

# PREDICTING CUSTOMERS' WAIT TIME

## CASE STUDY

Elder Research partnered with a client in the hospitality industry to develop a machine learning model that predicts a customer's wait time for their order. The solution was developed in Python and implemented in the client's mobile app by leveraging AWS cloud services.

### THE CHALLENGE

As technology advances and organizations gather more and more data, customers in the hospitality industry are growing accustomed to receiving thorough information and updates about the products and services they purchase. Some organizations are initiating and prioritizing data science and machine learning solutions to meet these expectations by giving customers accurate information based on known data. Creating a machine learning solution that would predict how long a customer would have to wait for their order to be ready was requested by an existing client.



### THE SOLUTION

Our team utilized the CRISP-DM methodology to comprehend the scope of the business problem, investigate the available data, develop and test a machine learning model, and implement the solution within the client's existing infrastructure. In addition, we collaborated with stakeholders to iteratively design solutions that began simply in order to test out the concept, but grew in complexity as more data was collected, end-user feedback was received, and the consensus for defining model success amongst multiple client groups evolved.

### INDUSTRY

Hospitality

### BUSINESS NEED

Utilize real-time order and location patterns to predict a customer's wait time interval.

### SOLUTION

- Developed a machine learning model that integrated into the client's ecosystem.
- Iterated to best fit the needs of all stakeholders.
- Received advocacy for chainwide implementation from over 90% of store proprietors during a testing phase.

### BENEFIT

Increased transparency for customers, identification of potential opportunities for data quality improvements, and utilization of predictions in other use cases across the organization.

#### OFFICE LOCATIONS

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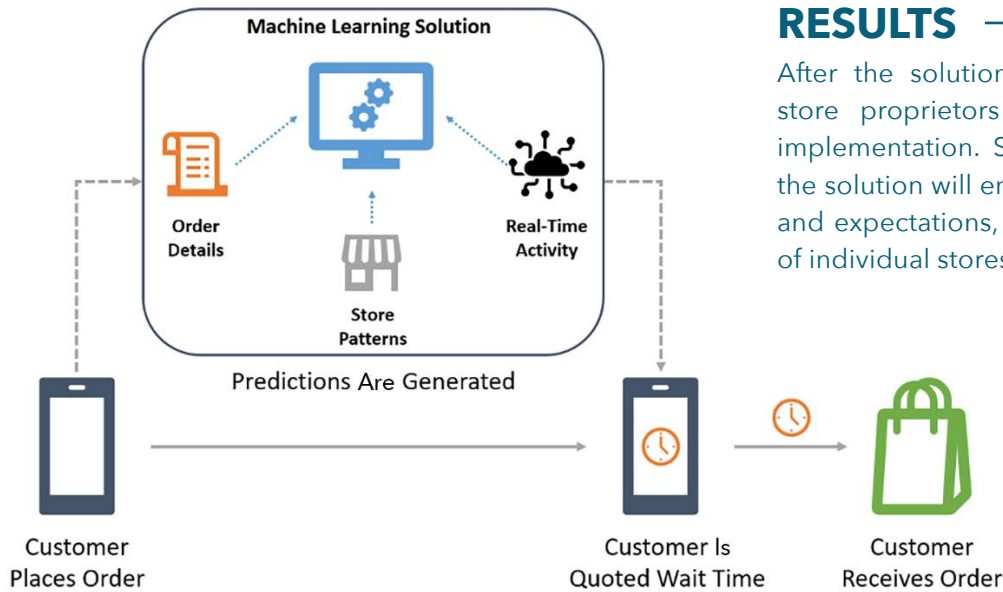
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## THE SOLUTION *(continued)*

The solution was developed in Python using the scikit-learn package and the LightGBM framework to predict an estimated wait time interval that would be displayed within the client's existing mobile app. The solution ingests data on individual order characteristics, store-specific patterns, and real-time activity levels to generate prediction intervals.



**The solution offers a 5.5-minute window on average, during which 87% of client wait times occur.**



## RESULTS

After the solutions testing phase, over 90% of store proprietors advocated for its chainwide implementation. Stakeholders are optimistic that the solution will enhance the customer experience and expectations, as well as inform the processes of individual stores by revealing wait time patterns.

## ABOUT ELDER RESEARCH


Elder Research is a recognized leader in the science, practice, and technology of advanced analytics. We have helped government agencies and Fortune Global 500® companies solve real-world problems across diverse industries. Our areas of expertise include data science, text mining, data visualization, scientific software engineering, and technical teaching. With experience in diverse projects and algorithms, advanced validation techniques, and innovative model combination methods (ensembles), Elder Research can maximize project success to ensure a continued return on analytics investment.

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