INFOMGMT 399 Information and Technology Management

Capstone Course Project

Title: Visualizing wearable data for remote health monitoring

Background:

Describe the importance/significance of the proposed project. Provide some justification as well if you find it necessary.

The field of data visualization has been around for a very long time. However, advances in technology and the advent of the big data era have brought renewed focus on data visualization as it offers the best medium for highlighting patterns and revealing insights from large datasets.

When collected, processed and analysed in a timely manner health and fitness data become critical tools to the health system in general and to physicians in particular as they can unlock information about patients' conditions so that diagnoses can be revealed more accurately and treatments can be started more effectively.

This project aims to create visualizations of health and fitness data from wearable devices in the form of smartwatches and activity trackers like Fitbit, Apple watch and the like.

Description:

What is the problem the project will address? Describe the situation that creates the problem and state the questions/issues for which a solution is to be provided.

In recent years, we have been witnessing the increasing availability of access to digitally-enabled care environments as digital technologies permeate almost every aspect of our lives. We use various devices and technologies, including wearables, social networks, and mobile applications, to track health and wellness.

Access to and availability of technology motivates us to take control of our health and value self-determination to achieve better health. Wearable technology in the form of smartwatches and activity trackers can enable cost-effective and innovative opportunities for remote and often real-time monitoring of health data by clinicians.

Tracking and monitoring enable the collection and storage of health data. Adding visualization techniques results in wearable data being more easily presented, described and understood by clinicians and individuals.

Objectives:

State 3 or 4 specific objectives defined as the scope of the project, doable in one semester (14 weeks)

- To design a software application with different dashboard interfaces for individuals/clinicians to get the visual representations of health data
- To pull data from a particular dataset based on the input received and display the data, which is easy to comprehend.
- To create an email alert feature for notifications.
- To visualize wearable data at different time points: weekly/monthly/ last 3-months

Artefact:

The team will create a software application that displays dashboards to visualize the digital biomarkers to provide clinicians/individuals with an understanding of their health and give other researchers the tools to develop remote health monitoring applications.

The app must retrieve each individual's data from a database and display the same in an informative manner. The key emphasis of this project is to understand how to use technology and data to improve access to health data.

Required skills:

The team can use any graphics and windowing toolkit or use any visualization toolkit available online. However, being a software project the team must develop the necessary code for user interface design. The app must go beyond using existing software such as Excel, Tableau, Spotfire, Illustrator, etc., to create the visualizations for the project.

Recommended sources of information:

- Frink, T. M., Gyllinsky, J. V., & Mankodiya, K. (2017, November). Visualization of multidimensional clinical data from wearables on the web and on apps. In 2017 IEEE MIT Undergraduate Research Technology Conference (URTC) (pp. 1-4). IEEE.
- Angelides, M. C., Wilson, L. A. C., & Echeverría, P. L. B. (2018). Wearable data analysis, visualisation and recommendations on the go using android middleware. Multimedia Tools and Applications, 77(20), 26397-26448.
- https://onlinemasters.ohio.edu/blog/benefits-of-data-visualization/
- https://uxdesign.cc/using-your-fitbit-to-visualize-your-pandemic-d0e7def15215
- https://healthinformatics.uic.edu/blog/health-data-visualization/
- Ko, I., & Chang, H. (2017). Interactive visualization of healthcare data using tableau. Healthcare informatics research, 23(4), 349-354.

Knowledge requirements:

- **Academic courses** *(prior courses students should have taken)*

  Courses on
  - Statistics
  - Database management
- **Programming languages** *(Programming languages to be used for the project)*

  Languages such as HTML/PHP/Python/Java/Javascript supporting Web/Mobile development.

- **Software packages** *(list of software programs recommended)*
  - Excel
  - Java
  - Android studio
  - Online No-code/Low-code platforms

Further advise specific to this project: