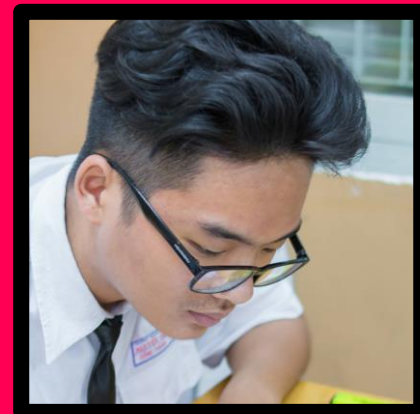




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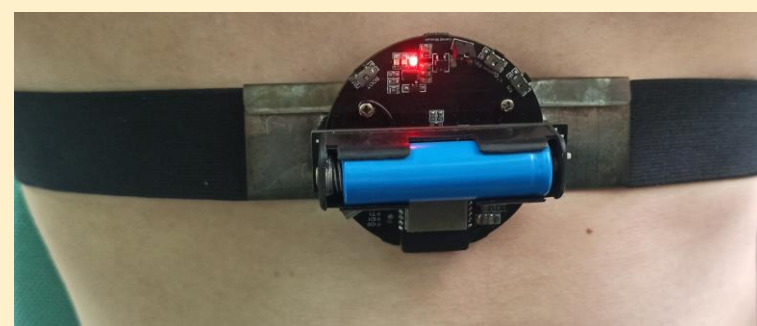
IOT DEVICE WITH AI SYSTEM FOR ECG CLASSIFICATION AND MONITORING

ABSTRACT

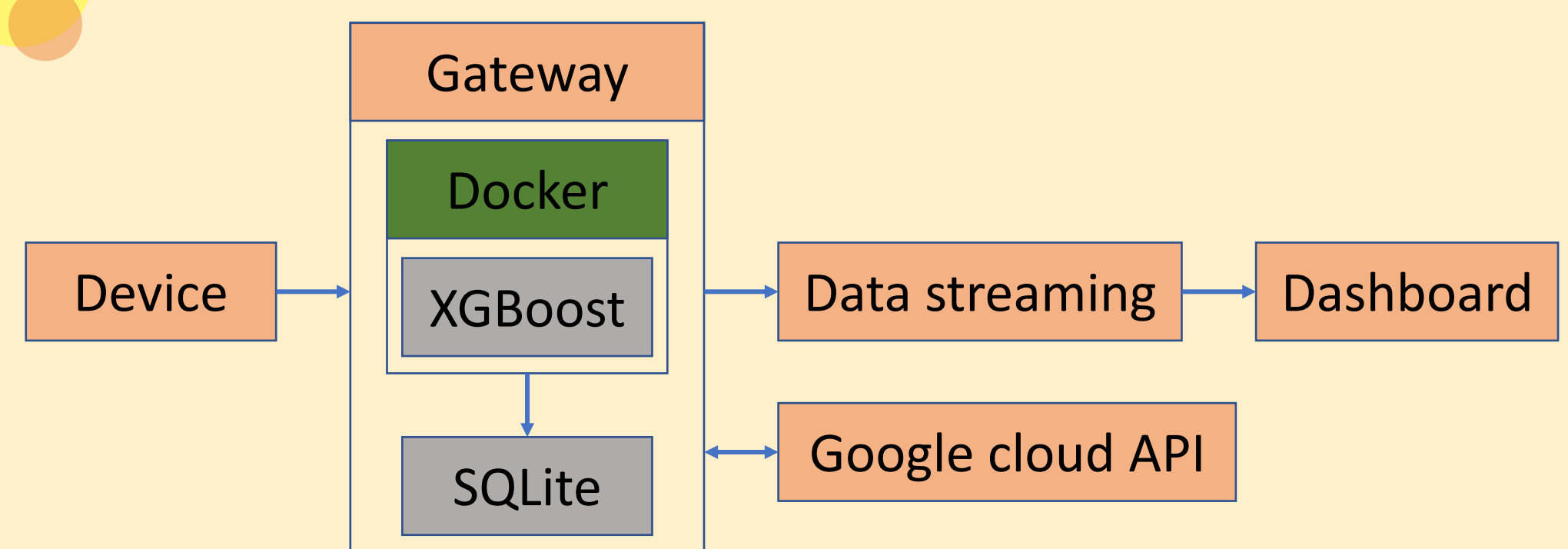
With the prevalence of life-threatening cardiac disorders on the rise, more cardiologists are in need of greater knowledge of their patient's heart health.

This solution is a form of a portable system. It's a combination of IoT and AI system, which can constantly monitor and send the result of ECG classification to the victim and doctor.

DEVICE:



AI SYSTEM DIAGRAM

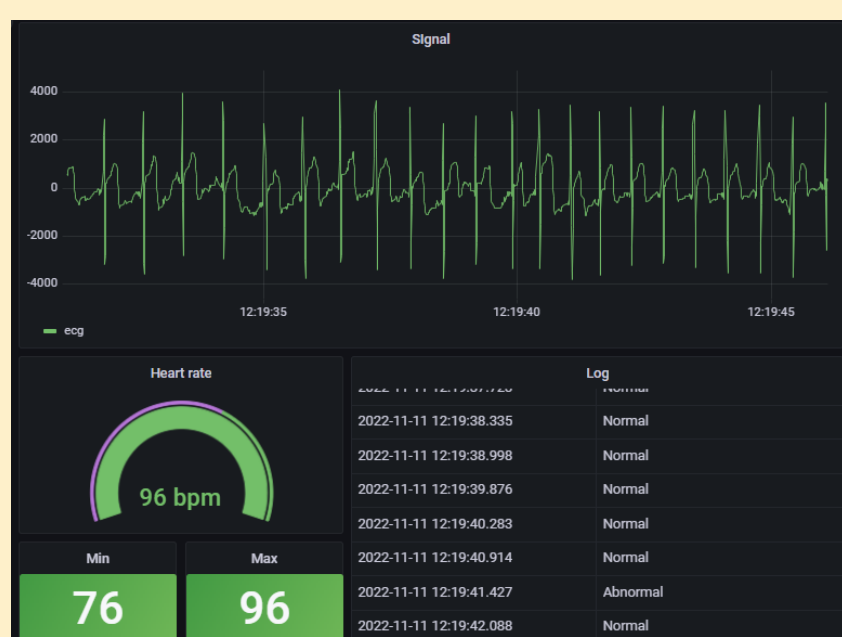


1. PROJECT SCOPING

An AI system can run in real-time, classify ECG and give output immediately. Finally, there must be a dashboard for the end user.

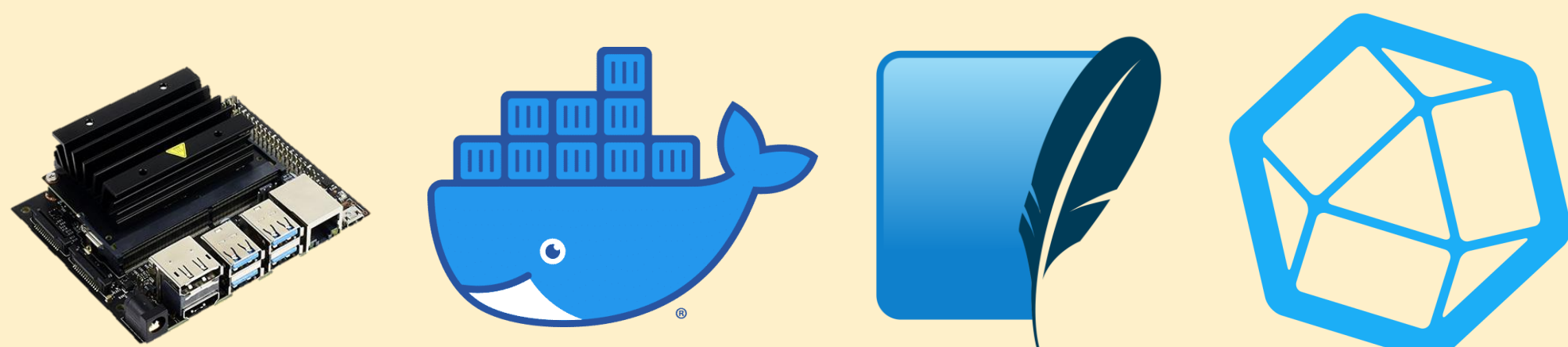
5. MONITORING AND CONTINUAL LEARNING

Create a dashboard with Grafana. Use Google API for continual learning.



4. MODEL DEPLOYMENT

Gateway: Jetson Nano Developer Kit 4GB RAM.
Create package with Docker.
Store data with SQLite and InfluxDB.



2. DATA ENGINEERING

- Dataset: MIT-BIH Arrhythmia with 2 classes, abnormal case and normal case. Data from device.
- Filtering: baseline wander.
- Scaling.
- Class imbalanced handling: nested cross validation vs bootstrap.

3. MODEL DEVELOPMENT

dmlc **XGBoost** + **Weights & Biases**

	Nested CV	ADASYN – RENN	ADASYN – IHT
TPR	0.910	0.911	0.905
FPR	0.002	0.003	0.003
TNR	0.998	0.997	0.997
FNR	0.090	0.089	0.095
F1-score	0.948	0.946	0.943

RENN: Repeated Edited Nearest Neighbours
IHT: Instance Hardness Threshold