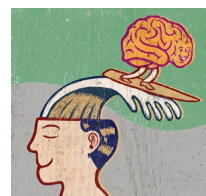


SeizureScoreAI: Multi-Agent Clinical Reasoning System

Vineet Reddy



BRAIN
MODULATION
LAB
MASS GENERAL
NEUROSURGERY

- **Objective:** Simulate epileptologists' clinical reasoning to assign ILAE (International League Against Epilepsy) outcome scores after epilepsy surgery.
- **Core Function:** Automates interpretation of clinical notes using a multi-agent system driven by Large Language Models (LLMs).
- **Relevance:** Streamlines decision-making, ensuring reproducibility and transparency in outcome reporting.
- **Adaptability:** While the system is tuned to generate ILAE scores, it can be fully adapted to generate Engel scores instead.

ILAE Outcome Scale

Class 1: Completely seizure free; no auras

Class 2: Only auras; no other seizures

Class 3: 1 to 3 seizure days per year; \pm auras

Class 4: 4 seizure days per year to 50% reduction of baseline seizure days; \pm auras

Class 5: Less than 50% reduction of baseline seizure days; \pm auras

Class 6: More than 100% increase of baseline seizure days; \pm auras

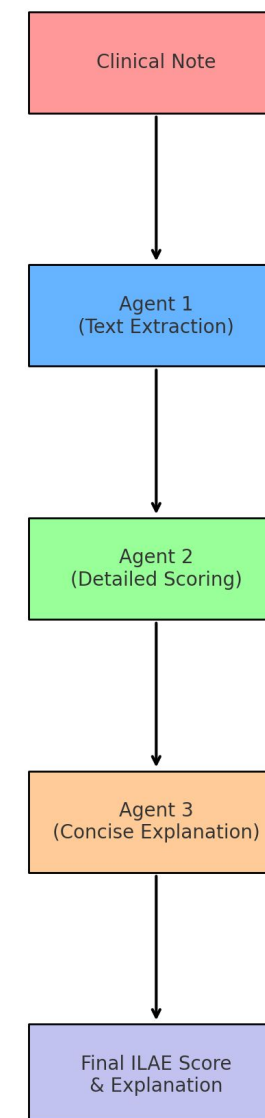
3-Agent System:

1. **Clinical Information Extractor:**
 - Identifies key data from clinical notes:
 - **Seizure recurrence**
 - **Aura presence**
 - **Baseline vs. post-operative seizure frequency**
2. **ILAE Score Calculator:**
 - Implements ILAE-defined scoring criteria:
 - Incorporates nuanced clinical reasoning for score determination.
3. **Concise Reporter:**
 - Generates user-friendly summaries:
 - **Final ILAE score.**
 - Key influencing factors from clinical note text.
 - Clinical logic supporting the result.

Workflow:

1. **Input:** Operative clinical notes.
2. **Processing:** Extraction → Classification → Scoring.
3. **Output:** Transparent, structured score reports and explanations.

SeizureScoreAI Clinical Note Processing



Features

- **Epileptology-Specific:** Tailored for seizure outcomes and ILAE scoring.
- **Streamlit Frontend:** Easy-to-use portal for efficient clinical note processing.
- **Backend:** Advanced multi-agent LLM pipeline for structured data analysis. Can be used to loop through thousands of clinical notes with inexpensive API costs.
- **Outputs:** Provides JSON-formatted reasoning consistent with ILAE guidelines.

Limitations

- **Not HIPAA-Compliant:** Avoid using protected health information (PHI) until future updates.
- **Assists, Not Replaces:** Complements expert judgment but does not substitute it.

Get Involved

- **Explore:** Visit the [GitHub Repository](#) for more details.
- **Collaborate:** Help refine this epilepsy-focused AI system!

This project builds upon an original AI ATL Hackathon project developed by [Vineet Reddy](#), [Viresh Pati](#), [MukProgram](#), and [Sachi Goel](#). After the hackathon, I revamped the project to create the advanced multi-agent RAG system and updated interface presented today.

- [Viresh Pati](#): Contributed to the design of the initial named entity recognition (NER) and knowledge graph retrieval-augmented generation (KG RAG) system, which has since been replaced with the multi-agent RAG system currently in use.
- [Mukesh](#): Helped develop the backend for the original NLP-styled NER and KG RAG system.
- [Sachi Goel](#): Designed the initial Streamlit frontend, which has been revamped into the current version.

Their contributions laid the foundation for the advanced multi-agent RAG system and user interface enhancements that define the project today.

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