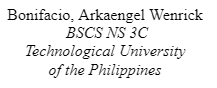
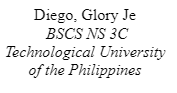
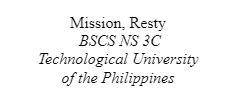
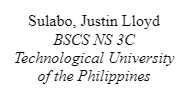
**THE DEVELOPMENT OF A PROPOSED PARKING AREA SIMULATION IN UPTOWN PARADE PARKING LOT BGC USING SIMIO 14**





**ABSTRACT**

This paper talks about various methods to study the turnover of parking slots in the framework of traffic flow characteristics and presents the analysis of the data of full-scale studies of the intensity and turnover of parking slots. It is shown that with the use of Simulation Software Application, it is possible to develop a dynamic simulation model of a parking space on the considered sections of the street and road network and to conduct an analysis of paid parking spaces and their impact on characteristics of the traffic flow. It is stated that the model allows predicting vehicle delays under predetermined characteristics.

**I. INTRODUCTION**

**I.I Context**

[1] Parking congestion has been already a problem that all urban planners are much worried about and they keep thinking about it while designing the building capacities. To give a solution to this problem, new improvement techniques were discussed, and the simulation system has a good part in dealing with the problem. We will include planning processes to identify optimal solutions for the Parking System using a discrete event simulation model. In order to use the software to model the parking simulation, we will need to understand all needs to have strong data from all users of parking lots in order to have clear information about drivers' arrival and departure times, the parking lots that they usually prefer, and other parking lots options that affect the traffic congestion.

**I.II Related Work**

[2] Parking can be a fundamental issue within cities, really in proximity to places of interest together with company units. The purpose of parking guiding solutions is to search for the ideal tactic to save some parking houses to get obtaining the lowest travel moment, also, to use up gas in cities (Phadnis et al. 2016). [3] The parking industry generates billions of dollars in annual revenue in the United States alone, and parking regulations may affect people's concerns about traffic congestion, air pollution, drivers' frustration about parking searching, and municipal objectives. Based on the observation that parking space reservations can help drivers to reduce the search time dramatically, (Wang et al. 2011) proposed a reservation-based solution, built on advanced sensing and mobile communication technology, with the objectives to alleviate parking contention, balance the benefits between parking service providers and drivers, coordinate among service providers, differentiate the needs of individual drivers, and reduce the amount of traffic searching for parking as well. To achieve the design of their goals, a powerful tool to model the behavior of both service providers and drivers is required.

**I.III Objective and Scientific Contribution**

This research will focus on achieving the following objectives:

* We will collect the data of the parking lot for a complete week for each deck, as well as some of the surface lots. By using the data we gathered, we can then understand the arrival and departure patterns for each of these lots or decks.
* We will conduct a survey that will cover all categories of users visiting the BGC place.
* Validating the hypothetical curves that will be acquired from the SIMIO 14 simulation model with the curves that will be generated from the collected data.
* Running different scenarios with changes in parking policies to see their impact on the Uptown Parade Parking lots and decks.

**II. MODELLING APPROACH**

**II.I Modelling Hypothesis**

The main objective of this paper consists in providing a simulation-based parking lot area. This tool will help decide on parking area location in the next 12 hours. The following hypothesis is taken into account:

* H1: A macroscopic model of the parking lot is used. The lowest level of detail is the stay in a parking area by customers. To that extent, the customer stay in the parking lot is modelled as a trace of stays in two parking points between his/her entrance and his/her exit.
* H2: We consider parking areas for resources. Each area of the parking lot has a predefined number of parking space available.

This model considers two main sources of customers:

1. Customers who successfully park inside the area

2. Customers who left because of insufficient parking space

**III. EXPERIMENTS AND RESULTS**

Our objective is to assess the parking congestion that is commonly the cause of the traffic. With this parking simulation of the uptown parade parking lot. We will consider two different scenarios; an increase in arrivals due to the rush hour, and a decrease in customers cause of insufficient parking space.

**III.I Case Study**

Bonifacio Global City (BGC) is known for its modern skyscrapers, exhibits of contemporary architecture, wide walkways, street art, and several mixed-use developments containing cafes, restaurants, and shops, can be considered a sight by itself and possibly the most

pedestrian-friendly area of Metro Manila. Uptown Parade is one of the famous parking lots around the area.

In this study, we collected data about the arrival and departure times of every vehicle that’s present in the parking lot which could help us to predict the impact of unexpected events on the parking system.

Our objective with this simulation is to minimize parking congestion and traffic problems with decision tools. This visualization tool will help drivers to manage their destinations.

**III.I.I Parameters of the Parking Lot**

Every public place has peak periods of parking demands. These periods vary based on the parking schedule. Providing a parking plan that can accommodate the rush hours is a challenge for many shopper planners. Rush hour commonly happens after lunchtime and before dinner time.

Understanding the parking dynamics of the rush hour period for parking can help in finding an efficient solution for parking congestion. Understanding parking dynamics means that the parking and transportation department needs to have a good idea about the following parameters:

* Arrival Time - this is the time when the driver arrives at the uptown parade parking lot and starts looking for a spot.
* Parking Duration - this is the period between parking in certain spaces and leaving the space. The Duration might be less than one hour or up to several hours.
* Driver’s Destination - the parking lot has options that the driver might check on the way to looking for a spot to park. The parameter can depend on the place where the driver needs to park for hours or park for a minute.

**III.II Data**

Our model is a proposed idea of parking simulation in Bonifacio Global City(BGC) and the data that we used were made based on our own assumptions in terms of the capacity of cars that can park and the number of parking areas that can be used, the numbers of cars that entered in the area and exited the system. This decision is based on the parking and transportation management experience.

**IV. DISCUSSION**

The main contribution of this paper is the process of the parking lot system. This simulation can be a valuable tool to estimate and manage the daily parking service and assess the time of drivers and workers. Although the results of the simulation are promising, we believe that this simulation model can be improved. Moreover, additional work should be done to clean the database and correct problems.

**V. CONCLUSIONS**

The curves that were constructed based on the collected data provided a good baseline to understand the arrival and departure patterns for each lot in the Uptown Parade Parking lot in BGC. Based on the analysis, the discrete event simulation was modified to finally fit in with these curves. It is applicable to make any change to the model and predict the impact of the change in possible future scenarios. With the results, each lot would be beneficial to reflect the impact of any change that can be applied to the campus parking lots in addition to any new policy that might be applied in the parking pass to allocate the cars around the location.

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