Production Test Tool

Reflection

Bachelor's degree in the Applied Computer Sciences

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1 INTRODUCTION

This document presents a reflection on my internship experience at Tokheim Belgium, where I developed a Production Test Tool for Crypto NOVA terminals using Kotlin and Jetpack Compose. The reflection is divided into two parts: a substantive reflection on the project outcomes and contributions, and a personal reflection on my learning experience, growth, and challenges throughout the internship.

2 SUBSTANTIVE REFLECTION ON THE PROJECT

This section provides an overview of the project outcomes, including what was achieved, what impact it had, and what areas could still be developed further.

2.1 Accomplishments and results

During the internship, I designed and implemented a modular Production Test Tool for PAX IM30 devices. The tool supports various hardware tests, including touchscreen, display, LED lights, chip reader, magstripe, NFC module, printer, barcode scanner and camera. I integrated the NeptuneLiteAPI and applied best practices such as dependency injection (Hilt), state-based UI management, and a unified navigation system.

This solution simplifies the testing process for production staff, increases accuracy in component verification, and reduces human error. Contributing to overall quality control at Tokheim.

2.2 Remaining work and potential extensions

While the tool successfully covers the core testing functionality, there are several potential improvements and extensions that could further enhance its usability and integration within Tokheim's environment.

One possible extension is the addition of multi-language support. Currently, the interface is available in a single language, which may limit accessibility for operators in multilingual environments or future international deployments.

Another area for enhancement is data export. At present, test results are displayed on-screen and printed as a physical ticket, but they are not stored digitally. Implementing a feature to export test results to a database or remote server would allow for better traceability, long-term storage, and integration with quality monitoring systems.

A further recommendation would be to explore integration with the service menu of the device itself. Tokheim uses a custom-designed service menu on the PAX terminals, tailored specifically to their hardware and support procedures. Embedding the test tool into this menu could streamline technician workflows by allowing them to access the tool directly without launching a separate application.

These improvements would not only enhance the flexibility and maintainability of the tool but also align it more closely with Tokheim’s internal systems and long-term vision for automated production testing.

2.3 Deployment and Usage

As of now, the application has not yet been deployed in a live production environment. However, a live demo was conducted at the manufacturing facility in Bladel, the Netherlands, where the tool was presented to the individuals responsible for production and testing operations.

The demo was well received, with positive remarks regarding the interface design, clarity of the test flow, and responsiveness of the tool. It provided a valuable opportunity to gather real-world feedback, including a noteworthy suggestion to consider consolidating functionalities into a single application. Currently, the production test tool operates separately from the terminal’s main software, and stakeholders expressed interest in having a unified solution to simplify device management and streamline operator experience.

This feedback highlights promising potential for further refinement and integration of the tool within Tokheim’s broader terminal ecosystem.

3 PERSONAL REFLECTION

This part of the document reflects on the internship from a personal perspective, focusing on what I've learned, how I've grown, and the challenges I encountered along the way.

3.1 Internship Impact

This internship represented a major turning point for me, as it was the first time I truly experienced the bridge between academic knowledge and real-world software engineering. While I studied Artificial Intelligence, most of my previous work had been focused on data processing, machine learning models, or Python-based solutions. I had never built a complete software tool, let alone one intended to be used on real hardware in a manufacturing context.

The only vaguely related experience I had before this internship was some Java coursework, but even that was limited and never the core of my studies. That's why this internship pushed me well outside of my comfort zone and that was exactly what I needed.

One of the most important aspects was being able to see how software actually fits into a real working environment: the expectations, the constraints, the interactions with other systems and teams. It was nothing like the simulated, isolated exercises we do at university. Working on something that could one day directly support people on a factory floor gave everything a completely different level of meaning and responsibility.

3.2 Skills and Competencies Developed

During the internship, I developed both technical skills and important soft skills, which together gave me a much more complete understanding of what it means to work in a real-world software engineering environment. Although some of these areas had been briefly covered during my studies, experiencing them in a professional context. With real deadlines, expectations, and collaboration. That was a very different and much more meaningful learning experience.

3.2.1 Technical skills

- Kotlin Development: I learned Kotlin from scratch and used it as the main language for the entire application. This included understanding Kotlin-specific structures like extension functions, sealed interfaces, lambdas, and idiomatic null safety.
- Jetpack Compose UI: I built the full user interface using Jetpack Compose, creating composable functions for every test screen, handling state updates, and designing a clear, intuitive layout for production operators.
- Hilt for Dependency Injection
- State and Navigation Management

3.2.2 Development Workflow & Tools

- Jira: I worked in sprints using Jira to track tasks, bugs, and progress. While I had some exposure to Jira in class settings, using it in a real time, with actual priorities and deliverables, taugh me how agile practices really work.
- Planning and Task Breakdown

3.2.3 Soft Skills

- Autonomy and Initiative: I was responsible for most of the technical implementation, which required strong decision-making and proactive problem-solving.
- Communication: I regularly shared my progress updates during the daily stand-up meetings and sprint reviews.
- Adaptability: I adapted to unexpected issues, such as API limitations, networking constraints on the device, and demo feedback.
- Learning under pressure: I had to quickly learn new frameworks, language, tools.

3.3 Growth

Throughout my entire academic journey, I have always done my best. I approached every project and assignment with dedication and care. But despite that, one question never left me: What will the first real step into the professional world look like? Even during my first year, I remember wondering what my internship would be like, whether I would be capable of meeting expectations, and if I would be able to handle the weight of real responsibility.

This internship answered that question. And, in a way, answered something in me.

It showed me that I am capable. That I can step into an unfamiliar world, learn a completely new tech stack, work on a real product, and still deliver something meaningful. There were moments of confusion, self-doubt, and pressure, but none of them stopped me. Instead, they helped me grow.

What I am taking away from this experience isn't just technical knowledge. It is a sense of confidence I did not have before. A better understanding of who I am when faced with uncertainty. A feeling of being just a little more grounded, more ready for whatever comes next.

I no longer wonder if I can take the first step because I already have.

3.4 Challanges and Problem Solving

I won't hide it. The beginning of the internship was very hard for me.

Everything was new. A new working style, a new technical stack, a new environment, new expectations. And it wasn't just unfamiliar. It was kind of overwhelming. There was so much to absorb and understand all at once that I often felt like I was lagging behind, trying to catch up in a space I didn't yet belong to.

At times, I genuinely questioned myself. Why did I pick something that wasn't even part of my expertise? I was studying AI and here I was, building production software in Kotlin, on unfamiliar hardware, dealing with APIs I'd never touched. I felt a bit out of place and, frankly, a bit stupid for choosing a path that seemed so far from what I knew.

But once I gave myself a moment to breathe, I remembered something important: this was exactly what I had wanted from the beginning. I never wanted to just stay in one area. I wanted to explore. To grow. To learn without walls. To choose an internship that would challenge me and it did.

And as the days went on, I found myself not just understanding things better, but actually enjoying them. I began to appreciate the structure, the clarity of the logic, the feeling of building something that worked and mattered. That shift in mindset became

one of the biggest victories of the whole experience. What started as a source of doubt eventually became a genuine source of motivation and pride.

4 CONCLUSION

What may come as a surprise is that this internship was not the end. It was just the beginning. I'm incredibly proud and happy to say that I've been offered a job at my internship company, and I will now have the opportunity to continue building on everything I've learned, alongside the people and the environment that helped me grow.

Looking back, this internship was more than a learning experience. It was a transformative chapter. I entered unsure, unfamiliar with the tools, the language, the workflow and I leave not only more skilled, but more confident, more curious, and more ready than ever to step into the professional world.

It wasn't easy. There were doubts, mistakes, and difficult moments. But I wouldn't trade any of them. Because they led me to exactly where I needed to be.

This experience showed me that I'm capable of far more than I thought and that sometimes, all you need is a bit of courage to take that first uncertain step.