

Who is at risk for cardiovascular disease?

A blood test that can save lives

A non-technical presentation

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Problem

- Cardiovascular diseases (CVDs) are highly prevalent globally
- CVDs are one of the main causes of death and disability
- The challenge is identifying those patients at early stages of CVD
- A significant number of patients with CVD are either undiagnosed, misdiagnosed, or diagnosed at late disease stage, putting them at an increased risk of morbidity and mortality.
- An urgent need for a convenient and reliable medical test that can be utilized to classify patients who are at risk of CVD.

Solutions

- Some blood biomarkers (i.e., plasma proteins) are elevated at early stages of CVD.
- These plasma proteins are still under considerable research as they are not very specific to a single CVD.
- Building a high-performance model that can use these plasma proteins levels with other features to predict patients with risk of CVD.

Important findings

- In predicting outcome 8, a highly reliable random forest model was built.
- The model performance was as follows
 - Accuracy = 89%
 - Recall = 89%
 - Precision = 90%.
- Plasma proteins 4, 1, and 5 are important predictors for risk of outcome 8.
- The final model also included other important features such as age, sex, and smoking status.
- A risk calculator was developed predicting the risk of CVDs

Next Steps

- This analysis needs to be repeated as a prospective multi-center study with a higher sample size.
- An external (unseen) test set need to be used for confirming the results.
- Plasma proteins levels should be continuously tracked over time in relation to the outcomes.
- A blood test kit needs to be manufactured to measure the proteins levels.
- CVD risk calculator can be uploaded online for public use or can be provided to clinics to be access only by healthcare practitioners.
- The patient can know his/her risk for cardiovascular diseases from a single blood test.