

Research Paper :

Title of the Project

The Optimazation, Allocation, and Presentation of Computer-Generated Parking

Abstract

Currently, parking lots are overlooked as a source of traffic congestion around a building, especially in schools. Buses are usually parked in the main thoroughways of the school's parking lot, and thus cause a backup when the students and busses are trying to leave at the same time. Although this pattern may seem to work for most of the day (because people are parked and no one is moving), it is really inconvenient when people are in a hurry. That is one of the main purposes of this project - to design a parking lot and allocate spaces such that this unnecessary traffic can be avoided. This project will primarily make use of optimization techniques to make parking more efficient.

Introduction

This project really has three components, as alluded to in the title. The optimization refers to maximizing the available space to allow for the greatest number of parking spaces while maintaining a reasonable traffic flow. Parking is such a routine thing that there will be very few variable day by day, it is pretty much a standard thing. This makes the project slightly simpler because I don't have to account for unexpected things, making it easier to optimize. Secondly, the allocation of parking spaces refers to how the spaces are assigned to the students and faculty. This is one of the aspects of the project that is pretty much limited to schools. I doubt that many businesses would need to adopt this portion of my project because it doesnt really apply to them, but it is extremely crucial for schools (seniors getting priority, etc). Finally, the presentation of the data will be stunning, hopefully a CAD representation of the newly-designed parking lot. Together, the use of optimization, allocation, and a beautiful presentation should make for the best way to deal with parking now and in the future.

Background

Last year I was disappointed by the way parking was done at this school. Not only were there not enough spaces, but they were being assigned in mysesterious ways. Furthermore, traffic in the school's parking lot gets ridiculous after big events such as the SAT's and football games. As a result of these three problems, I have decided to explore Computer Generated Parking for my Senior Techlab Project. The beauty of the project is that not only can it be applied to other schools, especially in our area because of the great number of students are small space available for parking, but it can also be extended to the workplace. Especially in this area, traffic is becoming more and more of a nuisance in business areas around town. This also exteneds to commercial areas, such as the mall. Basically, it's important that more people can benefit from this project than just this school - it extends to the commercial world as well.

Research Areas

Optimization is the key to my project. How can I fit the greatest number of parking spaces comfortably into the school and still allow an efficient traffic flow? This will require research of a lot of different methods used. However, I anticipate that the publication of parking methods is not very popular, so I think I will need to apply what I learn from other optimization techniques and modify them to fit my

project. For example, when construction workers are laying new tile in the bathroom, they try to minimize the number of cuts they have to make to the tile and the number of tiles they use. I think this kind of information can be applied to my project.

Sorting is a component of my project that is most related to actual computer science. The question is a classic, how can I sort my data most efficiently and quickly? There is a lot of published material on this subject matter, so hopefully I will be able to use an already-developed algorithm or maybe even create my own sorting method.

The research area most unique to my project is what kind of regulations are in place for parking. How wide are perpendicular spaces? How long are parallel spaces? How much clearance is required behind a car for it to pull out. This kind of information is very important to my project so I can optimize the number of available parking spaces.

A Glance Ahead

As the need to relieve traffic congestion increases, I predict that more and more people will analyze their parking methods. Many are laid out in such a manner that isn't conducive to efficient traffic patterns. For this reason, I think it will be more and more common for people to revisit their often-overlooked conventions and consider a redesign.