## Background

No one can deny that parking related problems are a major concern in most **~~of the~~** modern cities worldwide, and this is especially so in Qatar.

Finding a parking spot may seem like a superficial problem, or an individual problem, but ~~it~~ is in fact one problem that causes major issues in our day to day life. In metropolitan areas worldwide, having a parking area is increasingly important, and in order to accommodate the growing demand for parking spaces a significant amount of land and buildings are set aside. For instance, in a developed country like Australia, the availability of parking areas is particularly important **~~hold great~~** ~~i~~**~~mportance~~** especially in major cities like Brisbane, Sydney and Melbourne, where there are a huge number of parking spaces can range from 25,633 to 41,687 [8]. Furthermore, estimates show that around 30,000 square kilometers of land in Europe and 27,000 square kilometers in the US are devoted to parking spaces [9].

In addition, parking can be very time consuming and costly. This comes as no surprise, “The U.S. economy bears the brunt of parking pain as 40% of drivers say they have avoided driving to shops due to parking challenges.” [10]. According to a study from the car service company Inrix, Americans spend an average of 17 hours per year searching for a vacant parking spot, ~~this~~ which leads to a loss of $345 per driver in wasted time and fuel. Similarly, drivers in the UK spend an average of 44 hours a year looking for an empty parking spot, with an estimated total loss of £733.

Contrary to the popular belief that generous parking allocations benefits users, the opposite can happen when there’s a surplus of **~~exaggeration~~** in parking allocations. An enormous **~~big~~** parking lot can prolong **~~prolongs~~** transportation times, and is a waste of useable land. These effects, -along with recent land-use, socioeconomic and technological trends- are prompting towns to begin asking some important questions about how to solve the parking problem in a smart and cost-effective way.

For this reason, there have been many proposed solutions, as discussed in the Related Work section **~~attempts~~** to provide smart parking systems as a solution, with each having its own different approach as shown in the Related Work section. The **~~used~~** components used in these Related Works vary and can include ultrasonic sensors, infrared sensors, and cameras for vehicle detection. These components **~~The components above~~** help in providing services to the user such as reserving or checking the availability of a parking spot.