Annexure -1

**Synopsis for Minor Project-I**

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| **Title Of Project: Predictive Model for Heart Failure** |
| **Synopsis:**  **Introduction:**  Heart failure is a severe illness that affects millions of individuals globally. Early identification and management can dramatically improve patient outcomes and lower death rates. This study seeks to create a prediction model for heart failure using machine learning techniques. The algorithm will analyse patient health parameters to identify at-risk individuals, allowing for early and targeted medical intervention.  **Objective:**  The project involves processing and cleaning the heart failure dataset to make it suitable for analysis. Next, exploratory data analysis will be conducted to discover key predictors of heart failure from various health metrics. Multiple machine learning models will be created and tested to find the most accurate one. Finally, the best-performing model will be deployed as a web application using Flask for real-time predictions.  **H/W and S/W Requirement:**  **Hardware**:   * A computer equipped with at least 8GB of RAM and 500GB of storage.   **Software:**   * Operating System: Windows, macOS, or Linux. * Development Environment: Jupyter Notebook, any Python IDE (e.g., PyCharm, VS Code)   **Language Used:**   * Python * Libraries: Pandas, NumPy, Scikit-learn, Matplotlib, Seaborn, Flask   **Methodology:**   1. **Data Collection and Preprocessing:**    * Data Source: Obtain a publicly available heart failure dataset.    * Data Cleaning: Handle missing values, remove duplicates, and ensure data consistency. 2. **Exploratory Data Analysis (EDA):**  * Data Visualization: Use histograms, box plots, and scatter plots to understand data distributions and identify outliers. * Correlation Analysis: Compute correlation matrices to identify relationships between features and the target variable.  1. **Model Development:**  * Model Selection: Experiment with different machine learning algorithms such as Logistic Regression, Linear Regression ,Decision Trees, Random Forest, * Training and Validation: Split the dataset into training and validation sets. Train models using the training set and evaluate their performance on the validation set.   **Limitation:**   * The quality and amount of the dataset have a significant impact on the model's accuracy. * The prediction model may not perform well with fresh, previously unknown data outside of the training sample. * The model's predictions are based on probability and should not be used to substitute expert medical advice.   **Conclusion**:  The Predictive Model for Heart Failure research offers an important tool for early identification and prevention of heart failure. Healthcare practitioners may use machine learning to make educated decisions based on data insights. The successful deployment of this model as a web application illustrates its clinical value, with the potential to save lives through immediate medical intervention. |

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| **Group No: 13** | |
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