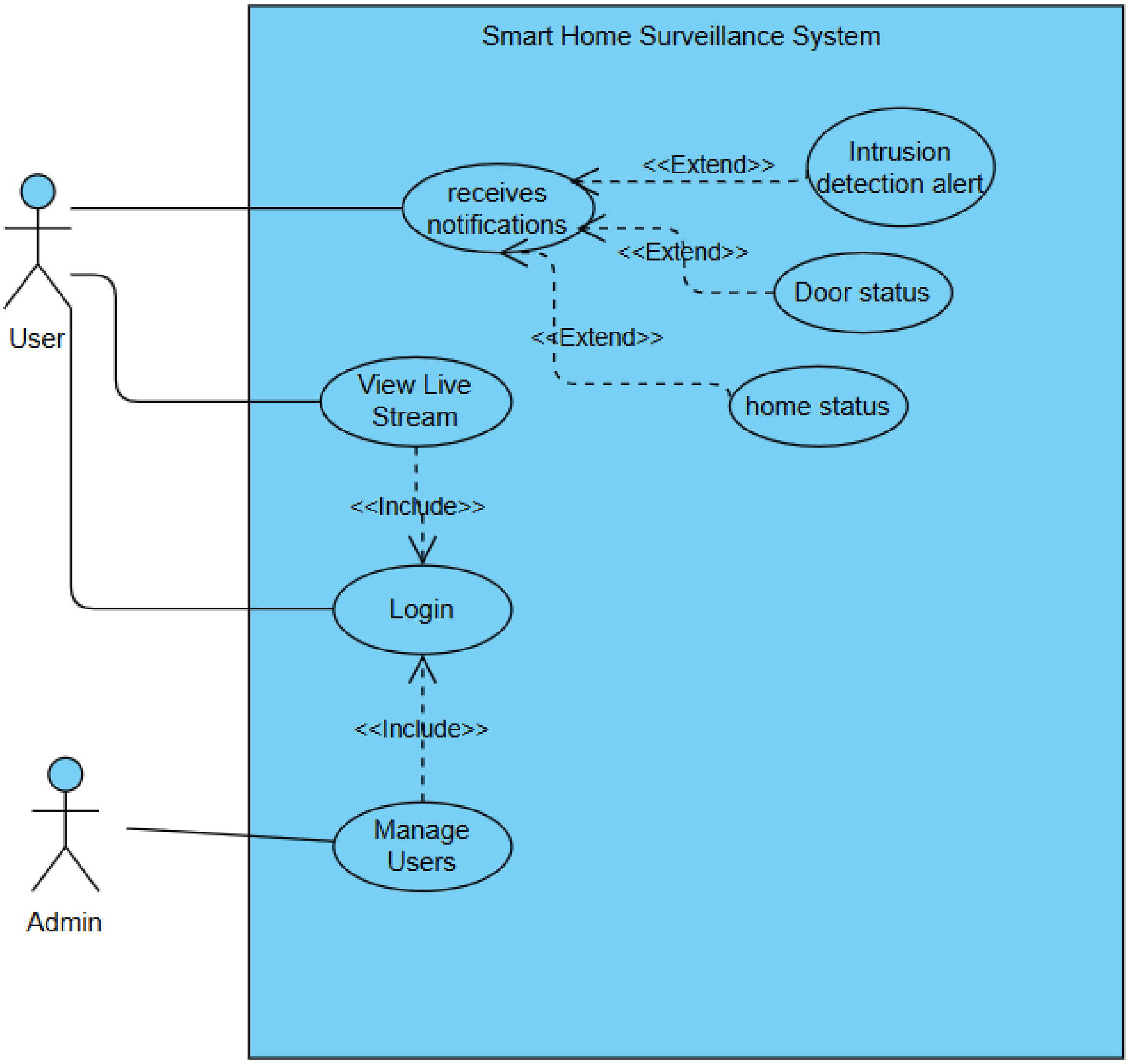

Figure 1.1: Use Case

1.4 Class Diagram

A class diagram clearly represents the structure and different components of a system to help view the application. The figure below showcases the class diagram of the IoT system:

Sensors capture the information and communicate with each other via the broker.

Communication is established through topics using the MQTT protocol publish and subscribe method.

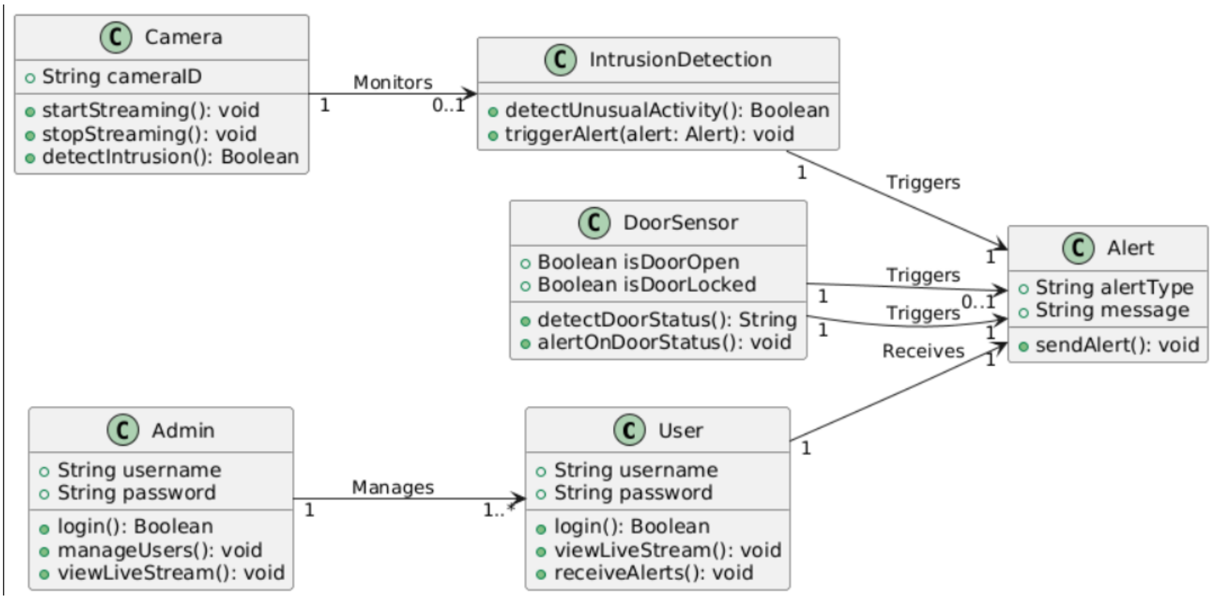

Figure 1.2: Class diagram