**MIT School of Engineering**

**Department of Computer Science and Engineering**

**Project Synopsis**

**Group ID: 07**

**Project Title: Cancer detection using Machine Learning**

**Group Members:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Enrollment Number** | **Roll Number** | **Name of student** | **Email Id** | **Contact Number** |
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**Problem Statement:**

Addressing the challenge of early cancer detection, this project aims to develop a web-based solution that leverages machine learning algorithms to effectively analyze cancer datasets, evaluate algorithmic performance, and provide interpretable insights, thereby enhancing diagnostic accuracy and facilitating timely intervention.

**Abstract:**

In today’s fast world of fast answers, we always tend to optimize our everyday life to be as efficient as possible. The medical field has not been behind in adopting newer technologies to aid researchers in finding new diseases, diagnosing patients, and helping doctors during surgeries. Machine Learning is being increasingly employed to diagnose various diseases and aid consulting doctors. Cancer is a fatal illness often caused by genetic disorder aggregation and a variety of pathological changes. Cancer, also known as tumor, must be quickly and correctly detected in the initial stage to identify what might be beneficial for its cure. An increasing array of tools is being developed using artificial intelligence (AI) and machine learning (ML) for cancer imaging. The development of an optimal tool requires multidisciplinary engagement to ensure that the appropriate use case is met, as well as to undertake robust development and testing prior to its adoption into healthcare systems.

Additionally, Explainable AI contributes to the ongoing dialogue surrounding ethical considerations in healthcare AI implementation. By shedding light on the decision-making process of machine learning models, XAI helps address concerns related to bias, fairness, and accountability. Healthcare professionals can assess the reliability and fairness of AI-driven diagnoses, ensuring equitable treatment for all patients.

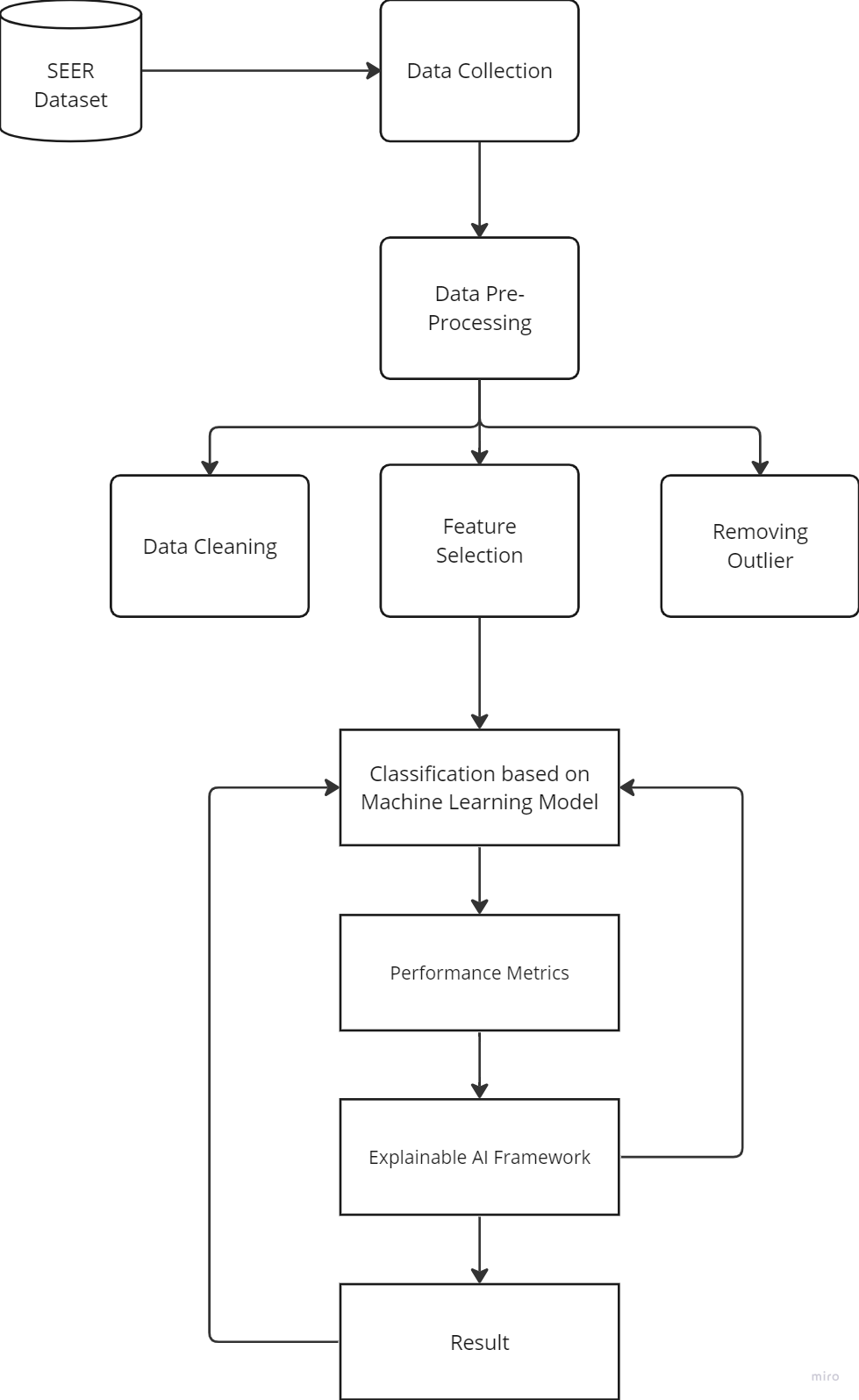
Furthermore, Explainable AI facilitates continuous learning and improvement in medical AI systems. Through transparent model explanations, healthcare providers can identify areas for refinement and optimization, enhancing the overall efficacy and reliability of AI-assisted diagnostics and treatment planning. This iterative feedback loop fosters a culture of continuous improvement and innovation in healthcare AI, ultimately benefiting patient care and outcomes.

In summary, Explainable AI represents a pivotal advancement in the integration of machine learning technologies into healthcare systems, particularly in the domain of cancer diagnosis and imaging. By promoting transparency, trust, and collaboration, XAI empowers healthcare professionals to harness the full potential of AI while ensuring patient safety and well-being.

**Literature Survey:**

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| Serial number | Name of the paper | Authors | Remarks |
| 1. | Breast Cancer Detection Using Machine Learning Algorithms," 2018 International Conference on Computational Techniques, Electronics and Mechanical Systems (CTEMS) | S. Sharma, A. Aggarwal and T. Choudhury | The Wisconsin Diagnosis Breast Cancer data set was used as a training set to compare the performance of the various machine learning techniques in terms of key parameters such as accuracy, and precision. |
| 2. | Comparative analysis of breast cancer detection using machine learning and biosensors | Yash Amethiya, Prince Pipariya, Shlok Patel, Manan Shah | The objective of this review was to present several approaches to investigate the application of multiple algorithms based on machine learning (ML) approach and biosensors for early breast cancer detection. |
| 3. | Accuracy Assessment of Machine Learning Algorithms Used to Predict Breast Cancer | [Ahmed Ahmed, Hesham Sedky](https://sciprofiles.com/profile/2675759?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_name),  [Saleh Mesbah](https://sciprofiles.com/profile/1782262?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_name) | Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without being explicitly programmed. Learning algorithms in many applications |

**Proposed System (Block Diagram):**



**Conclusion:**

In this project, we undertook a comprehensive examination of various machine learning algorithms using cancer diagnosis datasets. The objective was to determine the most effective algorithm for enhancing the accuracy and reliability of cancer diagnoses. Through rigorous analysis, we shed light on the strengths and weaknesses of different approaches, ultimately providing valuable insights for healthcare professionals and the broader medical community.

We demonstrated that certain algorithms exhibit superior performance in terms of accuracy, reliability, and generalization, offering the promise of more timely and precise diagnoses.

Explainable AI has helped us to measure the weights and biases of each Machine Learning algorithm. This will help researchers and developers to model and select better machine learning algorithms. It improves the decision-making process of the algorithms.

**References:**

<https://www.mdpi.com/2306-5729/8/2/35>

<https://www.sciencedirect.com/science/article/pii/S2667102621000887>

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