Division of Work and Responsibilities

The project is structured as an interdisciplinary collaboration between the Artificial Intelligence / Engineering team and the Medical (MBBS) team, ensuring both technical rigor and clinical validity.

1. Artificial Intelligence / Engineering Team Responsibilities

The AI team is responsible for all computational, system design, and implementation aspects of the project.

Key responsibilities include**:**

1. Designing and implementing the deep learning architecture (CNN / CNN-Transformer) for multi-label ECG classification
2. Developing the ECG preprocessing pipeline (noise filtering, baseline correction, normalization, lead alignment)
3. Preparing and managing ECG datasets for training, validation, and testing
4. Implementing the multi-label learning framework using sigmoid outputs and binary cross-entropy loss
5. Evaluating model performance using appropriate metrics (AUROC, sensitivity, specificity, precision-recall)
6. Designing and implementing the clinical ontology structure (Ontology_v1.0) and maintaining ontology files (labels.csv, ontology.json)
7. Implementing the rules engine and triage logic defined by clinical experts
8. Integrating AI outputs, ontology constraints, rules, and patient history into the decision fusion module
9. Developing explainability components to present model predictions and reasoning clearly
10. Writing the technical sections of the research paper (Methods, Model Architecture, Experimental Setup, Results)
11. Creating system architecture diagrams and technical figures for publication

2. Medical (MBBS) Team Responsibilities

The medical team provides clinical expertise, validation, and interpretation to ensure medical correctness and real-world relevance.

Key responsibilities include:

1. Defining clinically accurate ECG label definitions and validating ontology hierarchy (parent–child relationships)

2. Assigning triage priority levels (Tier 1, Tier 2, Tier 3) to ECG conditions with clinical justification

3. Designing and validating clinical rules (mutual exclusion, precedence, derived diagnoses) used in the rules engine

4. Reviewing and validating ECG dataset annotations, particularly for atrial fibrillation and orthostatic hypotension

5. Defining patient history variables and symptom-based decision logic used in the history module

6. Ensuring alignment of diagnoses and triage decisions with established clinical guidelines (AHA / ESC)

7. Interpreting model outputs from a clinical perspective and providing feedback for refinement

8. Writing or reviewing the clinical interpretation, discussion, limitations, and future work sections of the research paper

9. Assisting in evaluating the clinical usefulness and safety of the proposed system

3. Joint Responsibilities

Certain tasks require close collaboration between both teams.

Joint responsibilities include:

1. Final validation of ontology structure and rules before model evaluation
2. Reviewing system outputs to ensure both technical accuracy and clinical plausibility
3. Interpreting experimental results and refining decision logic
4. Preparing the final manuscript for submission, including figures, tables, and conclusions
5. Discussing ethical considerations, limitations, and future scalability of the system.