

Tomáš Repčík



Multiplatform Mobile Developer with a biomedical-engineering background

I combine **production mobile engineering** with **biomedical signal processing**, **healthcare interoperability**, and **applied AI**.

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Slovak (native) · English (C1)



PROFESSIONAL SUMMARY

01

Mobile engineering for healthcare and biomedical systems

Multiplatform **mobile developer** with **5 years of professional experience**, preceded by **3 years building biomedical and mobile software through university research and independent projects**. At **Siemens Healthineers**, I build patient- and clinician-facing products for Android and iOS, integrate medical devices and standards (**FHIR / LOINC**), and contribute to applied-AI initiatives involving on-device LLMs, ECG analysis and medical imaging.

KEY ACHIEVEMENTS

02

Impact at a glance

3 apps

Started as the sole mobile developer. The platform now has a full Scrum team around it.

80 / 564 / 19.7k

Participants, measurements and heartbeats in the master's ECG-biometry research.

86-90%

Fall-detection accuracy, plus 0 confirmed false crash alarms during field testing.

Local LLM

118-case, three-pipeline local-LLM benchmark presented at CodeCon 2026.

10+

Engineers reached with shared agent tooling, instructions, skills and demonstrations.

Speaking highlights

CodeCon 2026 Titans Stage and invited guest sessions at STU FIT.

- ▶ **Platform growth:** started as the sole mobile developer and helped evolve the work into three public apps supported by a full Scrum team.
- ▶ **End-to-end engineering:** architecture, feature delivery, developer tooling, native integration, WCAG, testing, observability and release automation.
- ▶ **Biomedical research:** peer-reviewed ECG-biometry work at *Computing in Cardiology 2020* and an award-winning fall and crash-detection project.
- ▶ **Applied-AI research:** interpretable biomedical models and a 20-model local-LLM benchmark across desktop and mobile runtimes.
- ▶ **Professional contribution:** ISAQB CPSA-F certification, CodeCon speaking, invited teaching sessions and 40+ technical articles.

Mobile engineering in healthcare

Flutter / Multiplatform Developer, Siemens Healthineers

Sept 2021 - present · Bratislava

Patient Portal, Stroke Connect and Consent platform · current

Started as the **sole mobile developer**, established the application and delivery foundations, and grew the work into a **three-app platform now developed by a full Scrum team**.

Patient Portal

Records, virtual visits, scheduling, secure messaging, activity/vital integration.

Stroke Connect

Stroke-care patient engagement, shared codebase.

Consent App

Scan/upload analog forms, QR prefill, digital signing and archival.

- **Owned application architecture and foundations:** MVI with `flutter_bloc` Cubits, DI via `get_it` + `injectable`, immutable frozen models, `go_router`, typed error handling and shared theming.
- Scaled the monorepo with **Melos and FVM**, and built a **Dart CLI** for versioning, localization tooling, iOS string catalogs, customer flavor onboarding, changelog and release tagging.
- **Owned delivery quality:** Fastlane CI/CD, WCAG-aligned accessibility engineering, i18n, observability, unit/widget/integration and snapshot testing, and the FHIR data model.

Telemedicine patient-monitoring app · first project, ~1.5 years

- Owned end-to-end delivery of a patient-facing Flutter app for a **65+** group, with usability and accessibility as primary requirements.
- Supported **10+ vital signs** and integrated **three measurement frameworks**: native BLE integrations for generic devices, a third-party camera/face-based blood-pressure and heart-rate SDK, and wearable **ECG** capture with analysis.
- Owned cross-vendor SDK integration across **Kotlin, Swift and Flutter**, including proprietary-device normalization into **FHIR** with correct **LOINC** encoding.

Junior Researcher, Cryptomood a.s.

Jul - Sept 2019 · Brno

Built an **algorithmic trading strategy** in Python using social and news sentiment from the CryptoMood API.

Intern, RECETOX

Jul - Sept 2018 · Brno

Created a **QuPath** interface (Java) for microscopic image processing and integration with large image databases.

Mobile, healthcare and applied-AI engineering

Daily production work

Mobile architecture, delivery and quality across a public healthcare platform.

Flutter / Dart

Kotlin

CI/CD · Fastlane

Testing

WCAG

FHIR / LOINC

Production integrations

Native platform work and medical-device integration used when product requirements cross the Flutter boundary.

Swift / iOS

Native SDKs

BLE devices

Health Connect

JNI / jnigen

Observability

University and biomedical research

Signal processing, classical ML and neural networks applied to ECG, motion sensing and medical imaging.

Python

TensorFlow / Keras

scikit-learn

MATLAB / R

ECG / IMU

CT / PET

Independent applied-AI work

Current research and prototypes around interpretable models, local LLMs and constrained medical assistants.

FastAPI

PydanticAI

TFLite / LiteRT

Grad-CAM / SHAP

Local LLMs

Mobile runtimes

Biomedical engineering and software architecture

Bc. · Bachelor

Biomedical Engineering and Bioinformatics

Brno University of Technology · 2016-2019

Three-year bachelor's degree in biomedical engineering and bioinformatics, including the regulated Biomedical Technician qualification. The fall and car-accident detection thesis won Best Bachelor Thesis 2019.

Ing. · Master

Biomedical Engineering and Bioinformatics

Brno University of Technology · 2019-2021

ECG biometry comparing RBF SVMs, Random Forests, feed-forward 1D CNNs and Siamese CNNs, with Bayesian hyperparameter optimization, R-peak detection, interpretability and TFLite deployment. Includes a peer-reviewed CinC 2020 publication.

ISAQB · CPSA-F

Certified Professional for Software Architecture

Foundation Level · Cert. 2602-CPSAFL-0272-EN

Architecture goals, quality, building blocks, cross-cutting concerns and documentation.

PORTFOLIO FOLLOWS

Selected research, open-source software, applied-AI work, conference talks and teaching continue on pages 4-6.

[tomasrepcik.dev →](https://tomasrepcik.dev)

Biomedical research translated into practical software

1 · ECG Biometric Authentication ([Master's Thesis](#) and [CinC 2020](#))

Publication · DOI 10.22489/CinC.2020.321

Verify a person's identity from their **unique ECG morphology** using deep learning, deployable on wearables/phones.

- CinC methods on 29-subject wristband data: time-domain RF (FAR 7.11/FRR 6.49), wavelet RF (6.96/21.61), **1D CNN: FAR 0.57% / FRR 0.00%**.
- Master's extension: **80 participants** (40M/40F), 564 measurements, ~19,700 heartbeats on Apple Watch S4 (512 Hz), vs Withings Move ECG and Maxim platform.
- Compared **RBF SVMs, Random Forests, feed-forward 1D CNNs** and Siamese CNNs with difference and contrastive objectives, using Bayesian hyperparameter optimization. Feed-forward CNNs performed best, averaging **TAR 98.9% / TRR 99.5%**.
- Single-beat verification in **0.78-2.15 s** (Engzee to Pan-Tompkins fallback), on-device TFLite **11x compression** (2820 to 240 KB).
- Occlusion, Saliency and Grad-CAM** identified QRS and T-wave edges as important. Twelve participants were successfully re-verified after 90-189 days, with one requiring a repeat measurement.



On-device ECG identity verification: live R-peak detection and accept/deny.

Python

TensorFlow / Keras

Scikit-Learn

Kotlin

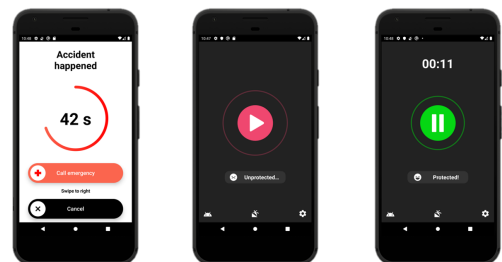
TFLite

C/C++

2 · BeSafeBox (Fall and Car-Accident Detection, [Bachelor's Thesis](#))

EEICT Winner · Best Bachelor Thesis 2019

- Data:** 3,260 records (840 falls) from 23 volunteers, 300+ h daily activity, field-tested 520+ h, 28 h / ~2,500 km driving with **0 confirmed false crash alarms**.
- Fall pipeline:** 3g trigger → free-fall → post-fall stillness → compact NN (6-9 neurons) on 7-8 features (from 43, reduced via PCA/ICA/NMF). ~86-90% accuracy, ~80% fewer NN calls to save battery.
- Crash pipeline:** fusion of >4g accel, GPS velocity change, Activity Recognition (in-vehicle) and accel variance, followed by multi-stage alarm escalation.
- ForegroundService and WakeLock provided reliable operation under **Android Doze**. TFLite reduced app size from **80 to 20 MB**. The app used a modular Detector/ModelManager architecture.



[BeSafeBox fall & car-accident detection UI.](#)

Java

Python / Keras

Android SDK

TFLite

Firebase

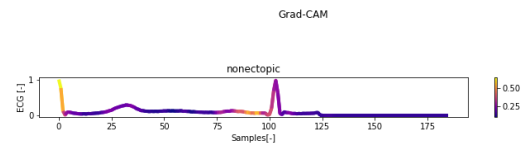
3 · SensorBox

Android + Wear OS sensor capture to CSV with annotations, alarms and multi-API subscriptions. Built with **Kotlin**, **MVI** and **Hilt** around a shared sensor-centralization module. Used for data collection in **BeSafeBox**.



4 · SignalScreen

Interpretability for 1D neural networks: **Occlusion**, **Saliency**, **Grad-CAM** on TensorFlow 2. The interpretability toolkit from the ECG thesis.



5 · Kotlin-Ecg-Detectors

Online & offline implementations of widely used ECG R-wave detectors. Companion C++ library **Cpp_Ecg_Detectors**.

Kotlin

C/C++

6 · flutter_interop_fhir

Reads **Android Health Connect** records into **FHIR**-oriented Dart models via **JNI/jnigen** instead of platform channels. Its clean layered architecture became the basis for a conference talk.

Dart

JNI

FHIR

flutter_bloc

7 · Small Local LLMs for Medical Result Interpretation · Applied Research 2026

[CodeCon Titans Stage · watch talk](#)

- **Research scope:** 118 manually reviewed synthetic blood-test cases, **20 small models** and three task levels covering extraction and interpretation.
- **Three evaluation pipelines:** LangExtract few-shot prompting, PydanticAI schema and tool calling, and heuristic prompting with a parsing fallback.
- **Structured output led every task level** with 84.39%, 63.82% and 75.49% exact match. Partial match remained above 83% throughout.
- **Real-device mobile benchmark:** Cactus, LiteRT, MediaPipe Tasks and ExecuTorch on Pixel 7a and iPhone 15, measuring throughput, CPU, RAM and thermals.
- In a matched Cactus run, Gemma 3 270M reached **60.61 tok/s on iPhone 15** and **26.93 tok/s on Pixel 7a**.
- **Product conclusion:** use a private, constrained assistant with deterministic extraction and validation, visible uncertainty and a clinician in the loop.

OPEN-SOURCE PORTFOLIO

github.com/Foxpace

Biomedical software

[BeSafeBox_research](#), [Kotlin-Ecg-Detectors](#) and [Cpp_Ecg_Detectors](#).

Applied AI

[slm-showcase](#), [SignalScreen](#) and [fastapi-pydantic-ai-example](#).

Teaching examples

[BluModify](#), [Compose AppDrawer](#), navigation, Turbine testing and Hilt examples.

Engineering leadership, research and knowledge sharing

AI Enablement for 10+ Engineers

Contributed as one of the main participants in the team's adoption of AI-assisted development. Helped deliver a shared **CLI repository that agents can use directly** and a companion repository with reusable **instructions and skills**, then demonstrated repeatable examples for interoperability, testing and code review to **10+ engineers**.

Innovation Days

1. **Flutter ID scanner** auto-creating users from scanned data.
2. **Anatomy detection and segmentation in CT** (+ PET screening).
3. **QRS detector**: two Pan-Tompkins variants targeting the remaining accuracy gap.
4. **FailTrail**: Rust CLI and MCP injecting context on agent command failures.

Conference Speaking

CodeCon 2026, Titans Stage: presented the full **small local LLM research pipeline**, from a 20-model desktop evaluation to Android and iOS runtime benchmarks. The talk focused on structured output, device tradeoffs, failure analysis and clinician-in-the-loop safety.

Invited Guest Sessions: STU FIT

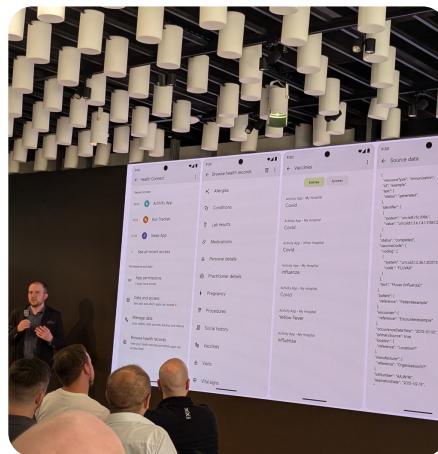
Delivered guest sessions for informatics students on **Flutter 101**, **AI in programming**, a simple **RAG example with Bun**, **slm-showcase**, and **Flutter interoperability** with FHIR.

Technical Writing

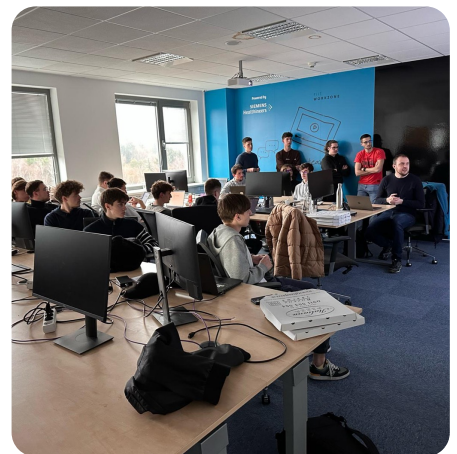
tomasrepcik.dev/blog with **40+ articles** on Flutter/Dart, on-device AI/LLMs, MCP and agent tooling, RAG / vector databases, and software architecture.



CodeCon 2026, Titans Stage: on-device LLMs for medical results



Health Connect and FHIR presentation



Guest lecturing at STU FIT · Flutter & AI in programming