# A Real-Time Point-of-Care Assistant on Raspberry Pi for Medical Diagnostics

Opportunity Open Source Conference OOSC 3.0


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OSC

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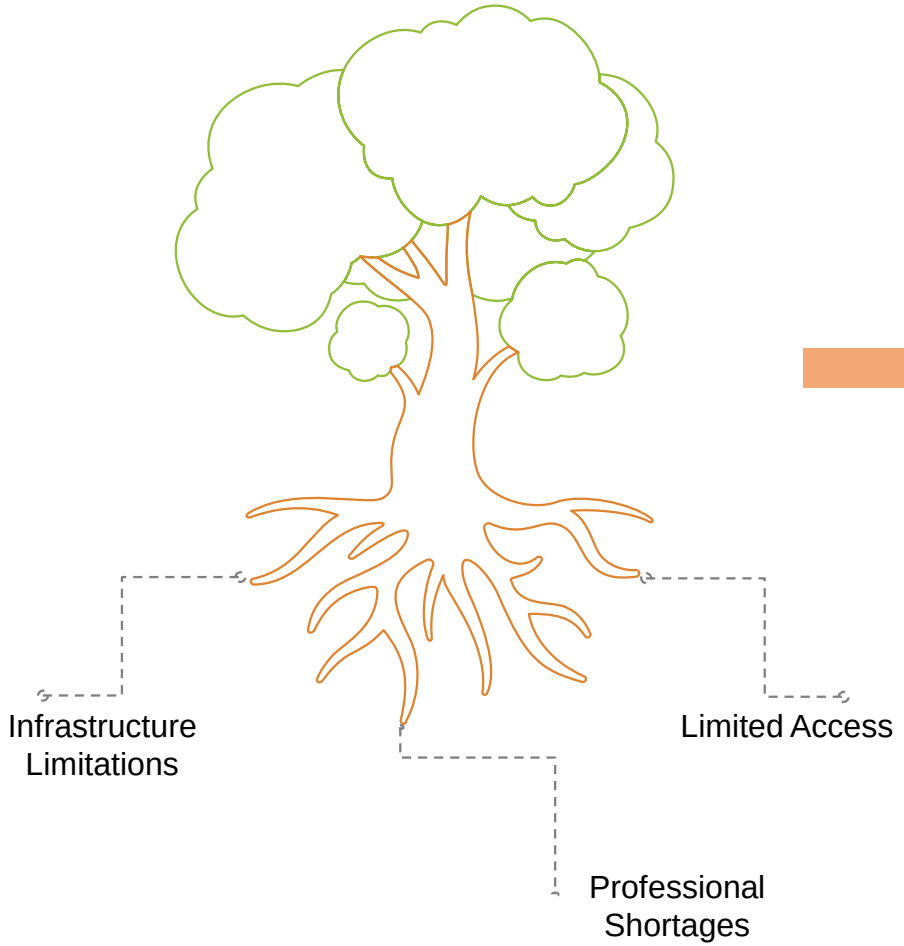
# Challenges in Patient Care




**Point-of-Care Diagnostics**



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# Point-of-Care Diagnostics


**Existing Solutions**

High cost, cloud dependency, single-modality

**Ideal Solutions**

Low cost, local processing, multi-modality



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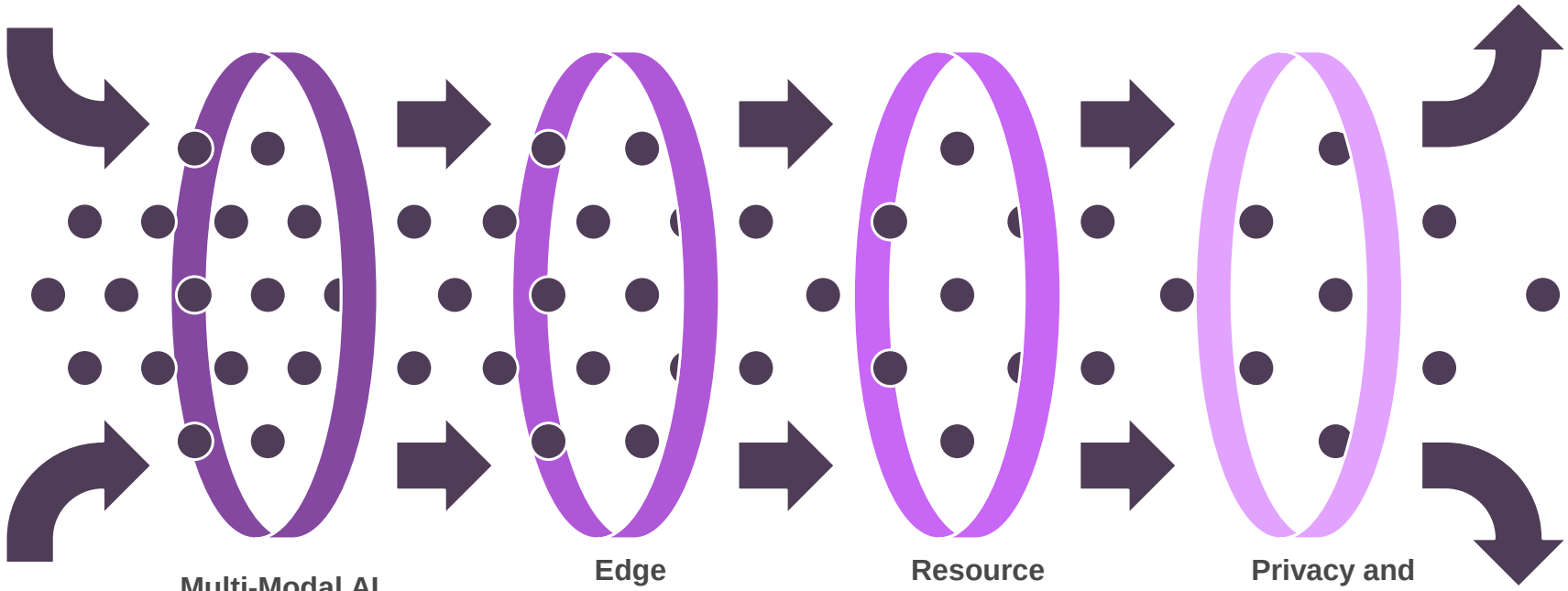
# Objective: A Unified AI Framework



**Multi-Modal AI Framework**

Integrating textual and visual data analysis

**Edge Computing Solutions**

Deploying AI models on Raspberry Pi

**Resource Constraint Management**

Developing solutions for limited resources

**Privacy and Security Measures**

Implementing federated learning for data privacy



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# Methodology: System Characteristics

| Characteristic | Multi-Modal AI | Edge Computing | Federated Learning | Open-Source Framework |
|---|---|---|---|---|
| **Data Support** | Structured and unstructured medical data | N/A | N/A | N/A |
| **Key Technologies** | OpenBioLLM-70B, MobileNetV2, Vision Transformers | TensorFlow Lite quantization, Knowledge distillation | Differential privacy, Asynchronous updates | HL7 FHIR, DICOM, Modular APIs |
| **Optimization** | Attention-based fusion, Supervised contrastive learning | Circular buffering, Asynchronous streaming | Multi-site learning, On-device fine-tuning | Community-driven design, Extensive documentation |
| **Performance** | 100% mAP in cross-modal retrieval | Real-time processing on Raspberry Pi | Privacy-preserving collaboration | Interoperability with clinical systems |



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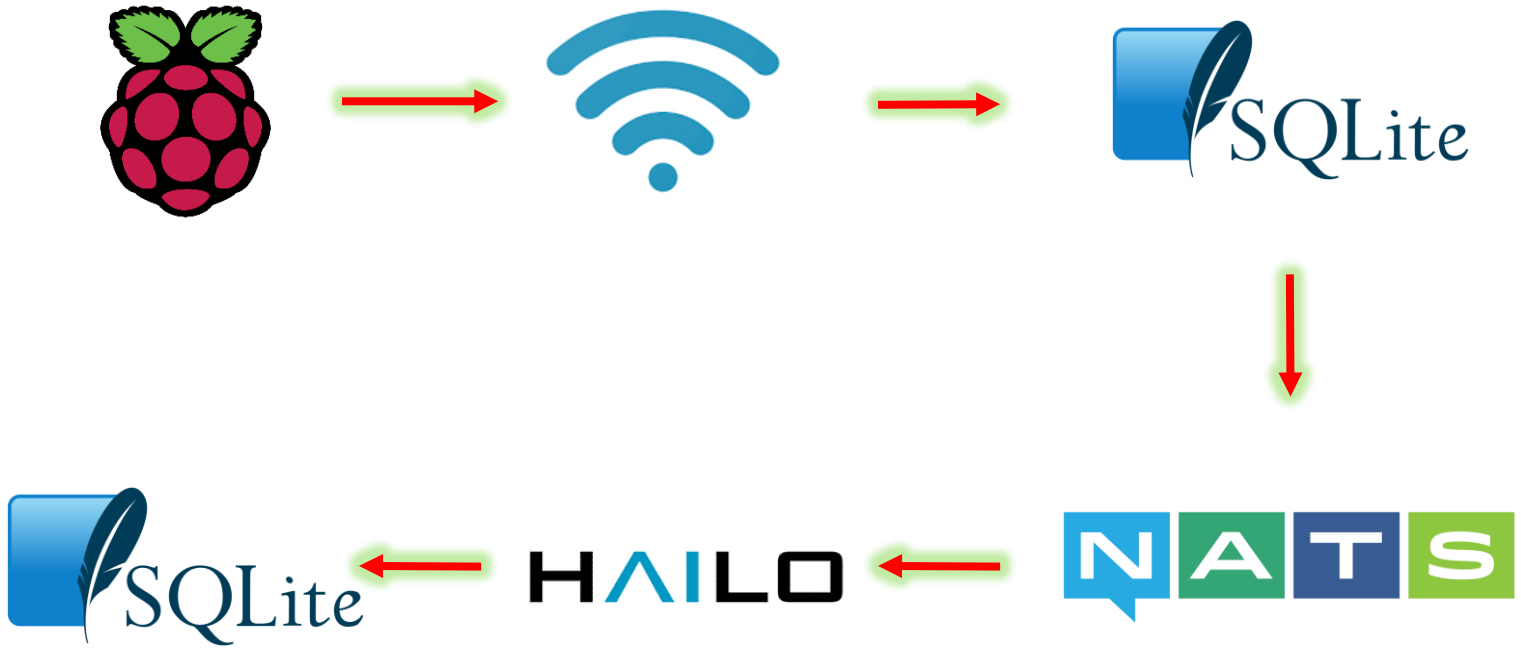
# System Architecture



# Multi-Modal Data (*currently*)



**Image Data (X-Ray)**

**Time Series Data (ECG)**



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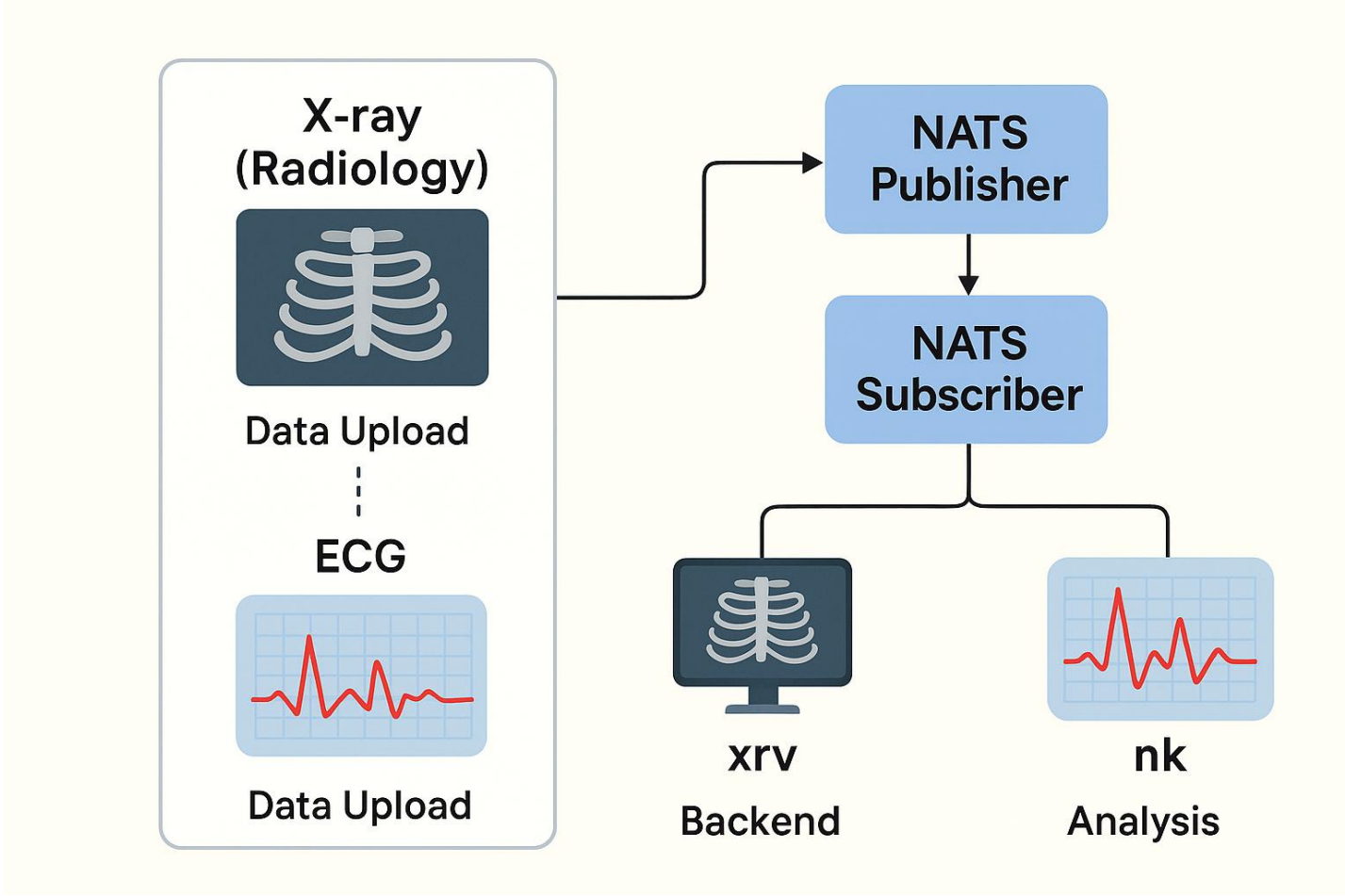
# Multi-Modal Data Flow



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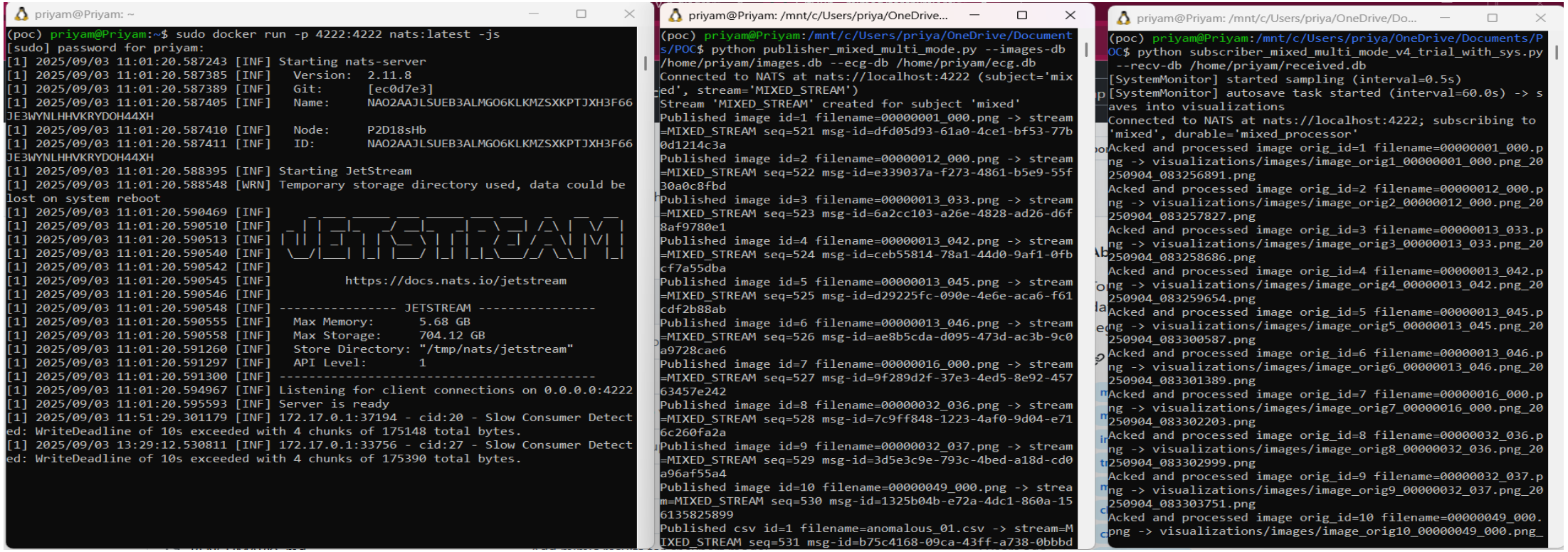
# Data Pipeline in Action

Server Running ...

Publisher Running ...

Subscriber Running ...



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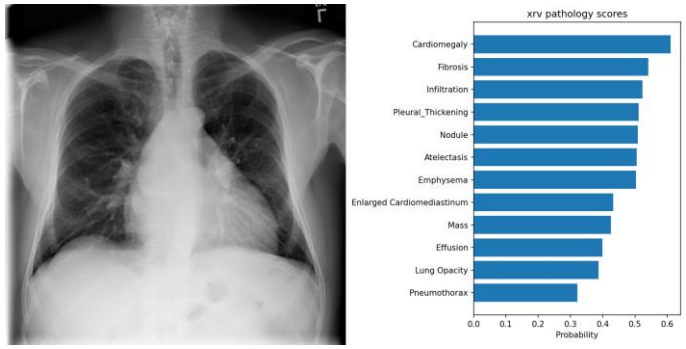
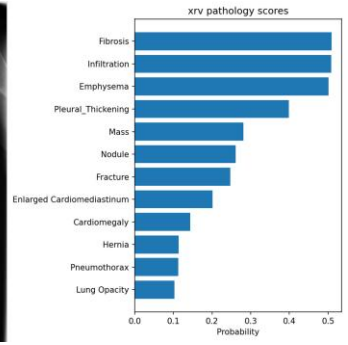
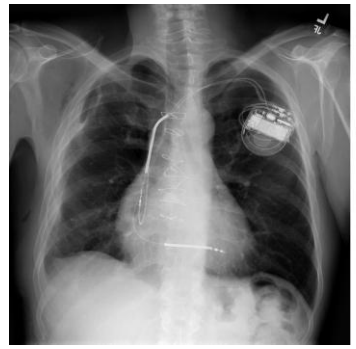
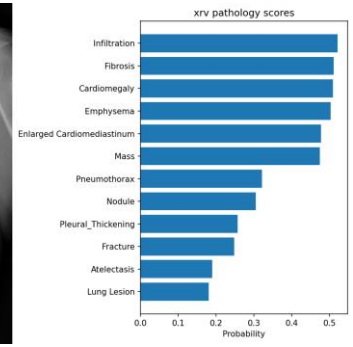
# Real-Time Analysis

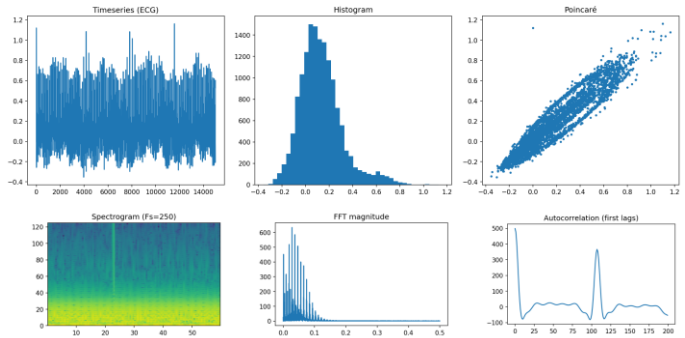


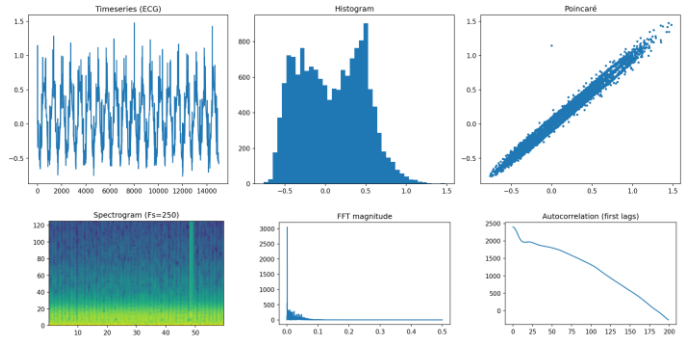


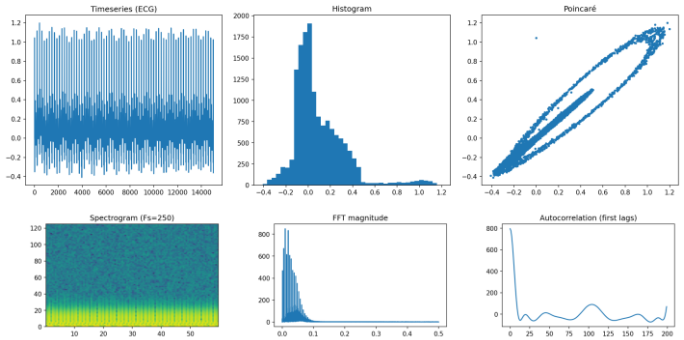





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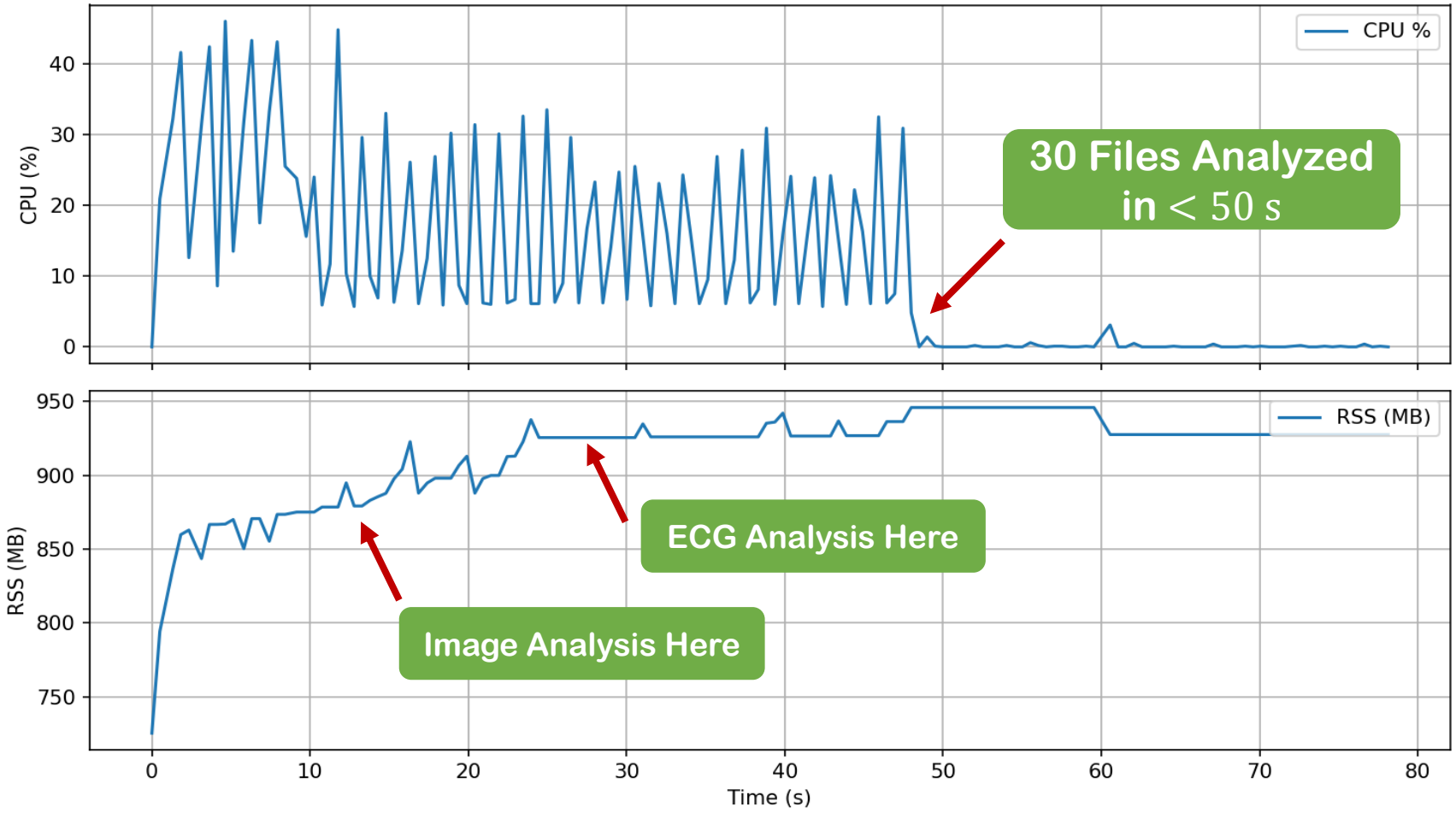
# System Monitor



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# Checks and Future Work

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# Thank You!

## Contact Us:

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