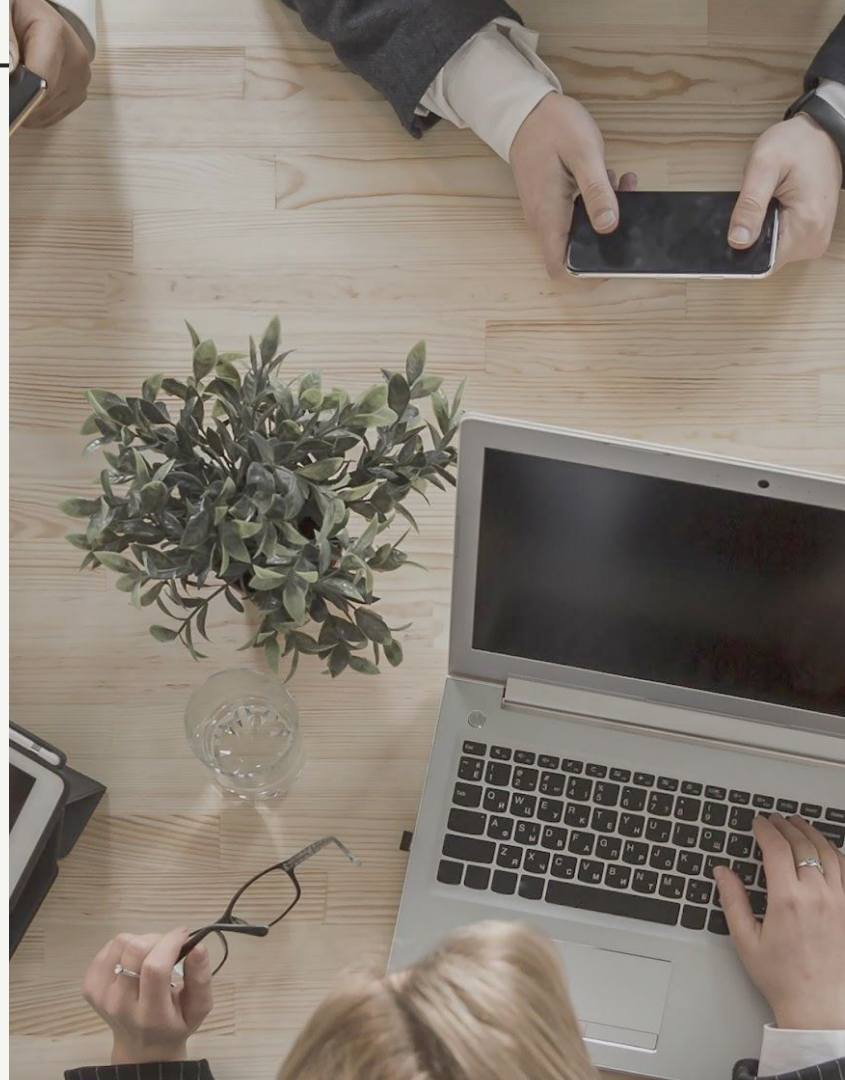
ATLAS :
Crowd Detection & Management System

Baiquan Shen
Bhupinder Jagwani
Gaurish Anvekar
Komal Srivastava

Table of Contents



Why

1. A mall infrastructure is home to many shops, fashion boutiques, and value stores.
2. It is not an easy task for mall to streamline everyday visitors and have efficient management.
3. Due to the complex nature of malls, we need a system for detecting crowds and monitoring the occupancy levels.

How

1. Our proposed system is aimed at monitory crowds in the mall.
2. The main concept is to estimate the number of people within a given area in real-time.
3. We achieve this using advanced CCTV systems, enabled with OpenCV and AI technologies, which provide dynamic resource allocations for efficient management.

System Request

System Request - Crowd Detection System (B2B)

Stakeholder/Sponsor: VP Operations

Business Need : Malls experience a lot of foot traffic on a regular basis, but there is no way to manage the mall catering to a sudden increase/ decrease in the number of people.

There is a growing need for smart surveillance systems in a mall to logically differentiate between normal and abnormal behavior. This is not just important for the convenience of the people but also for their security.Understanding video footage and classifying an activity as normal or suspicious especially in a crowded mall is possible and has been demonstrated through this system. This system helps in identifying if the crowd density has suddenly increased by detecting the crowd numbers and identifying a possible solution in the account. Whenever the crowd density crosses a particular density threshold, an alert is displayed on the surveillance screen, and an alert message is sent to the respective authorities.

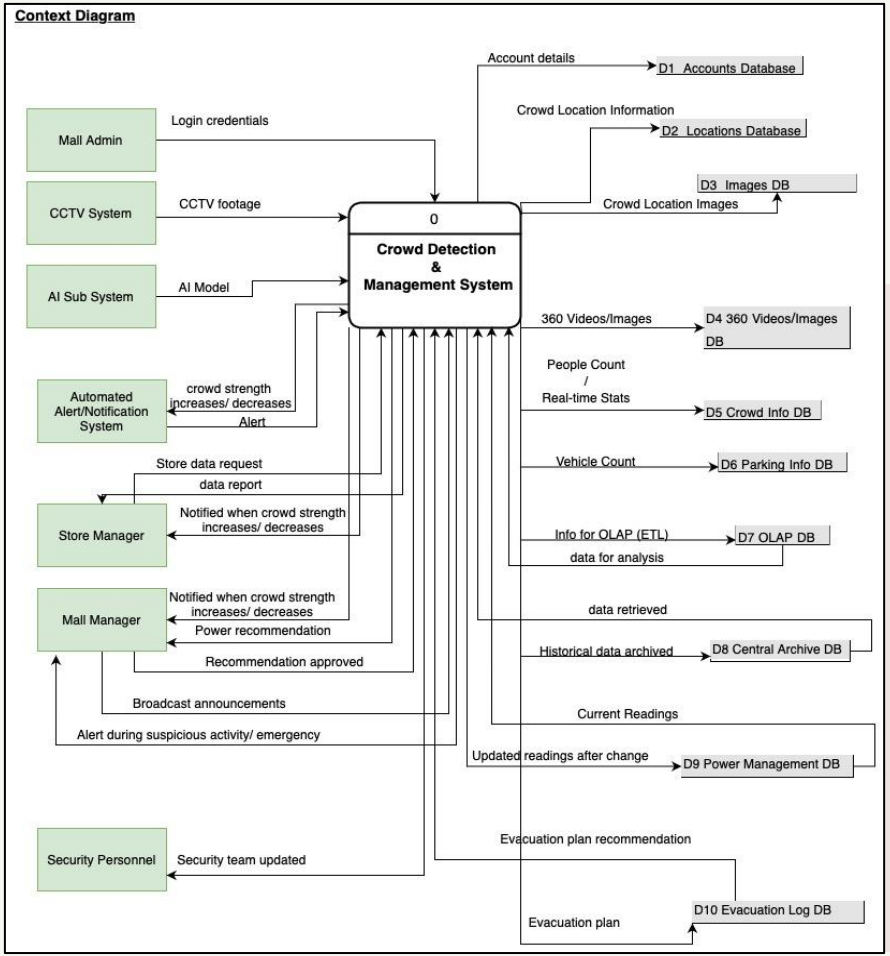
Business Requirements:

1. **Obtain data for mall management decisions:** The malls can leverage crowd strength insights for decision making.
2. **Notify each shoplet and restaurants, the nearby crowd strength:** The system can be used by every retailer and restaurant in the mall to get an idea of crowd strength.Staff can be immediately notified by email or SMS when crowds exceed configured threshold. Based on the foot traffic, the staffing (Example: Mall Police) can be increased/decreased.
3. **Obtain Data for Revenue Opportunity Analysis**: Collect real-world data about the amount of foot traffic within public space and make better decisions regarding advertising and service offerings.
4. **Power Management:** The system can be used for power adjustments based on the crowd strength.
5. **High-Risk Area detection and Evacuation:** Can be used by the ailing public before visiting the mall to avoid high-risk areas.The system can be used for effective safety planning of emergency evacuation routes.
6. **Manage Risk behavior:** The system can be used to detect suspicious activities and ensure mall safety.

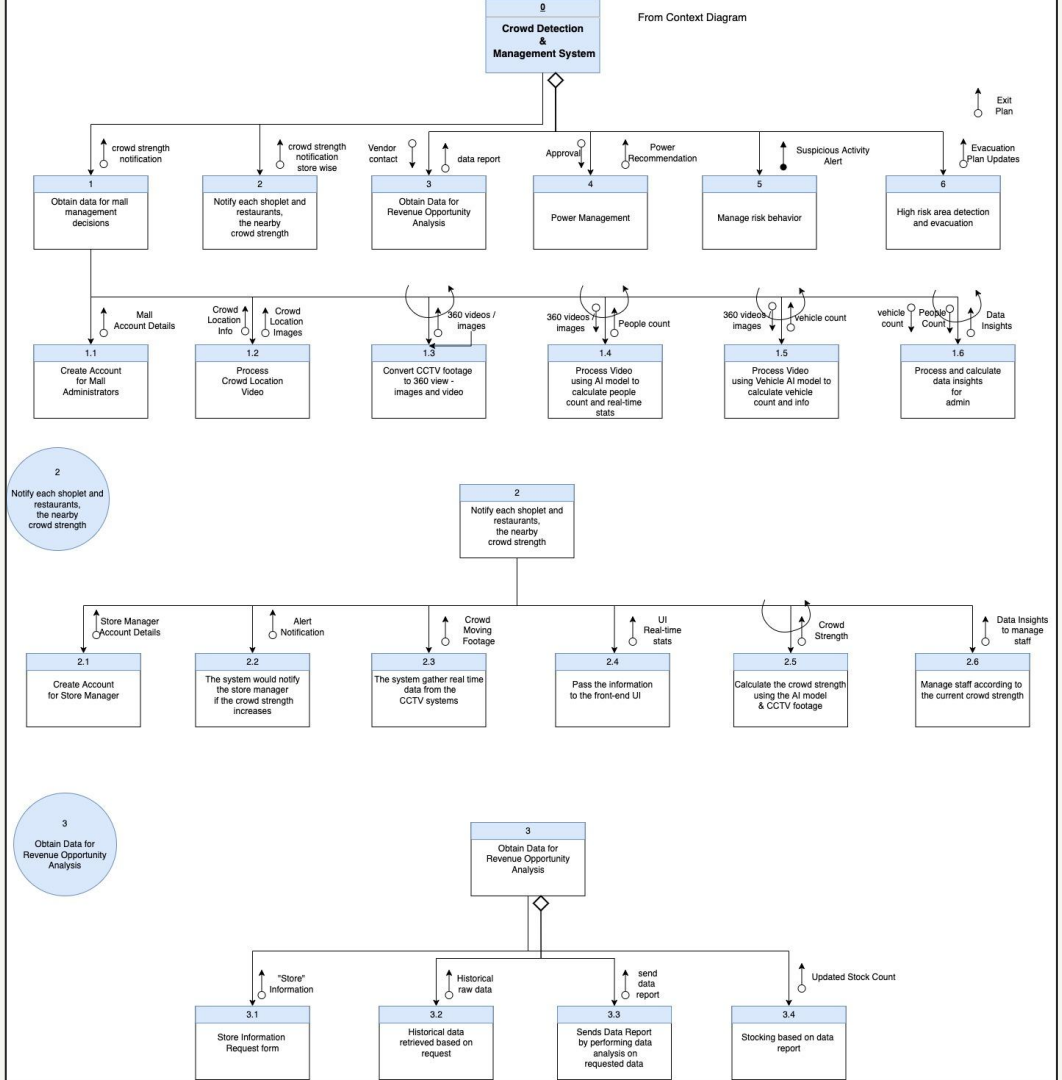
Business Value:

- A mall crowd detection system provides the flexibility to every retailer to understand the present crowd strength and also make predictions, and accordingly manage their staffing.
- Efficient crowd detection and management can be useful to judiciously handle mall resources - like power consumption, staffing, hoardings.
- The system can be used by the police department to capture and trace the suspect in open areas and guarantee public safety.
- The data collected over time can be used for efficient management and decision making.

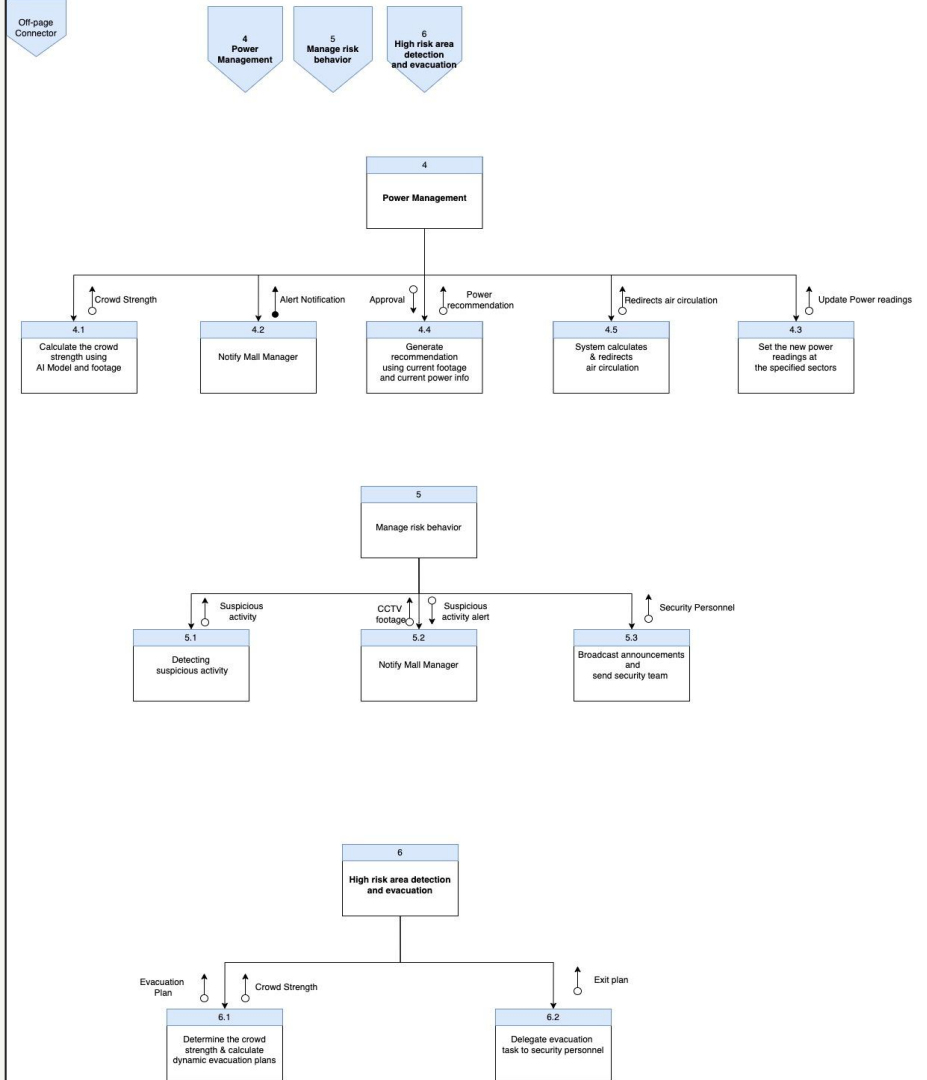
Context Diagram



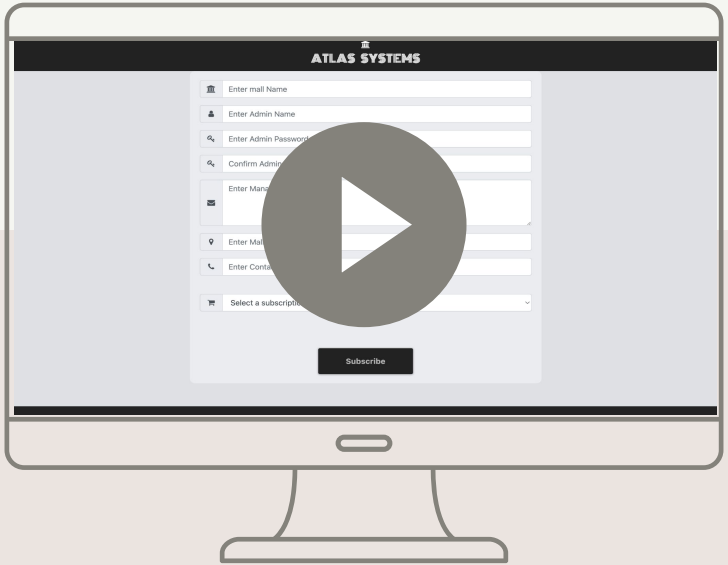
Structure Chart



Structure Chart



Website Demo



Conclusion & Future Work

1. For large-scale organizations and businesses, it is vital to use data insights for important decisions and efficient management.
2. Our system offers both, by using relevant and cutting edge AI technologies and CCTV systems for crowd detection, specifically for Mall management.

1. We want to build an application for the mall managers as well as users and use GPS to better detect the location of everyone in and around the mall.
2. We believe that with time, our system will be robust enough to be integrated with a range of large-scale businesses.