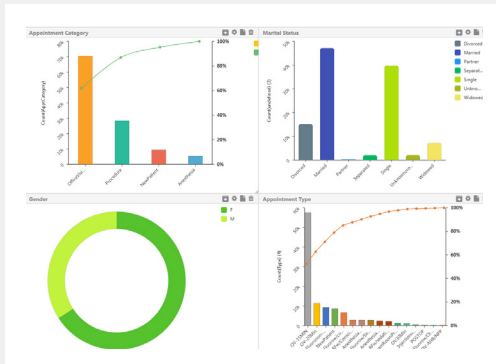


## PREDICTIVE ANALYTICS WITH MACHINE LEARNING

# 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**



### PROOF OF CONCEPT – POWERED BY ANALANCE

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



## LEVERAGING ML 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), 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 predictoroutcome 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
- Patients with a "separated" (33.91%) and "single" (33.1%) marital status
- Younger patients (39.31%) and students (34.84%)
- 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 is a trusted technology solutions provider that aims to empower Fortune 1000 companies through quality solutions and services. We work with organizations across various verticals to drive business outcomes and enhance their customer experience. Through our enterprise analytics platform, we build and manage data-driven digital platforms including business intelligence and advanced analytics solutions. We also offer a comprehensive services portfolio covering data management and cyber security to help clients stay ahead of the technology curve.

For more information please visit [www.analance.com](http://www.analance.com)

