Cardiovascular Disease Predictor Application

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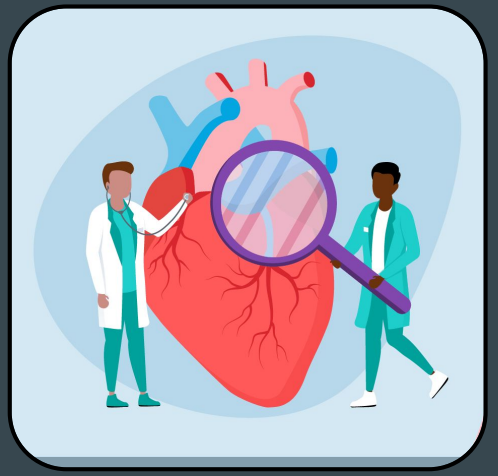
AIM



We aim to build a web application that uses ML to predict the presence of cardiovascular diseases. Our purpose is to allow clinicians to develop specialized preventative treatment plans for their patients.

Dataset

Resources:

1. [Cardiovascular_Disease_Dataset]: Focuses on identifying CAD.
2. [CDC Diabetes Health Indicators]: Focuses on the general presence of cardiovascular disease. Contains data on physical activity and several key predictors.
3. [Heart Attack Risk & Prediction Dataset In India]: Focuses on identifying HTN and Heart Attack Risk. Contains data on air quality and a rich variety of key predictors.
4. [Heart Disease]: Focuses on the general presence of cardiovascular disease. Contains data on physical activity and a rich variety of key predictors.
5. [Risk Factors for Cardiovascular Heart Disease]: Focuses on the general presence of cardiovascular disease. Contains data on several key predictors. Tracks 70,000 individuals.
6. [Two Year Hospital Admissions and Discharge Data from Hero DMC Heart Institute]: Contains data on the presence of diabetes mellitus, HTN, CAD, cardiomyopathy, and chronic kidney disease in patients. Contains a rich variety of key predictors, including lab parameters (such as hemoglobin, glucose, and creatinine levels). Tracks 12,238 individuals. **We selected this dataset since it best suited our requirements.**

Demo

Conclusion

We used classical algorithms and deep learning to predict heart diseases

1. Predict whether a sample has heart diseases
2. Predict the type of heart disease present in the sample. Current diseases that can be predicted are: HYPERTENSION, CORONARY ARTERY DISEASE, CARDIOMYOPATHY, HEART FAILURE, CONGENITAL HEART DISEASE'

Classical algorithm:

KNN highest accurate 74.02%

Deep learning algorithm:

180 epochs highest accurate 80.09% on model 1 and 9.% on model 2

Future

Road to Minimum Viable Product:

- Continue to improve model
- Have the application report the degree certainty of the predictions.

Additional Improvements:

- Add additional features to the application, including:
  - Loading results from previous samples
  - Creating profiles for patients
  - Updating the user interface to appear more modern (potentially using Bootstrap)

References

Research Publications:

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Gao, W., Sanna, M., Chen, Y. Occupational Sitting Time, Leisure Physical Activity, and All-Cause and Cardiovascular Disease Mortality. JAMA Netw Open (2024). 7(1):e2350680. doi:10.1001/jamanetworkopen.2023.50680

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