Felipe Meneguitti Dias

AI engineering for healthcare

I am a Senior R&D Specialist at Samsung with a PhD from the University of São Paulo. My work spans healthcare AI, signal processing and model validation, from development to deployment.

Selected work

Heart Institute (InCor), Hospital das Clínicas, University of São Paulo Medical School

Gorgona

I led Gorgona, a system that analyzes ECGs from urgent care units in Salvador and sends Telegram alerts to the team coordinating referrals.

ECG classification at InCor

I developed models to classify ECGs in the InCor emergency department, coordinated annotation with cardiologists and helped integrate the classifier into the hospital system.

RPMS

On RPMS, I developed data collection protocols and worked on PPG processing and the algorithms used by the mobile app.

Samsung · 2026–present | InCor · 2020–2026

f.meneguittidias@gmail.com

fmenegui.com · LinkedIn · CV

Gorgona

ECG classification integrated into urgent care

Objective

Gorgona sends a Telegram alert to the team coordinating referrals when an ECG suggests myocardial infarction. The ECG also goes through the usual telemedicine review. The aim is to give the team an earlier warning. Clinicians assess the patient and decide what to do next.

My work

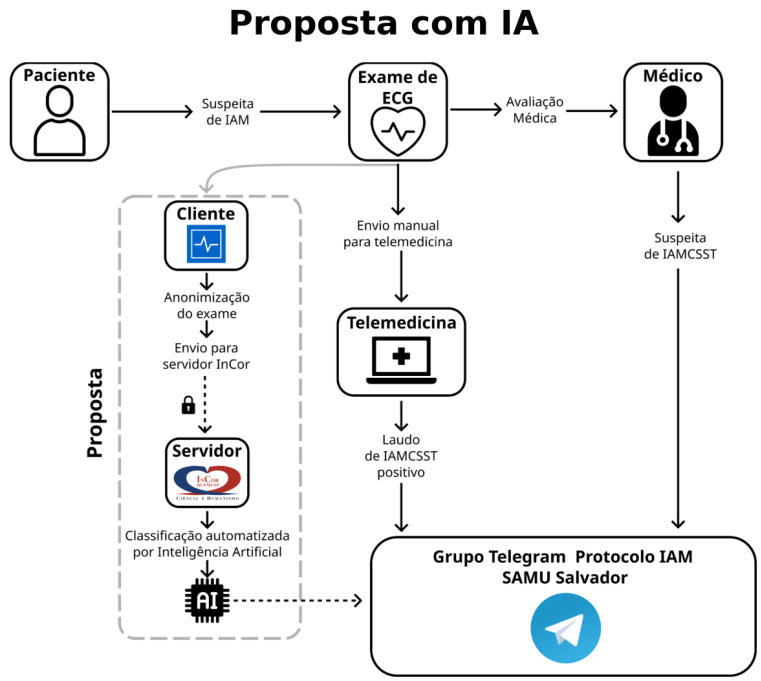
I led the project and connected the model to the Windows app, InCor server, dashboard and Telegram in the initial implementation. The clinical team defined the care protocol and reviewed the ECGs.

Previous workflow

Manual submission to telemedicine and staff communication with the coordination team, based on clinical assessment.

With Gorgona

Windows client, configurable anonymization, InCor server and automated Telegram alert.



Proposed AI workflow. Original project figure, in Portuguese.

ECGs still go through telemedicine review, and clinicians decide on care. The client can anonymize files before upload. Transfers use HTTPS and credentials for each installation.

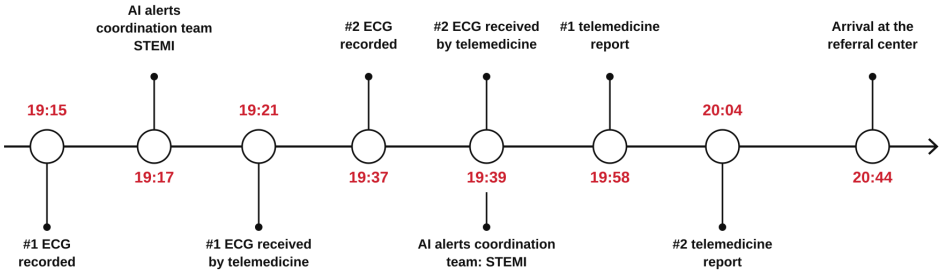
Case study

2 min
from ECG to alert in this case

41 min
before the first report

An urgent care encounter in Salvador

This case describes an encounter at an urgent care unit in Salvador. The patient was admitted at 18:52 and had two ECGs, each triggering an alert 2 minutes later. Arrival at the referral center was recorded at 20:44. The date and unit have been withheld.



Case study timeline, starting with the first ECG. Admission was at 18:52. Patient identifiers have been removed.

The first alert arrived 4 minutes before the ECG reached the telemedicine service. The two alerts preceded the reports by 41 and 25 minutes. The coordination team received the information sooner, but this single case doesn't establish whether AI improved treatment times or outcomes.

Classification model

Gorgona builds on the AIMED model. I led the team in the 2024 PhysioNet Challenge, where we won the classification task. The CinC 2024 paper and my thesis describe the method.

References

Image-Based Electrocardiogram Classification Using Pre-trained ConvNext · Computing in Cardiology, 2024.

Classificação automatizada de imagens de eletrocardiogramas por aprendizado profundo · Universidade de São Paulo · Tese de doutorado, 2025.

Image-based deep learning for emergency electrocardiogram classification · medRxiv · Preprint, 2026.

See the full case study for the location map, Windows client and online platform

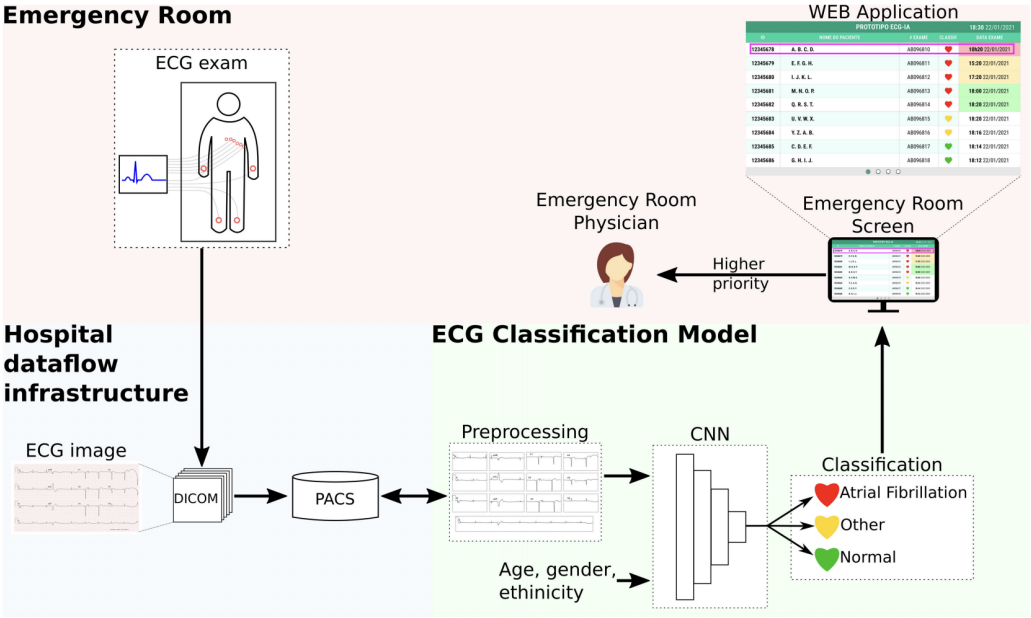
ECG classification at InCor

Objective

We built the classifier to help emergency department clinicians decide which ECGs to review first. Its predictions appear in the hospital application they already use.

My work

I developed the models and helped deploy the classifier in the emergency department. I coordinated the cardiologists' ECG annotations, including class definitions, review of conflicting readings and agreement analysis. After deployment, I helped evaluate the system with a cardiologist and compare it with specialists.



Integration of the ECG, PACS, classifier and emergency department application. Figure 1 from Dias et al., IEEE Access (2023).

Results and evaluation

The 2023 version classified ECGs as atrial fibrillation, other or normal. We later developed a ConvNeXt ensemble for 12 categories. In the 2026 study of 18,519 ECGs from 14,402 patients, it achieved a macro F1 of 0.807 on the held-out test set (95% CI: 0.788–0.825).

Evaluation after deployment included cardiologist review and comparison with specialists. The figures above describe the research dataset and its held-out test results.

References

Artificial Intelligence-Driven Screening System for Rapid Image-Based Classification of 12-Lead ECG Exams: A Promising Solution for Emergency Room Prioritization · IEEE Access, 2023.

Image-based deep learning for emergency electrocardiogram classification · medRxiv · Preprint, 2026.

Classificação automatizada de imagens de eletrocardiogramas por aprendizado profundo · Universidade de São Paulo · Tese de doutorado, 2025.

RPMS

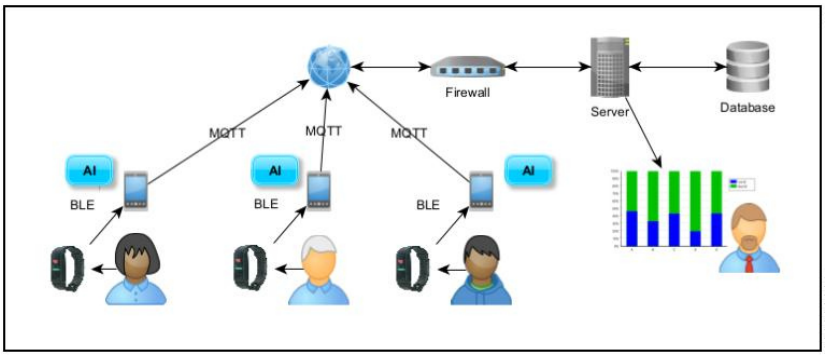
Remote Patient Monitoring System

Objective

RPMS uses watches and a mobile app to track physiological measurements outside the hospital. The phone processes the signals and sends results to a dashboard that clinicians can consult.

My work

I worked with prototype watches, helped define the recording protocols and organized the data. With the team, I developed the photoplethysmography (PPG) preprocessing pipeline and the algorithms used in the project.



Watch, app and clinical dashboard. Figure 1 from Moreno, Dias et al., SIoT (2022).

The watch sends PPG to the Android app over Bluetooth Low Energy. The phone processes the signal, estimates blood pressure and heart rate, and sends results over MQTT to a ThingsBoard server. The dashboard displays each patient's measurements over time.

Remote monitoring architecture published at SIoT in 2022.

Validation and research

Test participants are kept separate from those used for training. The 2022 system estimates blood pressure and heart rate. Related papers examine signal quality, diabetes and sleep.

References

IoT Medical Device Architecture to Estimate Non-invasive Arterial Blood Pressure · Symposium on Internet of Things (SIoT), 2022.

Quality Assessment of Photoplethysmography Signals For Cardiovascular Biomarkers Monitoring Using Wearable Devices · arXiv · Preprint, 2023.

Exploring the limitations of blood pressure estimation using the photoplethysmography signal · Physiological Measurement, 2025.

Machine Learning-Based Diabetes Detection Using Photoplethysmography Signal Features · SBCAS, 2024.

Enhancing Photoplethysmography-Based Sleep Staging Models Through Temporal Context Optimization · Studies in Health Technology and Informatics, 2025.