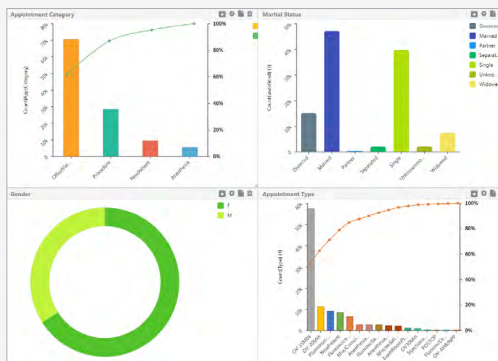


MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

Predicting Appointment Cancellations

“Users have direct access to the information they need and can analyze it right from an interactive dashboard. Generating and distributing reports is no longer a daunting task. This allows us to focus on only actionable information. Why didn’t we do this sooner?”

– COO



Data Source :

Pain Care Facility

Data Type :

Patient Appointment Data Set

Application :

Analance



PROOF OF CONCEPT – POWERED BY ANALANCE

This **Pain Care Facility** struggled with patient no-shows and appointment cancellations which unintendedly made other patients in the queue suffer, resulted in loss in revenue opportunity, loss of practitioner time, and contributed to wasted capacity.

Leveraging ML and AI to enhance patient experience

Analance used the Pain Care Facility’s Patient Appointment data set to identify patients most likely to cancel an appointment—with summaries and findings easy to explore through dashboards and reports.

By leveraging Analance machine learning (ML) and artificial Intelligence (AI), scheduled patients can be classified into risk categories based on their likelihood of cancelling and future outcomes can be predicted with accuracy as high as 76%. With built-in automations, alerts can be scheduled to notify administrators when patients are at risk of missing their appointment. This allows providers to proactively strategize on how to discourage no-shows.

Exploratory Data and Modeling Process

With visibility into a patient's likelihood of cancellation, providers can proactively reschedule appointments, schedule new patients, or put measures in place to mitigate cancellations and incentivize patients to show up for their appointment.

A total of 655,141 observations were made for 52,427 unique patients and 57 different predictor variables were considered like: appointment category, appointment type, marital status, gender, employment status, number of insurances, appointment duration, and more.

All variables available were studied to understand distributions. Data was cleaned by the means of handling outlying values, missing values, and looking for interrelationships between predictors before looking to see if any data had a significant relationship with the outcome. A Bivariate Analysis (Chi-Squared) was done for all predictor-outcome combinations, which helped in restricting the analysis to only those predictors that majorly influence appointment cancellations.

Data Modeling and Findings

A total of 50 different models were built. Based on model accuracy, Random Forest Model was chosen as the winning model for analysis. Findings suggest that the highest percentage of cancellations were found for:

- 3 facilities across different geographic locations
- Younger patients (39.31%) and students (34.84%)
- Patients with a "separated" (33.91%) and "single" (33.1%) marital status
- New patients (44.91%)

Data Analysis and Insights

A higher cancellation rate for certain locations may depend on the availability of doctors in the same area of specialty. Patients may book multiple doctors and opt in for the one offering the shortest wait time. Separated and single patients also cancelled more than married couples, perhaps due to not having a proper support system. Younger patients and students also cancelled more than the older and self-employed patients. We can speculate that younger demographics delay preventative care and put their day-to-day life and work obligations before health. They may also have transport-related obstacles. New patients, on the other hand, has a higher likelihood of cancellation. This behavior can be attributed to the fact that they are simply unfamiliar with the clinic and the doctors.

Next Steps

Providers can double book, send timely reminders (auto-call or text), offer rescheduling options, provide more strategic clinic hours, or collect cancellation fees upfront to incentivize patients to show up.

ABOUT DUCEN

Ducen helps Business and IT users of Fortune 1000 companies with advanced analytics, business intelligence and data management through its unique end-to-end data science platform called Analance. Analance is an enterprise-class, state of the art integrated platform that delivers power and ease of use to business users and data scientists with a seamless experience and platform scalability to support business growth and strategy.

 [For more information, contact us.](#)

