

2. Requirements, Constraints, And Standards

2.1. REQUIREMENTS & CONSTRAINTS

We have divided our requirements into two categories: Functional Requirements and Non-Functional Requirements. Functional Requirements include goals that have definitive results. Non-functional requirements describe conditions that do not list specific numerical values but are areas of focus.

Functional Requirements:

Our functional requirements include live sensor data, a mobile app, a way to communicate with non-app users, and a way to accept payments. Our sensors must send live, up-to-date information about parking spaces. Each sensor must be able to tell if there is a car in a parking space and the sensor information must be sent to our server to ensure the user gets reliable parking data. A mobile application must be user-friendly and allow users to reserve parking spots for a given lot. The app must also direct the user either to their reserved spot or an open spot, depending on what they were looking for. Another requirement we must meet is a way to communicate with users without the app by directing the user through a parking lot. Our final functional requirement is a unique way to accept payment from the user within the app and through a kiosk.

Non-Functional Requirements:

Our non-functional requirements include creating a system with low latency to keep the status of parking spots accurate. Additionally, the reliability of our application, server, and hardware are pertinent to ensure a user-friendly system. Furthermore, our server and application need to be online and working consistently. To hold the trust of our clients, our server and application must encrypt and protect user information while taking secure payments. Our application must be presentable and navigable to gain popularity and keep customers.

2.2. ENGINEERING STANDARDS

IEEE 3156-2023

Standard Ruling: A standard for privacy-preserving computation integrated platforms is needed to meet the evolving requirements of multi-sourced data computing and sharing. Requirements of privacy computation integrated platforms, including the reference architecture, the functional requirements, the performance requirements, and the security requirements of privacy-preserving computation integrated platforms, are provided by this standard.

Justification: Our project will require us to take user payments through our app. We must implement security systems that protect those users from potential attempts to steal information.

IEEE 802

Standard Ruling: This report includes use cases and communication requirements for wired and wireless bridged networks. Dense use of wireless devices with differentiated QoS requirements and operation in a factory environment are considered. Gap analysis from existing IEEE 802 standards and necessary technology enhancement are also covered in the context of time-sensitive networks for the future.

Justification: To communicate with our server, we will use a wireless bridged network for our hardware. To abide by this standard, we must operate our hardware in compliance with the code.

Standard 14-5A-5 C: Parking, Stacking Space Size, And Drive Dimensions

1. The minimum size of a standard off-street parking space is nine feet by eighteen feet (9' x 18'), exclusive of aisle width.
2. The minimum size of a compact off-street parking space is eight feet by fifteen feet (8' x 15'), exclusive of aisle width.

Justification: While this standard is for Iowa City specifically, this applies more generally to parking lots nationwide. These two subsections of this standard apply to our project by giving us dimensions to work within. Therefore, any hardware we deploy to the lot should not infringe on these dimensions.

BIBLIOGRAPHY

- [1] IEEE SA, "IEEE Standards Association," *IEEE Standards Association*.
https://standards.ieee.org/ieee/White_Paper/10123/
- [2] IEEE SA, "IEEE Standards Association," *IEEE Standards Association*.
<https://standards.ieee.org/ieee/3156/10834/>
- [3] "14-5A-5: CONSTRUCTION AND DESIGN STANDARDS;" *American Legal Publishing*.
https://codelibrary.amlegal.com/codes/iowacityia/latest/iowacity_ia/o-o-o-23897