

Automated Yield Management

Demand Based Pricing for Parking

Background

Demand based pricing - the parking industry's holy grail. Everyone is talking about it, because it makes a lot of sense. The airline and hotel industries have been optimizing pricing, and in turn revenue, through sophisticated yield management solutions for years. And yet, parking rates in some locations haven't changed for decades. The lack of progress is due to many factors including regulations, market and technology fragmentation, customer acceptance and - let's face it - demand based pricing is not an easy program to implement.

Dynamic parking fees are challenging because they currently have to be done manually, with limited information and time for analysis of the results. Coupled with a market that is resistant to change, and is unclear on the value of raising, or - especially - lowering prices to drive demand, the challenge becomes even more pronounced. It's not unreasonable to ask, *'why would there be a need to change the price of a stall more than once a month, let alone a week?'* The answer is fairly simple: adopting dynamic pricing strategies significantly increases revenues for parking asset owners. By identifying the changes in demand, and adjusting the corresponding fees higher and lower, asset owners can capture more NOI by generating higher revenues per transaction during peak demand, and creating incremental revenues during periods of low demand, such as evening and weekends. The parking consumer and parking locations are an extremely dynamic combination. It's time for parking prices to respond more efficiently to those dynamics. Airlines and hotels have known and responded to these changes for years. The parking industry is ready for dynamic pricing, and now with Smarking, we can actually achieve it.



AYM - The Smarking Demand Based Pricing Solution

If there is one thing Smarking has learned from analyzing our customer's parking data and operations over the past four years, it's that the demand for parking at a single location, for many garages, changes monthly, daily and hourly. Parking is incredibly dynamic, and consumer behavior is always changing.

The challenge to optimize pricing in a dynamic market is seeing the changes and opportunity quickly enough to respond to them. Our customers have been doing this with our Business Intelligence solution for the past four years. They've seen the value of automating parking data collection and visualization beyond time-consuming spreadsheets. They've taken Smarking data and manually developed optimal pricing and packaging schemes. But changing prices manually is both time consuming, and simply not fast enough to meet the needs of many parking locations. To optimize demand based pricing correctly the solution needs to analyze more data, calculate faster, and constantly learn and improve better than a human operator can. Demand based pricing requires computers and modern software algorithms.

During 2018, Smarking, with our team of MIT data scientists, developed and tested what we call AYM, or Automated Yield Management. AYM is the industry’s first fully automated, demand based (or dynamic) pricing solution. Simply put, AYM gathers and processes historical and current sales and occupancy data to determine real-time demand for a location, then calculates the optimal price associated with that level of demand. Currently, we offer AYM via one online channel, ParkWhiz, and are testing others. AYM will eventually provide multi-channel management and optimization capabilities.

How AYM Works

At its core, AYM is a very sophisticated software algorithm which analyzes multiple data feeds and produces variable pricing based on expected demand and occupancy levels. The prices are developed in real time, but currently are pushed to the sales channel four times a day. More broadly, AYM is a software solution that automates and manages both the price optimization and the rate communication process across multiple and client managed, variable parking sales channels across a parking portfolio. As mentioned above, we currently offer our service through the ParkWhiz online reservation channel, but are testing more channels both on and offline in order to provide our customers with a broad spectrum of channel management and optimization capabilities.

Some of the data which Smarking captures and analyzes for the AYM algorithm are listed below:

- Current occupancy of the garage
- Historical occupancy of the garage
- Predicted occupancy of the garage
- Historical reservation data
- Current reservation data



(Figure 1) AYM Reporting - Weekly channel review, year over year

The data above is sourced from our business intelligence solution, and processed by AYM. AYM in turn assigns a price to a product based on predicted demand, with the goal of maximizing revenue within inventory and price constraints. AYM adjusts the prices in real time as demand prediction evolves. In this case, a product is typically a time-frame allocation within the 24 hours of garage operation. The prices are automatically sent to ParkWhiz and posted within their service for the location.

The customer can manage the parameters of the AYM pricing output listed below:

- High and Low price
- Frequency of change
- Blackout dates
- Volume (to come)
- Channel (to come)



(Figure 2) AYM Reporting - Occupancy by channel

AYM is currently the only service available within the parking industry that automatically optimized parking revenue, with the following key differentiators:

<ul style="list-style-type: none"> • Software based • Real-time and automated • Machine learning with continual improvement 	<ul style="list-style-type: none"> • Multiple-channel, both online and drive up (currently one channel) • Maximize either revenue or occupancy (currently revenue) 	<ul style="list-style-type: none"> • Client configurable, with set it and forget it capability
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Results To Date

AYM has been in development at Smarking for over a year, and in deployment for nine months. We've deployed the software in more than ten locations, across three metropolitan areas, New York, Boston and Chicago. We are currently rolling out to over thirty locations across the USA.

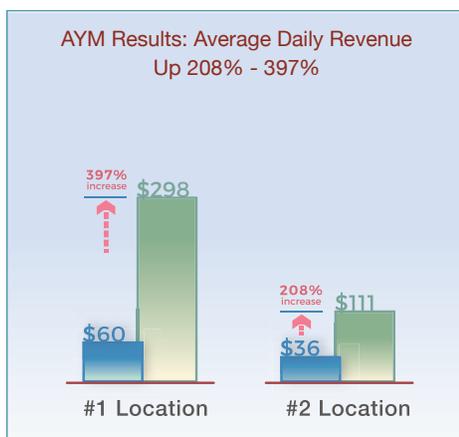
The results and value our customers have realized are summarized below:

<ul style="list-style-type: none"> • Minimum 40% increase in revenue • Average increase of just under 200% • No material impact to other sales channels, including drive-up transient parking 	<ul style="list-style-type: none"> • Smoother occupancy and revenue oscillations, mitigating in/out congestion, and other operational headaches • Increase in consumer satisfaction through more product choice 	<ul style="list-style-type: none"> • Increase in parker market size due to increased product choice (new users, not cannibalized users)
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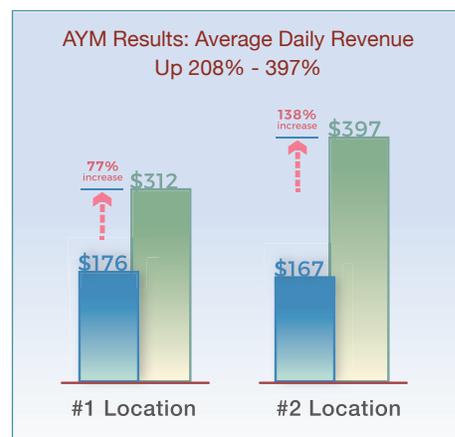
Please note the following data supported observations about these locations both before and after the implementation of AYM.

- There was no material cannibalization of other channels during the AYM deployment, including drive up
- There was no downward trend in the revenue per transaction, and in some locations the number actually went up
- There was no seasonality effect to the increase
- And while Smarking won't take responsibility for all the revenue growth at these locations, when isolated, AYM is responsible for the majority of the growth

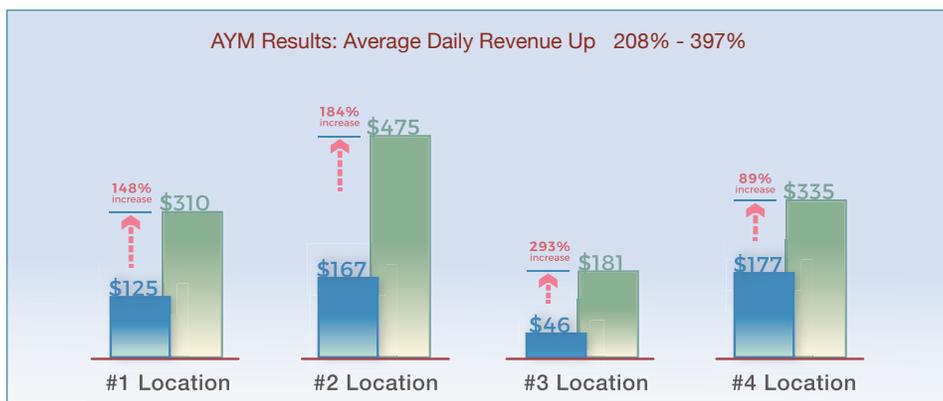
Daily Revenue on AYM Channel



NYC Locations



Boston Locations



Chicago Locations

Company

Smarking is the parking industry's leading data and yield management software solution, with over 2,000 active locations. We have integrated and consolidated data from over forty of the leading PARCS equipment and software solutions to provide our customers with a full, 360-degree view of their parking assets so they can increase operational knowledge, management efficiencies, overall revenue, and customer satisfaction.