

BY PETE BUCZKOWSKI AND HAI CHU

Editor's note: This is another in a series of articles profiling members of the INFORMS Roundtable.

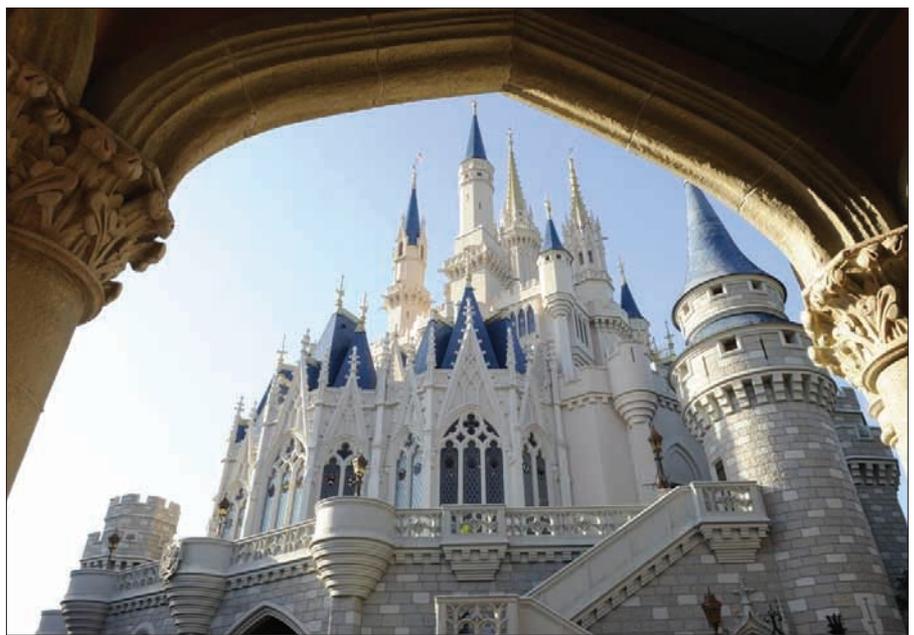
How analytics enhance the guest experience at Walt Disney World

IN THE MID-1960S, WALT DISNEY'S DREAM was to build a family resort destination like no other. The dream became a reality when Walt Disney World Resort opened in 1971, featuring Magic Kingdom as the centerpiece. Today, millions of guests visit the Walt Disney World Resort each year to experience the world-class theme parks and hotels. In addition to the four theme parks, there is a never-ending list of activities to enjoy, such as shopping at Downtown Disney, playing golf at one of five challenging courses or plunging down a slide at one of our two water parks. When guests get hungry, more than 300 places to dine await them across the resort, ranging from fast casual to fine dining. Guests are often surprised (and delighted) to discover that the resort has more sommeliers than any other company in the world! In all, more than 60,000 cast members guide guests through these experiences, delivering legendary service and creating memories that last a lifetime.

Guests vacationing usually focus on the entertainment and attractions the resort has to offer. What most guests don't see is the careful planning taking place "behind the scenes" to run the operation smoothly. In this article, we'll give you a peek at the role analytics plays in ensuring the guest experience is maximized.

Improving Guest Experience through Forecasting

FORECASTING SERVES AS the analytical foundation for operations planning at the Resort. It all starts with the park attendance forecast, which lays out the expected attendance at each park. These predictions are strongly considered when setting park hours and performing other strategic planning. More granular forecasts are required for each individual area, such as guest arrivals at the hotel front desks. The company recently launched a new labor demand planning system, which generates transaction forecasts for every 15-minute period at many locations throughout the property, including park entry turnstiles, quick-service restaurants and merchandise locations. These forecasts help the resort plan labor effectively to ensure guest service standards are met.



A unique side view of the iconic Cinderella Castle, centerpiece of the Magic Kingdom theme park.

The resort's costuming operation is the largest in the world, with more than a million costumes in inventory at Walt Disney World alone. Not only does total garment demand vary by season, but the distribution of individual garment sizes also changes as the cast mix evolves over time. Unlike a traditional inventory system, garments are laundered and placed back on the shelf after cast members return the garments. The recycling nature of the garment inventory is further complicated by occasional garment retires. This dynamic environment requires sophisticated forecasting models to have enough garments to meet cast member demand while not overspending on garments that sit on a shelf.

Another innovative way the resort uses forecasting is for attraction wait times. The most popular attractions utilize Disney's FASTPASS system – a unique virtual queueing system that allows guests to receive a ticket with a designated one-hour window of time when they can return and skip the regular line. The virtual queue poses an extra challenge to forecasting the standby wait time since many FASTPASS guests will return before the guest entering the standby queue reaches the front of the line.

All About the Roundtable

The Roundtable consists of the institutional members of INFORMS with member company representatives typically the overall leader of O.R. activity. The Roundtable is composed of about 50 organizations that have demonstrated leadership in the application of O.R. and advanced analytics. The Roundtable culture is peer-to-peer, encouraging networking and sharing lessons learned among members.

The Roundtable meets three times a year. Roundtable goals are to improve member organizations' OR/MS practice, help Roundtable representatives grow professionally and help the OR/MS profession to thrive. Further information is available at <http://roundtable.informs.org>.

The Roundtable also has an advisory responsibility to INFORMS. According to its bylaws, "The Roundtable shall regularly share with INFORMS leadership and advise the INFORMS Board on its views, its suggested initiatives and its implementation plans on the important problems and opportunities facing operations research and the management sciences as a profession and on the ways in which INFORMS can deal proactively with those problems and opportunities." The Roundtable meets with the INFORMS president-elect each spring to discuss practice-related topics of interest to him or her, and with the entire INFORMS Board each fall to discuss topics of mutual concern.

This series of articles aims to share with the INFORMS membership at large some information and insights into how O.R. is carried on in practice today.

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of the attractions to help guests
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From a central command center underneath the Magic Kingdom, forecasting models are executed every 5-10 minutes to project the return patterns of our FASTPASS guests based on a variety of factors, including entertainment schedules and the number of FASTPASS tickets that have been distributed. These forecasts are posted at the front of the attractions to help guests choose whether to enter the line, take a FASTPASS ticket or return to the attraction later in the day. As an added bonus, these projected wait times are also available on Disney's Mobile Magic smart phone app, which shares real-time information about the parks throughout the day.

Making Smarter Decisions

WHILE ACCURATE FORECASTING is important, the results are only valuable when utilized to make smarter decisions. As Disney analysts understand more about guests and their preferences, they can utilize analytics to customize offerings and experiences that better match resort guests' desires. As one example, data mining is used to understand what vacation packages are most appealing to different types of guests. This analysis, coupled with optimization models, allows the company's Web site and our call center agents to present offers that provide a more customized vacation planning experience.

The resort's table-service restaurant operation leverages optimization in unique ways. Statistical analyses helps the company understand the patterns around party sizes, arrival times and table turn times. This knowledge is incorporated into mathematical models that determine the right mix of tables to best meet guest demand. Another set of models helps develop inventory templates that embrace the stochastic nature of the operation while maximizing the utilization of the restaurant. A recent update made these models dynamic in nature – accounting for the bookings already made while considering the projected reservations up until the actual day arrives.

Disney also applies analytics to streamline back-of-house operations. An on-site textiles facility handles nearly 300,000 pounds of laundry every day, servicing costumes from across the operation as well as linens from resort hotels. The resort leverages computer simulation to recreate the facility in a virtual environment. Simulation offers many benefits prior to making physical changes, including identifying potential bottlenecks and testing new concepts or designs that can increase the overall capacity of the facility. The resort has also utilized simulations in many other operational settings, including attractions, hotel front desks, restaurants and warehousing facilities.



Guests enjoy playing in the new Haunted Mansion interactive queue.

One of the resort's newest innovations is the creation of interactive queues, which keep guests entertained while they wait in line for an attraction. The most recently opened queue is at The Haunted Mansion. Prior to entering the attraction, guests will find frightful fun in a new courtyard queue that brings them into an expanded, interactive graveyard featuring a ghoulish organ, a wall of unusual musical instruments guests can "orchestrate," a chance to complete a rhyme with the Decomposing Composer and photo opportunities with favorite spirits from the beloved attraction. This new concept changes the way guests navigate through the queue – instead of progressing in a linear fashion, they often gravitate to one of the interactive elements found in the queue. The resort is beginning to use agent-based simulation to model these new guest behaviors and look to incorporate the findings into future queue designs.

An Emerging Analytical Culture

OVER THE PAST DECADE, analytics at Disney have emerged as a powerful means to bring even more magic to its resort guests.

Numerous departments across the company are leveraging enhanced tool sets to help solve its most challenging business problems, including forecasting, marketing, industrial engineering, revenue management and transportation, to name just a few. One result of this growth is the annual Disney Analytics & Optimization Summit. Taking place in the fall, it brings together cast members who have analytical roles throughout the company with other external O.R. professionals. Last year, nearly 300 cast members attended the summit – a true testament to the volume of analytical work being accomplished and how it is highly valued throughout the company.

While much of this work originated at Walt Disney World, the groups are also taking on projects throughout the broader Disney organization. Many of the successful analytical projects are subsequently implemented at our other parks and resorts around the world. In fact, Disney recently launched two new cruise ships into the Disney Cruise Line family, the Disney Dream and Disney Fantasy. Analytics were utilized throughout the planning process, including organizing the logistics around training the nearly 1,700 new crew members and planning crew rotations on and off the ship.

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