Big Data and Your Parking Operation

White Paper
Introduction

You have probably heard the term “big data” thrown around quite a bit lately—people talk about it as the conglomeration of several large data sets in an easily digestible format. But its true purpose is to convert data into information that is actionable.

Many parking operators now have the technology to process their data, but are not fully utilizing the information. It is time to start examining how big data can and should benefit your parking operation.

Explosive Growth

Every industry, business and person is affected by the data around us. Every day, 2.5 quintillion bytes of data are created, with 90 percent of the world’s data created in the past two years alone.

For example, Wal-Mart processes one million customer transactions per hour, stored in databases estimated to contain more than 2.5 petabytes (1 million gigabytes) of data.

Big Data Leaders

So how can we turn these enormous data sets into actionable information? Many organizations are already doing it with tremendous success, using big data to:

Derive knowledge

• Amazon’s “customers who bought this item also bought” suggestions
• Netflix’s recommendation engine
• YouTube’s ad feedback

Predict behavior

• NSA “protection”
• Credit card fraud prevention
• Weather prediction for farmers

Gain operational intelligence

• Google Analytics
• IBM Smarter Planet

Big Data’s Startling Success

Retail has had tremendous success mining data to produce hyper-targeted marketing. This story from a major national retailer provides a glowing example of big data’s power.

The major retailer’s statisticians analyzed shoppers on the baby gift registry and looked for purchasing trends. What they found was that during the 1st trimester, the women would buy un-scented lotions, vitamins and a few other specific items.
Taking that information, they then began to target marketing to those customers whom they could identify as having purchased “pregnancy and baby products”.

This sounded like a good idea, but not long after they began the targeted marketing campaign, a man came into their store outraged that the store sent baby clothes and formula coupons to his young daughter. The assistant store manager apologized profusely and the gentleman left.

The store manager followed up the following week to apologize again for the mishap and the father promptly apologized to the manager saying, “My mistake, I found out this week that my daughter is pregnant.”

Where Do I Find It?

Parking operations generate a lot of data, and have many systems that work directly and indirectly with parking. The systems that are close to parking represent one data set (meters, PARCS, LPR, cell parking, credit card payments, events, cashier terminals, valet, etc.) that are mostly within the control of parking.

But there is more data available, in a lot of cases public data, and you should consider this as all part of the big data available to your parking operation for data mining and extracting value (security, way-finding, traffic, public transit, car share, shuttle service).

How Do I Use It?

Converting your data into actionable information allows you to be proactive, rather than reactive when managing your parking operation. You will find it far easier to make accurate predictions and policy adjustments when you can visualize data points like occupancy over time and citations issued by location in one simple interface.

This not only allows you to manage your operation more effectively, it also builds credibility to your administration or governing body.

You also have the intriguing opportunity to monetize your data by selling it outright to users or third parties—or even selling advertising around the use of your data.

Know Your Audience

The data that is collected by a parking operation has different value to different audiences. Often the same data can be used to present to different groups. Presentation of the data (i.e. format) is an important consideration for how the data is received, perceived, and valued. Some of the common audiences include:

Management

Mostly interested in the strategic aspects of the data, such as trending, demand curves, elasticity, ROI, debt service, etc. These are the data that provide insight into making decisions that guide an operation toward long-term success.
Customers

Parkers have a great interest in the data, usually for immediate (tactical) decisions. These types of things include where to park right now, what is the cheapest parking, where are spaces available, which devices take cash/credit, etc.

Industry Peers

Big data can provide benchmarking for the parking industry. Each parking operation has unique qualities, but there is a lot of similarity in their operational goals. Looking at those yearly, quarterly, or monthly reports can often leave a lot of unanswered questions.

When big data is shared in the cloud, parking operators can easily share their data with industry peers—this opens up conversation and makes it easier for all parties to create benchmarks for success. By dividing by market segment (campus, municipal, airport, hospital, geographic area, etc.) you can better compare apples to apples.

Others

Suppliers can benefit from monitoring data to be able to provide better service to you, prevention of issues, etc. Aggregators will use your occupancy or pricing to deploy to mapping companies.

Data Visualization

Once you have your data properly aligned, you will want to be able to analyze it in a clean, easily digestible way. The answer is parking management dashboards. Having a dashboard available to you each day to see how your organization is operating will allow for better informed decisions. Let's look at some examples.

Financials

Figure #1 shows daily revenues for 12 days in February 2014. Looking at it from an operational perspective, it appears that revenues dip once a week. Now, if this were a one-time occurrence you'd likely pause and research why this is happening. But, more than likely, since February 23rd, 2014 was a Sunday, there is probably an ordinance on the books that parking is free on Sundays in the downtown zone.

This graph is a great example of how you can slice your revenue information into usable data. Knowing how much money is made by day, by location or by rate is imperative to making informed operational decisions.
Know Where You Stand

Figure #2 shows over 75% of the year’s citation revenue is yet to be collected. Clearly, collection efforts need to be increased.

Historical Data

Understanding the past allows better decisions for the future. Figure #3 shows permits sold annually by classification—and it raises some questions. Why did employee permit sales drop this year? The answer could be around pricing, for instance, did you raise rates significantly to push staff to alternative transportation?

Or the answer could be that buildings were placed on two very large parking lots and the actual parking space inventory has reduced. Having this data visualized gives a quick view into some of the statistics that you need to make decisions.

Drill Down for Details

Figure #4 shows the total amount of citations issued year-to-date. This will give an administrator a quick glance on how the campus enforcement officers are doing. For instance, at a university, it is common to see a reduction in citations written during the summer months due to less faculty and students on the campus. But if you were to see a large dip in the month of May it would trigger you to drill down into more details.
Figure #5 drills down on Figure #4 to see the number of citations written at each location during May 2014.

Your data helps you answer questions, and helps you understand what else to ask. Why are the most citations written in the Computer Science lot? Maybe Computer Science is the largest parking lot on campus? Maybe it is in the central part of campus? Or maybe you just changed the lot designation? Drilling down into the information will give you more information or maybe just more questions.

Let's drill down further to Figure #6 and examine the type of citations being written in a particular lot. Looking at the number of no valid WSSU permits might beg the question, “Is there enough signage at the entrance to let customers know that this is a permit only lot?” Or why is there a large number of “Not Parked in Designated Area” citations? Is it a signage problem? Could it be a striping problem? These details provide opportunities for you to investigate and improve the way your organization operates.

Figure #7 examines a different drill down on Figure #4, showing the number of citations issued by each officer in March 2014.

This graph also raises several questions. For instance, why is the temporary staff member writing more citations than a full time enforcement officer? Could it be that “Gullick” isn’t being as productive as he/she could be? Or did someone give all the temps that work during the busy times of the semesters the same username and password and now all the information is combined?
Since were curious about “Gullick”, lets examine the type of citations he/she is writing in Figure #8.

This level of detail can provide insight to better inform daily work plans for enforcement officers. And it can raise and answer questions based on your organizations goals.

For instance, how much time is “Gullick” spending writing citations in the metered lots? Is that an appropriate amount of time to be spending in those locations? Or do you have an emphasis on keeping the metered spaces turning? What about the amount of citations he/she is writing to those people not parked in their correct permit areas? Is there a reason for that? Did the lots just get reconfigured and people are confused? Or have you oversold a type of permit and need to adjust your sales capacity numbers?

Get to Work

Understanding big data and how it fits into your parking operation is no easy task. It takes a significant time commitment to implement and monitor successfully. However, if done successfully, it can open up a new world of possibilities not just for your operation, but for the parking industry as a whole.