**PROJECT NAME: Parking Automation System**

**GROUP MEMBERS:**

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| REQ. # | FUNCTIONAL REQUIREMENTS |
| 1 | **User Authentication & Authorization:**  • The system must allow users to **register and log in using their university credentials and vehicle license plates**.  • **Integration with the University ID System:** The system must be integrated with the university’s identity verification infrastructure.  • **Unauthorized Vehicle Prevention:** Only authorized university-registered vehicles should be allowed to enter the parking lot. |
| 2 | **Vehicle Entry & Exit Management:**  • The system must control **vehicle entry and exit** using **Automatic Number Plate Recognition (ANPR)** and mobile application check-in/check-out.  • Upon entry, users must be verified via **license plate recognition**, and upon exit, the system must automatically update the parking spot as available. |
| 3 | **Real-Time Parking Spot Detection & Allocation:**  • The system must use **sensors** to detect occupied and available parking spots in real-time.  • Upon vehicle entry, **the system must automatically allocate the most suitable parking space** and notify the driver. |
| 4 | **Mobile Application Interface:**  • Users must be able to **view available parking spots**, navigate to their assigned parking space, and check out through the mobile application. |
| 5 | **Digital Display-Based Guidance:**  • The system must display **personalized parking space assignments** on **digital screens inside the parking lot**.  • Entering drivers must receive **block and parking number-based navigation** on digital screens. |
| 6 | **Real-Time Navigation Support:**  **• The mobile application must provide real-time navigation assistance to guide drivers to their assigned parking spot.** |
| 7 | **Payment Processing:**  • Users must be able to **make parking fee payments digitally** through the mobile application.  • Exit should not be allowed unless the payment has been completed. |
| 8 | **Violation Detection & Penalty System:**  • The system must detect **vehicles occupying multiple parking spaces or parked incorrectly** using **AI-powered cameras and sensors**.  • Violating drivers should be **automatically fined and notified** through the system. |
| 9 | **System Alerts & Notifications:**  • Users must receive **notifications for assigned parking spots, violation penalties, and payment confirmations** via the mobile application. |
| 10 | **Data Logging & Reporting:**  • The system must **record entry/exit times, parking duration, and occupancy trends** for analytics.  • Parking usage statistics must be available as reports for administrators. |
| REQ. # | **NON-FUNCTIONAL REQUIREMENTS** |
| 1 | **Scalability:**  • The system must support **an increasing number of users and vehicles** without performance degradation. |
| 2 | **Reliability:**  • The system must operate **24/7 without interruptions**, ensuring continuous parking management. |
| 3 | **Security & Legal Compliance:**  • User data must be **encrypted and protected** against unauthorized access.  • The system must comply with **GDPR, KVKK, and other data protection regulations**, ensuring user privacy. |
| 4 | **Performance & Response Time:**  • The system must **update parking availability status within a maximum of 3 seconds**.  • Entry and exit processes must be **executed quickly without delays**. |
| 5 | **Usability:**  • The mobile application and digital screens must have a **clear and user-friendly interface**.  • The system must be designed for **easy use with minimal training required**. |
| 6 | **Maintainability:**  • The system must have a **modular and well-documented architecture**, allowing easy updates.  • Maintenance and troubleshooting should be **easily handled by technical teams**. |
| 7 | **Compatibility:**  • The mobile application must be **fully compatible with iOS and Android devices**.  • The system must **function seamlessly across different browsers and operating systems.** |
| 8 | **Environmental Durability:**  • **Sensors and cameras must function reliably** under various weather conditions such as **rain, fog, and nighttime usage**.  • Digital screens and other hardware in the parking lot must be **built with weather-resistant materials**. |
| 9 | **Data Backup & Recovery:**  • The system must include an **automated backup mechanism** to prevent data loss.  • Critical system data must be **securely stored and quickly restorable** in case of failures. |
| 10 | 10. **Integration with Third-Party Systems:**  • The system must be **seamlessly integrated with university databases, external payment systems, and identity verification infrastructures**.s  • API support should enable **data exchange with other applications and systems**. |