



Research



Analysis



Healthcare

Machine Learning Powers Thoughtful and Streamlined Analysis

SPECIAL REPORT



Introduction

Machine learning (ML) is a powerful tool that can be used to open up a whole new world of data-driven perspectives. When added to qualitative research, teams can use ML to make better informed decisions.

State of the Industry

With the advent of ML, data scientists and analysts can now leverage algorithmically designed models to seek out answers to new questions and generate patterns of interest that were previously unobtainable.

Machine learning is also becoming simpler to use. Platforms are offering user-friendly interfaces, and overall, the systems are getting smarter. In some cases, companies can even go directly to the platform to get feedback on their data.

The Power of Models

At the heart of machine learning are models, built and trained from sets of data, enabling highly scalable approaches for enhanced analytics, data mining, or data science practices. Models provide the ability to look at the data and describe it; essentially, they tell the algorithm the shape of the data. This is captured inside of the system, which then provides information based on the model.

For example, when different pieces of study data are received, they can be described in a model. An algorithm is then selected to highlight different patterns. Since algorithms are unbiased, they become powerful tools in providing reliable analysis.

A Realistic Approach

The challenge as machine learning practitioners is to be realistic about how to best answer questions using the tools and techniques we have available. Specifically, are we able to get reliable results and make them useful for the constituents? Is the effort required worth the return on investment?

This is where Knowvanta and other market research companies come into play. Not only can we help clients determine if ML is a good option for them, but we can also ensure the data is fed to the algorithms in a way that is market-research aware.

For example, when data is fed to a machine, we expect to get results that compliment our hypothesis. If the algorithm produces data that is strongly correlated to our research, we gain confidence to proceed. If, however, the data doesn't match, we have our work cut out for us. In the event our results do not strongly align, there are a number of model adjustments to be made to ensure the results are meaningful and reassuring, giving us the information needed to make strategic business decisions.

Process

To use machine learning effectively, analysts follow a precise protocol. Although the details may vary from study to study, the process generally follows these steps:



Market research is done to collect a series of scores



A machine learning model is used to organize and predict the results



Classification algorithms are chosen to categorize the data



The information is analyzed in conjunction with the traditional summary analysis

CASE STUDY

Knowvanta was recently approached by a medium-sized pharmaceutical company that was preparing to launch a recently approved medication. They requested that Knowvanta conduct market research to determine which campaign message resonated most with potential customers.

Market Research Process

We began by conducting market research related to advertising materials. The materials were aimed at making patients aware of the benefits and availability of the new therapy. Respondents were shown the materials, and scores were collected based on their responses.

The marketing team's key question was: After seeing these materials, how likely are the respondents to ask their healthcare provider about this new medication? Traditionally, analysis would be done against the set of market research answers in order to quantify the likelihood using a series of opinions.



Do respondents understand the messaging?



Are there any barriers to asking?



Which statements are most motivating?

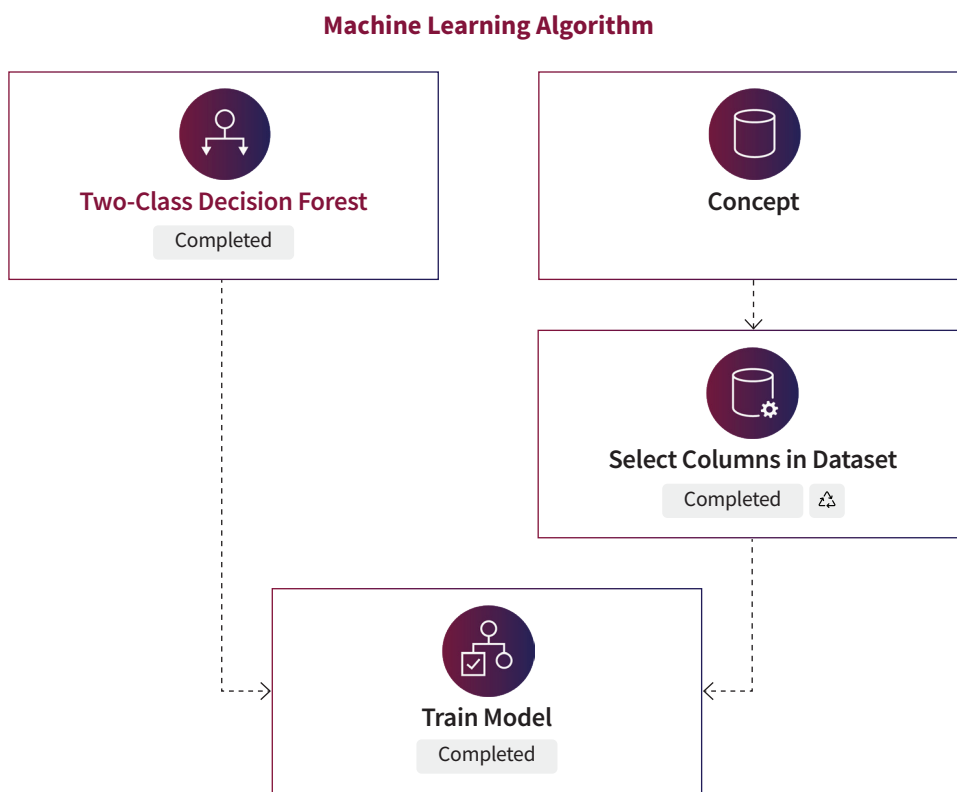
As market researchers, we raised an additional question: Can machine learning offer us some clues to better understand the likelihood of patients asking their healthcare provider about this new medication? We received approval from the project sponsor to build a machine learning model to help create an accurate prediction.

Classification Algorithms

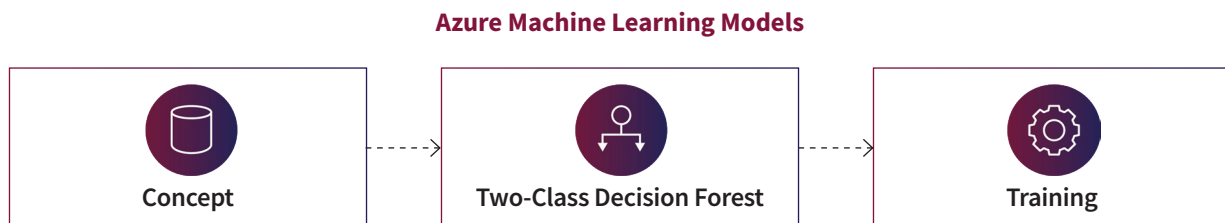
In order to build a compelling machine learning case, classification algorithms were chosen to best identify the respondents most likely to speak with their healthcare provider. By taking samples and then making a benchmark against which all new data is compared, the model can determine how far or close something is to the benchmark. The designations, in turn, would indicate to the team how well the messaging connected with the audience. This was done in conjunction with the traditional summary analysis.

Algorithm Options

Before we could proceed, we had to decide which algorithm was a good choice for the classification. We decided to use the Two-Class Decision Forest (TCDF) as our classification algorithm. Next, we had to think about the features available in the data to train the model. The following illustrates the way the algorithm was implemented.



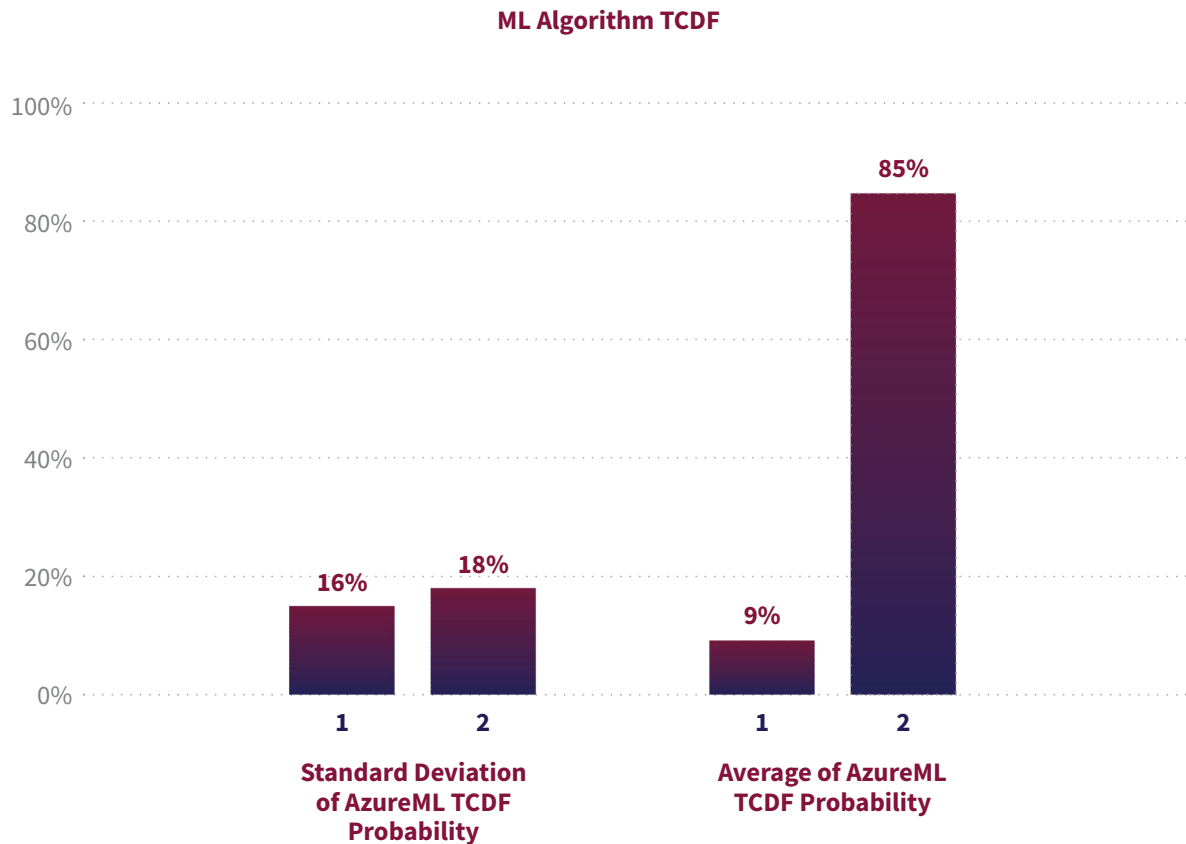
The diagram below shows the last step of implementation to get the results.



Once we had the analysis, we used a fixed scale to interpret the results. This fixed scale gave us a fairly good indication of the strength of the advertising component.

Since this data was structured and accurate, there wasn't much we needed to do in order to apply it to the machine learning design. We loaded the source data into the Azure Machine Learning Studio and assembled our training flow.

The results of the TCDF gave us valuable insight, reinforcing the research thesis.



Once the model was trained, we moved over to Power BI and began to create the visualization story necessary to prove the business case.

After connecting the machine learning model to the data, the next step was to see how the model performed when applied to the results. The Two-Class Decision Forest showed high confidence in determining which respondents were likely (group 1) or unlikely (group 2) to speak with their healthcare provider.

Case Study Conclusion

While we did not see agreement in the first iterations of the algorithm, this is okay, and in fact, welcome. Since the aim is for the team to look at the results and glean valuable information to make better decisions or to form accurate conclusions, the information provided the analyst with a sound base of results to accelerate the formation of conclusions. The other good news is the models generally agree, in the aggregate, with a few outliers in disagreement.

The results allowed the team to show empirical observations from a trained machine learning model, and with the use of clear visualizations, explain how running these models in parallel provided a sound supplemental result to their market research study. This enabled the marketing team to better understand the effectiveness of the advertising materials to motivate patients to seek out a conversation with their healthcare professional.

Conclusion

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When added to market research design, machine learning enables analysts to leverage all aspects of the data collected. This provides more reliable, unbiased results that business stakeholders can use to make informed decisions.



Knowvanta knows global healthcare and empowers companies with insights through research, cutting-edge analytics, and domain-specific enterprise software. Leveraging human expertise with AI and automation, we offer a deeper understanding of surveys and research results to drive better, more informed decision-making.