Deployment Plan

# Overview

The purpose of this application is to save radiologists time while providing the best possible treatments to patients. Medical imaging is a technique through which radiologists are able to view the interior of the body and diagnose the patient based on what they have observed (MedlinePlus, 2019). The average radiologists observed (at least in 2017) approximately 20 to 100 scans a day, with each scan containing multiple images for review (Silverman, 2017). The use of DICOM files to make predictions will place the software application in a position where it must also ensure it meets the HIPAA compliance requirements regarding Personal Health Information (PHI) (Crotti, 2020). Once the software meets the HIPAA requirements for PHI, then hospitals will be able to use the software safely.

Installing the software will be done by downloading an executable file that can be found at a public Github page. As the application can be downloaded on any site, it provides administrators with the ability to distribute the application to all computers simultaneously. For future iterations, as the use of EHR systems increase, the software application will be an application developed within an EHR system such as EPIC (Evans, 2016).

# Assumptions, Dependencies, Constraints

A lack of HIPAA compliance may be the biggest factor in delays to deployment. Before a product can be HIPAA compliant, multiple investigations must be conducted (Crotti, 2020). Running the risk of not securing the data may lead to not only investigations, but also possible loss of business and lawsuits (Crotti, 2020). Second to this, is the accuracy of the machine learning model. The daily rate of misdiagnosis caused by either systems or humans in radiology is between 3%-5% daily (Brady, 2016). To mitigate this, the model will have an accuracy upon its test of at least 95% with the goal (in terms of accuracy) being 98%. The third factor that may affect deployment is the popularity of EHR systems. As demand for standardization rises in hospitals, so does the need of EHR systems that not only neatly displays data, but also allows for ease download and transfer to other hospitals (Evans, 2016). Besides these three factors, the application should be ready for deployment.

# Operational Readiness

Testing model predictions with regressive data in conjunction with comparison between models will be the main form of assessing deployment readiness. As spoken before, the model must be fully trained and saved before making the Graphical User Interface (GUI) into an executable file. This is because without the predictions, the entire software application itself becomes useless. One can also assess readiness based on the current market for offline medical software applications. Many locations within hospitals do not have wireless internet capabilities due to the noise and disturbance it may cause when in use with other medical devices, therefore offline GUIs are popular to use even today (Concordia University, 2015).

# Data Conversion

The conversion of data will be based on the GUI itself. The user will first load the paths to the DICOM files that he or she wishes to diagnose, then the GUI application will begin extracting the DICOM data that it requires to make prediction and plot some charts. Once the main dashboard of the GUI is loaded, the user will be able to download a csv containing an array of the image used together with the patient metadata at the click of a button. Within the csv, will be a set of probabilities regarding whether the image should be classified as benign or malignant.

# Phased Rollout

The first phase of the rollout will consist of a free version of the software without the ability to download the full report. Only the patient ID and predicted classification columns will be downloaded for the radiologist to update the diagnosis on his images. The second phase will include a purchasable and updated version that will allow the radiologist to download the complete report displayed within the application. Depending on the popularity of EHR systems, a port containing similar functionality to the offline application will be introduced as an extension for the EHR system.

# Support

Support will be provided through online documentation within the desired website. The documentation will provide a guide on how to use the application while a dedicated email address will be provided for the sake of allowing interaction between hospitals and the company. In a future phase, a forum will be built that would allow users to comment on the issues that they may be encountering.

# Release Planning

The first release will be considered as version 1.0. Any version before this release will be considered beta or experimental and only recommended for experimentation and feedback. After version 1.0, the product will be provided with both a free version and a paid version. In the case that the paid version does not reach targets, then a price range will be set in place while extending the ability for the user to extract more data from the DICOM file.

# Bibliography

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