Raymond JNC Cruz 2/11/2014

ITM 189 – X

Loyola Schools Parking Lot Management System

# Introduction

Finding a parking spot is one of the everyday problems of an LS student. A typical student would enter each LS parking lot to find a spot, which takes a significant amount of time and fuel. This phenomenon is usually encountered by students which arrive at the campus during non-peak hours, by which then the parking lots are almost fully occupied.

Free parking slot counters placed in strategic areas will inform the student if there are remaining vacant slots in the parking lots. Availability indicators within the parking lot will direct the student to vacant spots, if there are any. This solution will save the student time and resources, which is invaluable to most LS students.

# Technology

## Parking Slot Counter

The counters simply are LED displays that show the number of slots available in the parking lot. The LED displays are housed in a protective casing. The counters are interfaced with the overall system via underground protected cabling pipes.

## Parking Slot Availability Indicator

The availability indicators are composed of the LED indicator light, sensor, and protected cabling pipes. The LED indicator lights are mounted on top of a post, and emit a red or green light depending on its respective sensor’s input. The sensors use infrared signals to detect if a vehicle is occupying its respective parking slot. Both of these components, along with the parking slot counter, are linked via protected cabling pipes, which are mainly underground. The cables are encased in steel or PVC pipes to provide protection.

## Software

The system is administered through a management software installed in a terminal that is connected to the system’s infrastructure.

# Cost Benefit Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | | **Cost(Monthly)** | |
|  | Development | | Production | |
| Server | Php2,500.00 | |  | |
| Workstation | Php1,666.67 | |  | |
| Infrared Sensors | Php10.42 | |  | |
| Microcontrollers | Php3,304.17 | |  | |
| Cabling | Php527.04 | |  | |
| Personnel |  | | Php13,500.00 | |
|  |  | | **Benefit(Monthly)** | | | |  |
| **Students** |  | |  | | |  |  |
| *Total* | 8000 | |  | | |  |  |
|  |  | |  | | |  |  |
| **Category** | **Total units per category** | | **Estimated Sales** | | | **Tuition Rate Increase** | **Revenue per Month** |
|  |  | |  | | |  |  |
| Students | 8000 | | Php133,333,333.33 | | | 0.1% | Php133,333.33 |
|  |  | |  | | |  |  |
|  |  | |  | | |  |  |
| Total Benefit (Monthly) | | |  | | |  | **Php133,333.33** |
| Development Period | | | 8 |
| Interest rate | |  | 0.05 |
| Projected Changes(Annual) | | |  |
| Production Cost | |  | 0.04 |
| Production Benefit | | | 0.06 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Projected Costs |  |  |  |  |  |  |
|  | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Server | 20000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Workstation | 13333.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Infrared Sensors | 83.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Microcontrollers | 26433.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cabling | 4216.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Personnel | 0.00 | 162000.00 | 168480.00 | 175219.20 | 182227.97 | 189517.09 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Annual Costs | 64066.33 | 162000.00 | 168480.00 | 175219.20 | 182227.97 | 189517.09 |
| NPV of Annual Costs | 64066.33 | 154285.71 | 152816.33 | 151360.93 | 149919.40 | 148491.60 |
| NPV of Cumulative Costs | 64066.33 | 218352.05 | 371168.37 | 522529.31 | 672448.71 | 820940.30 |
| Projected Benefits |  |  |  |  |  |  |
|  | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Annual Gross | 0 | 1600000.00 | 1696000.00 | 1797760.00 | 1905625.60 | 2019963.14 |
| NPV of Annual Gross | 0 | 1523809.52 | 1538322.00 | 1552972.68 | 1567762.90 | 1582693.97 |
| NPV of Cumulative Gross | 0 | 1523809.52 | 3062131.52 | 4615104.20 | 6182867.10 | 7765561.07 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Annual Net | (64066.33) | 1438000.00 | 1527520.00 | 1622540.80 | 1723397.63 | 1830446.05 |
| NPV of Annual Net | (61015.56) | 1304308.39 | 1319529.21 | 1401611.75 | 1417843.50 | 1434202.38 |
| NPV of Cumulative Net | (61015.56) | 1243292.83 | 2562822.04 | 3964433.79 | 5382277.29 | 6816479.66 |