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PREDICTIVE ANALYTICS WITH MACHINE LEARNING
Predicting AIDS Fatality

Data Source :
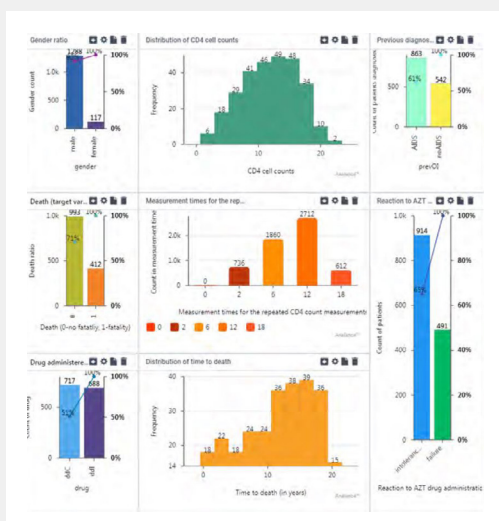Randomized Clinical Trial from joineR

Data Type :
Drug Trial Data

Application :
Analance

Analance

PROOF OF CONCEPT – POWERED BY ANALANCE

Today in the United States, about 1.1 million people are living with HIV and AIDS (Acquired Immunodeficiency Syndrome). And in 2016 alone, there were 15,807 related deaths.[1] To optimize treatment options and pathways, it's critical to get visibility into probable outcomes.

LEVERAGING ML
TO FORECAST OUTCOMES ACCURATELY

Analance used drug trial data to predict AIDS-related fatality among patients—with summaries and findings easy to explore through dashboards and reports.

By leveraging Analance machine learning (ML), patients can be classified into risk categories based on their probability of death and future outcomes can be predicted with accuracy as high as 91%. With built-in automations, alerts can be scheduled to notify healthcare professionals when patients are at risk of AIDS-related mortality. This allows providers to implement proactive measures and improve outcomes.

EXPLORATORY DATA AND MODELING PROCESS

With visibility into a patient's risk of fatality, providers can facilitate early detection, offer prompt treatment, or put measures in place to promote timely intervention.

Different predictor variables were considered such as gender, previous diagnosis of AIDS, reaction to AZT drug administration, observation time for repeated CD4 count measurements, 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 fatal outcomes.

DATA MODELING AND FINDINGS

A total of 50 different models were built but the Two-Class Adaptive Boosting Classification model was chosen as the winning model based on the model accuracy. From the analysis performed, the risk of fatal outcomes is linked to a number of variables:

- There is a risk of fatality regardless of the patient's gender.
- A lower CD4 cell count could indicate a higher risk of fatality.
- Reaction to the AZT drug (Total failure: 41.96%, Intolerance: 22.54%) is linked to fatality.

DATA ANALYSIS AND INSIGHTS

Gender doesn't seem to play a significant role in fatality risk. This is interesting to note, as the annual number of new HIV infections among females has decreased between 2010 and 2016. The number has remained stable among males though.[1] As for CD4 cell count, this is often associated with fatal outcomes. Research has shown that a higher CD4 cell count, which may indicate earlier treatment, is strongly linked with better survival. It also follows that adverse reactions to a treatment drug may be more strongly associated with mortality.

NEXT STEPS

Using this information, companies in the pharmaceutical sector can determine the right treatment pathway for patients. The treatment pathway with a low probability of death can then be prescribed to patients in an attempt to improve health outcomes.

SOURCES:

1. HIV.gov, "U.S Statistics"

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

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