



VITAL AGENT

ECG & PPG SIGNAL QUALITY REVIEW PLATFORM

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PROBLEM & OBJECTIVES

OUCRU researchers collect hours-long ECG and PPG recordings that require time-intensive manual review to identify reliable signal segments. This limits the timely use of collected data. Fully automated systems are faster, but their decisions may be difficult to explain and trust.

Vital Agent identifies low-quality signal segments, presents supporting evidence, and allows researchers to approve or override each result. The anticipated outcome is a traceable, auditable, and portable quality-control platform for clinical research.

PLATFORM WORKFLOW

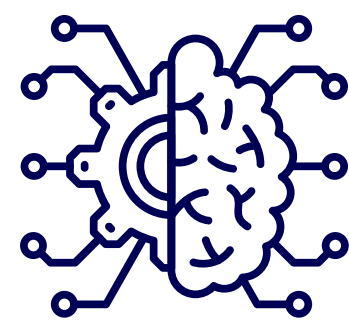
INGEST

Upload ECG or PPG recordings and validate their structure, metadata, and signal channels.



ASSESS

Use deterministic signal-processing tools to calculate Signal Quality Indicators and identify questionable segments.



REVIEW

Visualise waveforms and supporting evidence, then allow researchers to accept or override the proposed assessment.



REPORT

Generate an explainable report containing results, evidence, reviewer decisions, and processing history.

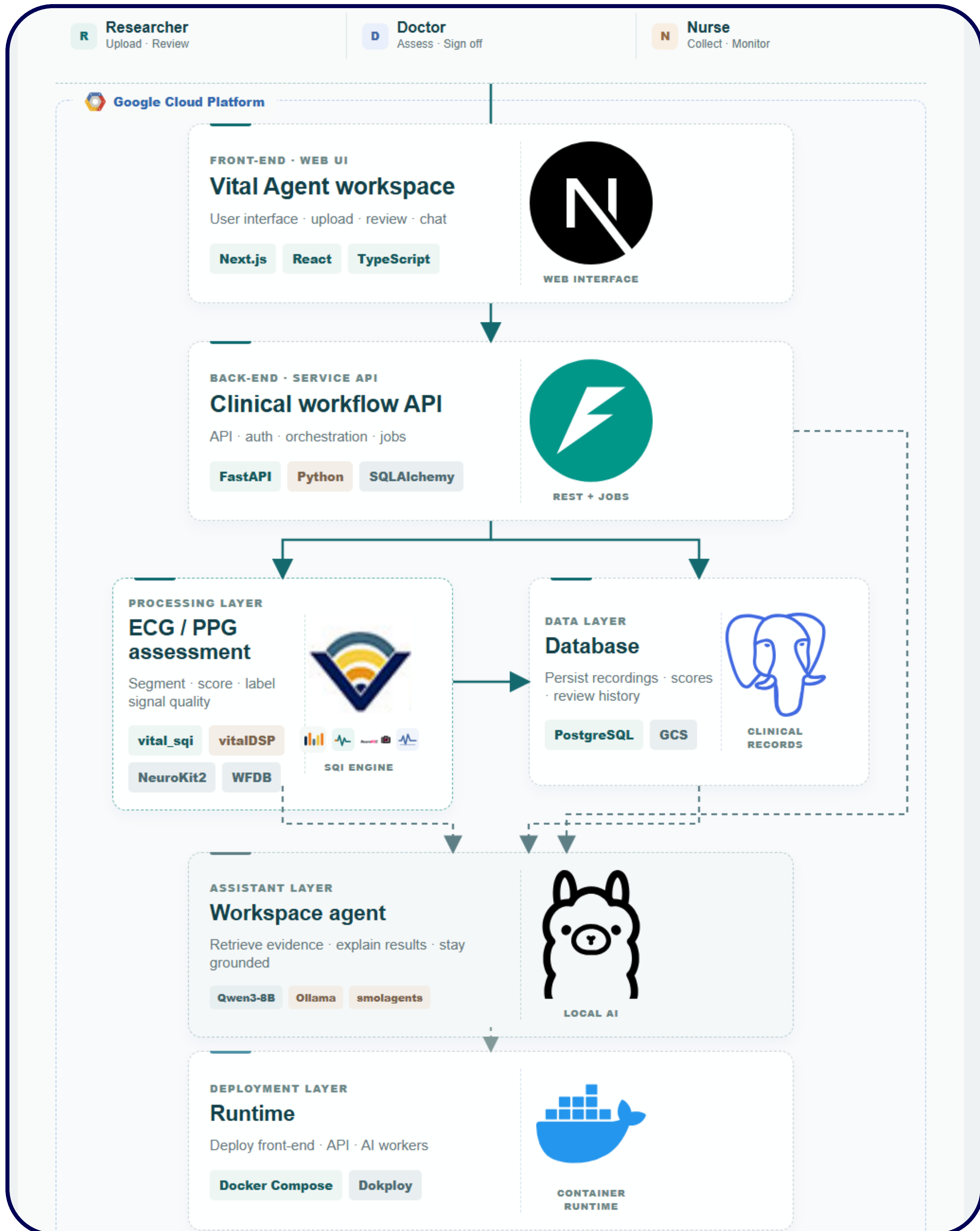


ASK

Use a contextual assistant to explore study results without directly changing approved assessments.



SYSTEM ARCHITECTURE



RESULT AND DISCUSSION

PROCESSING SUCCESS

90%

API SUCCESS RATE

99.07%

FHIR RESOURCE TYPES

8

PRECISION IMPROVEMENT

3.86x

METHODOLOGY

- Data ingestion and preprocessing
- Deterministic SGI calculation
- Agent architecture
- LLM/model evaluation
- Scenario-based testing
- Model selection criteria

CONCLUSION

This project focuses on advancing the automated quality assessment of high-frequency physiological recordings through **OUCRU Vital Agent**, an explainable agentic AI system for ECG and PPG signal quality control.

Vital Agent converts hours of expert review into minutes of verified decision-making, establishing a reusable standard for evidence-grounded AI in clinical research data pipelines.

