Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	11 May 2023
Team ID	NM2023TMID19325
Project Name	Cancer-Vision: Advanced Breast Cancer Prediction with Deep Learning.

Technical Architecture:

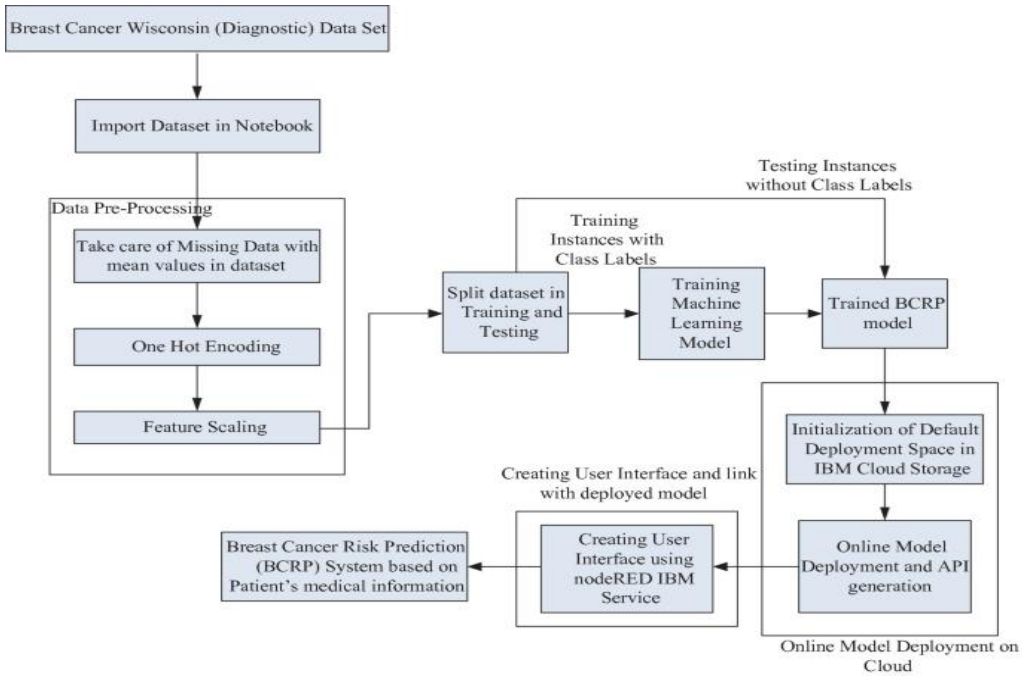

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Data collection	The first step in building an effective predictive model is to gather high-quality data. This data can come from a variety of sources, including electronic health records, medical imaging, pathology reports, and patient-reported outcomes.	Electronic health records (EHRs), Medical imaging technologies
2.	Data pre-processing	Once the data has been collected, it needs to be cleaned and pre-processed to ensure that it is in a format that can be used by the predictive model. This can involve tasks such as removing duplicates, handling missing values, and standardizing data formats.	Microsoft Excel and OpenRefine
3.	Feature extraction	To build an effective predictive model, it is important to identify the most relevant features or variables that are most predictive of breast cancer. This can involve using techniques such as principal component analysis or feature selection algorithms.	Principal component analysis (PCA) and Mutual information
4.	Deep learning architecture	A deep learning architecture, such as a convolutional neural network (CNN), is used to learn the patterns and relationships between the features and breast cancer diagnosis. The CNN consists of multiple layers that progressively learn more complex features and relationships.	Deep learning frameworks such as TensorFlow, PyTorch, and Keras

5.	Model training	The deep learning model is trained on a large dataset of breast cancer cases and healthy controls. The training process involves iteratively adjusting the model's weights and biases to minimize the difference between predicted and actual outcomes.	GPUs (graphics processing units), cloud computing platforms such as Amazon Web Services (AWS) and Microsoft Azure, and deep learning frameworks.
6.	Model evaluation	The trained model is then evaluated on a separate set of data to determine how well it performs in predicting breast cancer diagnosis. This evaluation is critical to ensure that the model is accurate and reliable.	Scikit-learn, TensorFlow, and Keras
7.	Prediction and decision support	Once the model has been trained and evaluated, it can be used to make predictions about breast cancer diagnosis and treatment. This information can be used by healthcare professionals to make informed decisions about patient care.	Web-based platforms and application programming interfaces (APIs)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Accurate Predictions	Cancer-Vision uses deep learning algorithms to analyze various factors such as age, medical history, and genetic markers to accurately predict the likelihood of advanced breast cancer in patients. The application's accuracy is continually improved by learning from new data.	Convolutional Neural Networks , Drop out, Transfer Learning.
2.	User-Friendly Interface	The application features a user-friendly interface that allows medical professionals to input patient data and obtain predictions quickly and easily.	HTML, CSS, JavaScript, RESTful API.

S.No	Characteristics	Description	Technology
3.	Security	Given the sensitive nature of patient data, Cancer-Vision employs strict security measures to ensure that patient information is kept confidential and secure.	Encryption, Access Controls, Two-Factor Authentication.
4.	Customizability	Cancer-Vision is customizable to suit the needs of different medical institutions. The application can be tailored to specific patient populations, and its algorithms can be fine-tuned based on local data and expertise.	Open-source Software, Configurable Parameters, Modular Architecture.
5.	Continuous Improvement	The application is designed to learn from new data, which means that its accuracy and effectiveness will continue to improve over time.	Machine Learning Frameworks, Cloud Computing, Automated Testing.