**3.3.1 Functional Requirements**

The system should enhance user experience. With real-time data on parking availability, drivers can locate vacant spaces quickly, eliminating the time and stress of endlessly circling the parking area. A user-friendly interface, accessible via web portal or mobile app, allows for convenient filtering of parking options based on preferences and provides navigation assistance to guide users directly to available spots.

The system should improve parking management. The system empowers administrators with real-time insights into parking space occupancy and usage patterns. This valuable data allows for informed decision-making regarding parking space allocation and optimization. Additionally, the ability to remotely manage and update parking information through a secure administration interface ensures the system remains accurate and efficient.

The system will allow streamlined traffic flow. By minimizing the time drivers spend searching for parking, the system can contribute to a smoother flow of traffic within the designated enclosed area. This not only reduces congestion and associated emissions but also improves overall traffic flow in the surrounding areas.

The system will allow data-driven decision making. The system's ability to collect and analyze parking usage data provides administrators with valuable insights. This data can be used to identify peak parking times, optimize parking space allocation strategies, and potentially implement dynamic pricing models to encourage efficient parking utilization.

**3.3.2 Non-Functional Requirements**

The system must adhere to specific non-functional requirements to ensure its effectiveness, reliability, and user experience.

The system should deliver real-time data with minimal latency. Users expect near-instantaneous updates on parking availability to make informed decisions quickly. This necessitates efficient data processing and communication protocols to minimize delays to enhance system performance.

The system should be designed to accommodate future growth. As the number of users and parking sensors increases, the system should seamlessly handle the additional data volume without compromising performance and ensure scalability.

The system should be highly available, minimizing downtime that could disrupt user experience and parking management operations. Redundancy measures and robust infrastructure choices can ensure the system remains operational for extended periods.

The system should be designed for ease of maintenance and troubleshooting. Modular design principles and well-documented code facilitate future updates, bug fixes, and integration of new functionalities.

The overall system should be cost-effective to implement and maintain within the budgetary constraints of the designated enclosed area in Nairobi. Open-source technologies and resource-efficient hardware choices can contribute to a cost-conscious approach.