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Heart Attack Prediction App Business Requirements

To create a heart attack prediction tool that can provide healthcare professionals with an additional tool in their arsenal to help assess patients' risk of heart attack based on vitals that are already being collected and logged in our hospital will require the following things:

- Data -cleaned and organized
- Algorithm – selected for suitability and accuracy
- Model Testing and Validation
- App Development
- Product Testing
- Final Roll Out

Objectives

Enhance patient outcomes and provide an effective and efficient tool for our healthcare staff to assess heart attack risk better. Improve efficiency and confidence in diagnosis.

Product Scope

The heart attack prediction app will be a simple program with an input interface allowing healthcare workers to input freshly taken vitals and receive a prediction. Additionally, a Jupyter notebook with various data displays demonstrating the model's predictive efficacy will be created so our staff can feel confident when using the tool.

Current Gaps Which This Product Addresses

Currently, our staff relies on their training and personal experience when interacting with patients. While we have a highly skilled staff, decision fatigue and possible gaps in experience may lead to an inaccurate risk profile. Additionally, developing this app will ensure everyone is using the same tools and taking all the same vitals, adding an additional check to ensure something is not missed during the initial patient assessment.

Key Requirements

- Functional Requirements
  Data input: users must be able to enter data
  Prediction: the app must give a judgment based on input
  Accuracy: the model must provide an accurate prediction. Ideally, this would be greater than 80%
- Non-functional Requirements
  Usability: needs to be easy to use with minimal training requirements
  Performance: needs to be responsive and quick to use
- Data Requirements
  Data on patients' vitals that are correlated to heart attack risk

Change Management

It is important to remember that every change requires change management. Feedback will be gathered from the healthcare staff during the testing phase. Additionally, the help desk will be properly trained and staffed during roll-out to ensure a smooth integration of this new tool.

Resource Costs

Python is open source, and our staff already uses the IDEs that will be used during development, so there is no cost associated with that. However, it is recommended that an additional resource be added to the help desk with an estimated salary of 50,000. Additionally, it will tie up two programmers for ten weeks and our data scientist for at least two weeks, so that cost is approximately 32,000 worth of their salaries since we are diverting them from any other projects that might come up this cost is primarily an opportunity cost but still needs to be noted. Lunches will also be provided for each healthcare team when the initial presentation of the new tool is pitched. Additional training sessions will be held once the final product is launched. Catering and training costs for this are estimated at 8,000. Total estimated cost: 90,000

Validation and Verification

The product will be validated using the following methods. Model validation: A confusion matrix, ROC curve, and heat map are used to demonstrate that the health markers are, in fact, correlated and can be used as predictive factors for health attacks. Internal Testing: our healthcare stall will begin using the app in a staggered rollout allowing for feedback and monitoring of individual teams before the full launch. Ongoing user feedback: All users are encouraged to continue offering suggestions on how to improve the product.

Timeline

Project time: 10 weeks

Milestone 1: Data Collection (1 Week)
Tasks: Data collection, cleaning, and preparation.
Dependencies: Data must be available.
Resource: Data Scientist.
Dates: 9/30 – 10/4.

Milestone 2: Model Development and Initial Testing (1 Week)
Tasks: Develop and test the KNN model (with possible consideration of other algorithms); print accuracy scores and create data visualizations.
Dependencies: Clean data must be available.
Resource: Data Scientist.
Dates: 10/7 – 10/11.

Milestone 3: GUI Design (3 Weeks)
Tasks: Design the GUI, test for bugs, and implement full functionality.
Dependencies: A trained model that can accept input and make predictions.
Resources: Software Engineers, App Testers, QA Team.
Dates: 10/14 – 11/1.

Milestone 4: Product Validation (3 Weeks)
Tasks: Validate the product through use and feedback from internal medical practitioners.
Dependencies: A working application, training documentation for healthcare staff, and tech support for setup if necessary.
Resources: Help Desk, Healthcare Workers.
Dates: 11/4 – 11/22.

Milestone 5: Final Launch (2 Weeks)
Tasks: Incorporate feedback from the validation phase, finalize the product, and roll out the final version.
Dependencies: Feedback from initial testing.
Resources: Software Engineers.
Dates: 11/25 – 12/6.