EVAREWIEW

Project Specifications Document

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Project Repository Link: https://github.com/PelinalWS/CMPE_491

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Document Revision History

Version	Date	Ammendment
1.0	25.10.2024	Initial Document

1. Introduction

The main focus of this project is to provide the target users, who are primarily medical professionals, with a system that will streamline access and recording of surgical data and increase survival rates of the patients. By the use of deep learning on tomography data, oncoming patients' surgery process will be reviewed based on multiple factors such as feasibility, odds of mortality and suggestions for the procedure. This utility will be accessed through a web based portal application that will hold the relevant data about the patient with a database. This project is aimed to decentralize the processes that are taken before EVAR surgeries and streamlining the ways of accessing the relevant data.

1.1. Description

EVAR is a surgical technique that is used to treat aneurysms by entering the body through an incision in the groin area and directing a stent graft from inside the blood vessels. EVAR might have many different types or names depending on the modifications on the surgical tools or the body region that is targeted but the core part is the "Endovascular Aneurysm Repair".

The operation has many factors that are to be considered, the main aspects are vein widths, balloon volume, and the angles for the veins that the stent graft should travel through. The utility that this project will provide through a portal service to the user base will be the capability to consult an AI model to ascertain the surgery's feasibility and certain suggestions that can be implemented into the surgery process.

One possible suggestion is to provide a distance of a certain length from a certain point and describe the position that the stent graft should be placed in order to maximize the aneurysm's shrinking.

This utility will be a part of a web application that will allow for the doctors to have dedicated pages for the patients that can also record and store relevant information that will streamline reviewing processes before or after

consultations or surgeries. A main intended use of this application would be that the data is organized with options to toggle cluttering parts of the reviewing pages.

Doctors that have access to the patient's information may provide their team with viewing or editing access. In cases that there are incorrect edits, the editors or the original doctor would be able to revert the changes. Following are some of the deliverables:

- Login page for medical personnel
- Patient portal which will include medical history, current medications and allergies
- Order management for imaging, lab tests
- Comprehensive decision support tool for surgeries
- Communication panel with other personnels for coordination

1.2. Constraints

- Different user roles (e.g.,admin, responsible surgeon, attending doctors) need distinct access rights to minimize data exposure.
- Given the critical nature of healthcare, the system must maintain a high uptime, at 99.9% or more.
- Backup and recovery mechanisms must be in place to prevent data loss in case of system failure.
- For any data used in research or analytics, patient information should be anonymized to protect identity.
- The system should handle a large number of simultaneous users without slowing down, especially during peak usage hours.

1.3. Professional and Ethical Issues

- **Quality Assurance for Algorithms and Data Models:** If using algorithms that assist in diagnosis or treatment planning, engineers must continually assess and validate the models to prevent harmful inaccuracies.

- **User-Centered Design and Testing:** Failure to prioritize usability in medical settings can lead to user frustration, misuse of the system, or even medical errors. Engineers should engage in continuous testing, particularly with real-world users like healthcare staff.
- **Usage of AI as Decision Tool:** Medical personnel may benefit from decision tools, however the software should include disclaimers to prevent reliance on software as a substitute for professional medical judgment.
- **Building Transparent Error Reporting:** Designing an easy-to-use error reporting mechanism within the software can help users communicate issues quickly, encouraging transparency and improvement.

2. Requirements

- Python
- OpenCV
- TensorFlow
- Javascript
- HTML, CSS
- MySQL

3. References

- https://www.ieee.org/about/corporate/governance/p7-8.html
- https://www.acm.org/code-of-ethics