Vision and Scope Document

for

EasyLot

Version 1.0 approved

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# Revision History

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| --- | --- | --- | --- | --- |
| Name | Date | Reason  Changes | For | Version |
| Emily & Eric | 9/19/25 | Original Write Up | | 1.0 |
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# Business Requirements

The goal of the project is to provide a low cost, Ai-powered tool that helps to solve the age-old issue of doing death circles to find a parking spot and being late to work because of it.

## Background

Availability of a parking spot is a recurring issue everywhere, but a considerable issue for universities. Students, faculty, staff, and visitors alike have to compete for a parking space, which are extremely limited on a bustling campus. The existing systems, gate counters and sensor-based parking spot detectors, work but are limited in providing information and, are expensive and complex to install around a large campus with multiple parking lots. EasyLot addresses these issues by using AI-powered camera-based detection to find free parking spots in real time and display the open spots on a web-based interface.

## Business Opportunity

The solution is very marketable for many reasons. Companies that have wildly spaced apart parking lots that cause employees to be late because they go to locations that lack available parking. Another option would be to make this available at multiple parking lots and charge a monthly fee to use the system.

## Business Objectives and Success Criteria

The primary objective of EasyLot is to provide all users with a cost-effective, reliable, and scalable solution to campus parking problem. Success of the EasyLot will be measured by its accuracy, user friendliness, and flexible. It must achieve a minimum of 70% detection accuracy, with a hopeful target of 80% or higher with continuous work. A functional beta demonstration ready for deployment with an easy to use and understandable interface suitable for users of any background. Flexibility is a key long-term goal, meaning EasyLot must be able to adapt to other sized parking lots, layouts, and traffic patterns. This includes scaling from small faculty only lots to large commuter areas, with future support for infrequent vehicles like motorcycles or compact vehicles.

## Customer or Market Needs

Within big cities, parking remains a significant challenge. Many pay to park garages and surface lots do not actively number of vehicles inside, which often results in overselling access. Customers may enter just to discover that there are no parking spaces available, forcing them to leave and search for another location. This can cause a person to be late, leading to a drop in production, or even a firing or loss of a position for a company they are interviewing for.

## Business Risks

There are several risks with developing EasyLot, including competition with existing sensor-based systems, user acceptance challenges, and possible implementation issues with accuracy under varying conditions like weather, lighting, and location. The most critical risk is failure to meet the minimum % accuracy, which could alter user trust. To avoid these risks, EasyLot will emphasize case testing, accuracy reporting, and AI model refinement to ensure the system will accurately detect available spaces.

# Vision of the Solution

This section describes the long-term vision for EasyLot. The solution aims to be a reliable, accessible, and easy-to-use way for users to locate available parking spaces in nearly real time. The vision of EasyLot will focus on addressing convenience for users, time waste reduction, and being an efficient parking resource.

## Vision Statement

The vision of EasyLot is to be a seamless, user-friendly parking solution that detects all visible available parking spaces, communicates them instantly to users, and improves the overall parking experience. By merging real-time spot detection, minimal delay updates, and seamless access for every user, EasyLot aims to reduce frustration, save time, and increase efficiency with parking lot management. It will benefit both end-users and the owners of the parking lot, by simplifying parking and optimizing resources and enhancing user satisfaction.

## Major Features

The goal of the system is to have the following key features:

1. Spot Detection – monitor and identify available parking spots
2. Spot Availability Count – informs users of total number of open spots in a specific lot
3. User Interface – a straightforward, easy-to-navigate web-based interface for desktop users.
4. Spot Location Guidance – shows users to a specific open spot
5. Regular System Updates – minimal delay in update availability when a spot is full or empty

Additional features if time allots:

1. Detection of motorcycles
2. User alerts and notifications
3. Identification of handicap-designated spots

## Assumptions and Dependencies

The development and deployment of EasyLot assumes that users will only access the system from a desktop or laptop device with reliable internet connectivity. The system is train for a single parking lot, so additional locations will require retraining. Due to the limited 1080p resolution for the camera hardware, the system relies on adequate lighting and efficacy may be reduced in poor light or weather. Stakeholders are expected to use EasyLot due to its simplicity and time-saving benefits. EasyLot’s success also depends on consistent camera placement, reliable AI model performance to achieve the minimum detection accuracy, as well as a functional web-based frame to deliver near real-time updates. Finally, collaboration with facilities management stakeholders is required for future deployment, training, and maintenance, while scalability will depend on this retraining and any adjustments.

# Scope and Limitations

EasyLot will not have the ability to identify vehicle type or color in any parking spot, also will not be able to read license plates. The system will not be able to verify whether a space is a metered location. Since it is trained on one location, it will have to be retrained for other desired locations. A live video feed will not be provided, but a simple location diagram will indicate parking locations. Camera resolution will be limited to 1080p, and it might have a color-based video capture system. Due to limited camera resolution, EasyLot will not operate in poor lighting conditions (at night) and adverse weather might reduce performance. The system will not be able to differentiate between a single car in a single spot or a single car taking up multiple spots, just that a spot is full.

## Scope of Initial Release

A wireframe illustrating the goal of final system, without time limitations and a PowerPoint outlining the plan of action for the creation of the EasyLot system. A user interface will not be included in the initial release.

## Scope of Subsequent Releases

An untested proof-of-concept system. A user interface may not be fully integrated at this point.

## Limitations and Exclusions

EasyLot will not be able to provide the exact location of vehicles, only if a space is taken up by a vehicle. There will not be a way for the system to verify if a user has permission to park in the lot since there are no user logins. Since training is taking place on a single lot, there is not a way to inform the user if the parking is free or not. Since EasyLot will not be able to identify if a vehicle is parked in an invalid location, the system will not be able to issue tickets or suggest such.

# Business Context

EasyLot will enhance the parking experience of students, faculty/staff, and visitors by proving an accurate, easy to use parking availability detection system to improve punctuality and reduce stress. Initial deployment focuses on one lot with real time updates through a web only interface while providing accuracy and easy usability all within a limited budget and timeframe.

## Stakeholder Profiles

The stakeholders for EasyLot include university students, faculty and staff, and campus visitors. Despite being different stakeholders, all three will interact with EasyLot in the same way but have distinct main concerns and expectations. By identifying their values, attitudes, and interests, the project can reduce the chance of unplanned requirements coming up later and make sure that EasyLot delivers benefits to each user type.

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| --- | --- | --- | --- |
| Stakeholder | Major Value | Attitudes | Major Interests |
| Students | Reduces time searching for a spot before class, improving class punctuality | Highly receptive with an accurate system and easy to use | Real-time space availability, simple interface, accurate reporting of open spaces, clear instructions on space location |
| Faculty/Staff | Increased productivity and punctuality for classes or meetings | Highly receptive with an accurate system and easy to use | Real-time space availability, simple interface, accurate reporting of open spaces, clear instructions on space location |
| Visitors | Easy navigation of unfamiliar lot, reduced stress and frustration during campus visits | Highly receptive with an accurate system, easy to use, and no prior login/setup | Real-time space availability, simple interface, accurate reporting of open spaces, clear instructions on space location |

## Project Priorities

EasyLot prioritizes accuracy of spot availability, usability, and deployment schedule within the constraints of the project deadlines and the $250 budget. Spot availability accuracy and user ability are the key drivers, as reliable performance and ease of use determine the how well the system performs with user testing. Deployment schedule is also a high priority, as there needs to be a functional beta demo by Week 14 of the Fall 2025 Semester. While features such as scalability and future support for different vehicle types are important in actual use, they can be implemented

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| Dimension | Drive/Objective | Constraint | Degree of Freedom |
| Schedule | Mostly functional beta demo by Week 14 | Academic timeline | Minor features may be dropped |
| Features | Real-time parking spot detection | Ensuring angle and set up is same during different testing phases | Advanced features (motorcycles/lot scaling) may be implemented if time allows |
| Accuracy | Provide 70% detection accuracy, aiming for 80% by end of project | Shouldn’t fall under 70% | Accuracy can improve with AI refinement |
| Usability | A simple and easy to use interface for all users | Web-only access, due to time limitations | Interface design can evolve with feedback |
| Cost | Stay under $250 Research Award | Creating model, purchasing camera, and building software within budget | Optimize component selection |

## Operating Environment

EasyLot will initially operate from a single vantage point, focusing on a single parking lot. It will achieve real-time updates, with minimal delay, and display the location of any available parking spot. All users, students, faculty/staff, and visitors, will be able to access the system through a web-based interface which will display where open parking spots are. There won’t be a need to combine data from multiple sites during beta demonstration, since the system is localized to one lot initially. The system will have nearly continuous availability, but if any service interruptions occur, it will not be a major hinderance to users. EasyLot is speculated to provide improvement on punctuality and decrease parking related stress.