

Dynamic Cardiovascular Disease Analysis: Unveiling Insights Through Interactive Big Data Visualization

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1. Introduction

The human heart is crucial for life, yet cardiovascular disease (CVD) remains the leading cause of global mortality. CVD encompasses a range of conditions affecting the heart and blood vessels, including coronary heart disease, stroke, and peripheral arterial disease. It accounts for over 17.5 million deaths annually, projected to rise to 23.6 million by 2030 (Shangzu et al., 2022). Despite its prevalence, public awareness about CVD is low, especially among young women (Gooding et al., 2019).

The public's knowledge and awareness of CVD can be improved by utilizing big data and data visualization. This project aims to create an interactive dashboard using Microsoft Power BI to visualize data the dataset on Kaggle, evaluate user acceptance through the Technology Acceptance Model (TAM), and ultimately increase public awareness about CVD. By transforming complex data into intuitive visual formats, we aim to inform the public about CVD risk factors, symptoms, and preventive measures, promoting healthier lifestyles and potentially saving lives.

2. Methodology

The methodology for this project involves five key phases: preliminary study, analysis, design, development, and testing. In the preliminary study phase, the project's foundation is established by discussing the title, objectives, and scope, and reviewing

related literature. The analysis phase focuses on gathering relevant information to identify suitable data visualization techniques and software requirements.

In the design phase, the data model and dashboard layout are created using Draw.io and Balsamiq. The development phase involves building the data warehouse with Apache Hive, cleaning data with Python, and creating visualizations with Microsoft Power BI. The testing phase evaluates user acceptance using the Technology Acceptance Model with 30 public respondents.

3. Results & Discussion

The TAM questionnaire results reveal that the project dashboard well-received by users. A high mean score of 4.61 for Perceived Ease of Use indicates the dashboard is user-friendly and easy to navigate. The highest score, 4.73, for Perceived Usefulness, shows users find the dashboard extremely beneficial for managing cardiovascular health and raising awareness. Users' positive attitudes are reflected in the 4.63 mean score for Attitude Towards Using, indicating satisfaction with its features. The 4.58 score for Intention to Use suggests strong future usage intent, though there's room for improvement. The overall mean score of 4.64 highlights the dashboard's effectiveness and user approval. Continuous updates and user-centered design can further enhance its value. Table 1 shows the overview of overall mean and mean for each section of the TAM questionnaire.

Section	Mean
Perceived Ease of Use (PEU)	4.61
Perceived Usefulness (PU)	4.73
Attitude towards Using (ATT)	4.63
Intention to Use (ITU)	4.58
Overall Mean Score for All Section	4.64

Table 1. Overall Mean of TAM

4. Conclusion

Overall, the project dashboard that was created with Microsoft Power BI efficiently displays and examines data related to cardiovascular health. The project's objectives were met with the aid of favourable user feedback and appropriate visualizations, providing a solid basis for upcoming developments in the analysis and prevention of cardiovascular disease.

References

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