**Team 2 - ParkEZ (Fall 2023)**

**Use Cases I4**

**Revision History**

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| **Date** | **Revision #** | **Created By** | **Revision Notes** |
| 11/08/2023 | 1.0 | Krunal Bhavsar | UC.02.02 Access Footage Archive |
| 11/08/2023 | 1.1 | Tom Alex | UC.02.03   Detect Overparking |
| 11/30/2023 | 1.0.1 | Krunal Bhavsar | UC.02.02 Access Footage Archive- Changed Joint Points |
| 11/30/2023 | 1.1.1 | Tom Alex | UC.02.03   Detect Overparking – Changed Alternative Flow along with the Joint points |
| 11/30/2023 | 1.2 | Tom Cookson | Cleaned up exceptions and alternative flows for consistency with software and to avoid redundancy |

**UC.02.03   Detect Overparking - Tom Alex**

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| **Actor(s):** | Business Lot User, Business Lot Manager, Customer Support Manager |
| **Short Description:** | This use case begins when the system identifies a vehicle that has potentially overstayed the authorized parking duration and ends when the overparking incident has been recorded, and necessary notifications have been sent. |
| **Pre-conditions:** | The Actor should be logged into the system. |
| **Post-conditions:** | The overparked vehicle list is updated.  The system records the overparking incident for audit and future action.  The Actor has been notified of the overparking incident. |
| **Frequency of Use:** | High |
| **Normal Flow of Events:** | |
| 1. The use case begins when the Actor logs into the system and navigates  to 'Parking Monitoring'. [JP 1: ET In]  2. The System processes incoming images and identifies occupied parking spots. [JP 2: CL, SI-In]  3. The System calculates the duration each vehicle has been parked. [JP 3: CL, CA, PF ]  4. The System flags vehicles that exceed the parking time limit. [JP 4: DF-In, CN, ER]  5. The System sends a notification to the Actor about the overparking incident. [JP 5: ET Ex]  6. The  Actor reviews the overparking details.  7. The  Actor takes necessary action, such as notifying enforcement.  8. The  Actor receives alerts for any data inconsistencies or processing errors and resolves them. [JP 6: CS]  9. This use case ends when the  Actor logs out or navigates away from the 'Parking Monitoring' screen. | |
| **Alternative Flows:** | |
| NA | |
| **Exceptions:** | |
| E1. If the System fails to process images or send notifications, from Step 4 or 5 perform E1:  E1. “System Failure “:.     1. The System logs the error and alerts the Customer Support Manager.     2. The Customer Support Manager investigates and resolves the issue. | |
| **<<Include>> Relationships:** | NA |
| **<< Extend>> Relationships:** | NA |
| **Assumptions:** | All interactions with the image processing and notification systems are secure and comply with relevant data protection standards. |

**UC.02.02 Access Footage Archive - Krunal Bhavsar**

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| **Actor(s):** | Lot Business User, Lot Business Manager, Customer Support Manager |
| **Short Description:** | This use case begins with the implementation of a non-GUI element that seamlessly delivers up-to-the-minute occupancy status data. This essential information is accessed through a user-friendly interface tailored for Parking Lot Managers, facilitating seamless integration with their websites, and enhancing overall management efficiency. |
| **Pre-conditions:** | The actors must have an account and should be logged into the system. |
| **Post-conditions:** | 1. The actors are equipped with the capability to effortlessly track the real-time occupancy status of the car parking lot, ensuring a comprehensive view of the current situation.  2. The actors are granted access to confirm overparking incidents through an archive of visual representation, utilizing data images that provide clear evidence and insights into any such occurrences.  3. The actors possess the ability to retrieve archive images capturing the car parking lot at every half-hour interval within any specified date and time range, offering a detailed and customizable historical perspective for effective analysis and decision-making. |
| **Frequency of Use:** | High (The demand for this use case is elevated, reflecting the actors' frequent need to retrieve data related to overparking incidents. The high frequency is driven by the essential nature of obtaining real-time and historical information, underlining its critical role in addressing and managing overparking situations effectively) |
| **Normal Flow of Events:**  1. The actors initiate the use case by navigating to the business website, where ParkEz parking information is seamlessly embedded. [JP 1: CS, JP : CN]  2. Upon reaching the website, the actors access and review the current occupancy information. This includes detailed insights into the number of occupied and vacant parking spots over a specified period. [JP: DF-In, JP: EN IN]  3. Subsequently, the actors explore webcam images available on the website, providing a visual representation of the actual parking lot. These images feature indicators highlighting the status of occupied and vacant spots for the designated time frame. [JP 1: DF-Out, JP: EN ET JP: CA]  4. The system responds by presenting overparking confirmations, complete with car images captured at half-hour intervals during the specified period. This information is dynamically generated based on the usage of parking time. [JP : DDV, JP: SI IN]  5. Armed with a comprehensive understanding of the parking and overparking scenarios, the actors leverage the provided information to make informed decisions regarding their parking strategy or addressing any overparking incidents that may have occurred during the specified period. [JP: PF] | |
| **Alternative Flows:**  A1. The parking lot is full, from step 2:  1. If, upon reaching step 2, the system detects that the parking lot is at full capacity, it refrains from providing a best spot recommendation. The system explicitly communicates that there is no available spot through the best spot recommendation, which is indicated as "None." | |
| **Exceptions:**  E1. Webcam or image transmitter down, from step 2:  1. In the event of a webcam service or image transmitter outage, the system gracefully handles the situation by displaying the last available image along with the corresponding parking lot information. This ensures that the actors still have access to the most recent data despite the temporary disruption.  2. If the webcam service or image transmitter is down, the system takes a proactive approach by refraining from saving any data in the archive for overparking confirmation footage. This precautionary measure prevents the storage of potentially incomplete or inaccurate information during the downtime, maintaining the integrity of the parking system records. | |
| **<<Include>>**  **Relationships:** | NA |
| **<< Extend>> Relationships:** | NA |
| **Assumptions:** | Assumptions:  1. The computer vision system and machine learning algorithms employed for determining parking spot occupancy exhibit a high level of accuracy, ensuring reliable and precise information regarding the current status of parking spots.  2. The assumption includes the presence of a correct and expected delay between actual changes in parking spot occupancy and the corresponding updates on the business's website. This ensures that the information presented to the actors reflects real-time changes in the parking lot without introducing misleading or outdated data. |