

DATE:10/10/2023

PROJECT ID:Proj\_223339\_Team3

PROJECT NAME:SMART PARKING

## 1.Introduction

Due to the rapid increase in automobile numbers, finding an available parking space in city centers during peak hours has become a serious problem for drivers. It is estimated that 30% of daily traffic jams in crowded areas is caused by car-owners looking for vacant parking spaces, and that a driver spends, on average, 7.8 minutes trying to find an available spot [\[1\]](#) [\[2\]](#) . This problem not only consumes time and fuel, but increases air pollution and driver frustration. As the situation becomes worse, so the demand for smart parking systems and services is rapidly growing. The Internet of Things (IoT)-enabling technologies have great potential for providing an ideal solution—a smart parking system to significantly reduce traffic congestion and improve the quality of life of citizens.

## 2. Background

### 2.1. Publish/Subscribe (Pub/Sub) Model

The pub/sub model is an alternative to the traditional client/server model, whereby a client communicates directly with an endpoint. It is a data-centric architecture, whereby messages are delivered to interested destinations without knowing the IP addresses of these destinations. In other words, it decouples the sender of a specific message (publisher) from another client, who is getting the message (subscriber), and allows communication via a third component (the broker).

## 3. Models and Goals

In this section, we cover the main components of our framework, threat model, and design goals.

### 3.1. Proposed Framework

As shown in [Figure 3](#), our proposed framework consists of several components, involving a large number of parking spaces equipped with sensor nodes, a smart gateway, a broker, and clients.

## 4. Framework Description Details

In this section, we describe in detail the proposed framework, which can use any pub/sub messaging protocol, such as Message Queuing Telemetry Transport (MQTT).

## 5. Security Analysis

In this section, we analyze the security of the proposed framework against different cyberattacks, and how it can counter these attacks.

## 6. Performance Analysis

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As discussed earlier, our framework relies on TLS to secure communications over the Internet; however, using TLS comes with a price, as with any security measure

## 7. Conclusion and Future Work

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Cybersecurity is currently a growing issue in the IoT, which has tremendous benefits in smart city applications, such as smart parking systems. In this paper, we have proposed a secure and privacy-preserving framework for smart parking systems, utilizing the pub/sub messaging model.

- **Steps**

- 1. Concept
  - First, you come up with the concept of your IoT-based parking solution
- 2. Prototype
  - Next, you engage the Internet of Things experts to [build an IoT prototype](#)
- 3. Design
  - At this stage, your experts create the user interface and select features for the MVP.
- 4. Development
  - This step involves mobile, front-end, and back-end, hardware developers.