# Singaravelan Neelakandan

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## Summary


Results-driven Embedded Software Developer with 3+ years of experience specializing in secure firmware development and cryptographic implementations. Combines deep technical expertise in ARM-based secure elements and low-level driver development with proven leadership as a Scrum Master. Distinguished track record of delivering security critical solutions at Infineon Technologies, complemented by working in AI-driven gesture recognition and hardware security verification. Brings a unique blend of embedded systems knowledge, security engineering, and agile team leadership to complex technical challenges.


## Education

- **Technical University Kaiserslautern** — Kaiserslautern, Germany
  Master of Science in Electrical & Computer Engineering - Embedded Systems; CGPA: (1.6/5.0) *Oct. 2017 – Dec. 2021*
- **Anna university** — Chennai, India
  Bachelor of Engineering in Electronics & Communication Engineering; CGPA: (8.6/10.0) *Aug. 2013 – July. 2017*

## Experience

- **Infineon Technologies** — Graz, Austria
  **Embedded Software Developer - Firmware** *March 2022 - Present*
  - *Developer*:
    - Firmware development for RF-based contactless cards and NFC solutions utilizing ARM Cortex secure elements, delivering robust security implementations for mission-critical applications.
    - Develop low-level drivers for secure element interfaces like I3C and symmetric crypto processors, ensuring optimal performance and security compliance.
    - Strengthened projects by analyzing key performance indicators, increasing code coverage and maintaing above 90% by implementing comprehensive tests, and establishing robust CI/CD pipelines for automated testing and deployment.
    - Successfully coordinated with stakeholders and QA teams to deploy multiple security-critical firmware releases, ensuring quality standards and timely delivery.
  - *Certified Scrum Master*:
    - Serve as Scrum Master for developer team size of 9, facilitating agile ceremonies, removing impediments, and fostering continuous improvement through effective sprint planning and retrospectives
- **Infineon Technologies** — Linz, Austria
  **Intern** *Feb 2020 - May 2021*
  - *Gesture Recognition using RADAR data on Edge Devices*:
    - Recognition of hand gestures with processing of raw Radar (60GHz FMCW Soli-C) data with Convolutional Neural Network, deployed in Raspberry Pi.
    - Raw Radar data for each gesture is processed by Range Doppler and Range Angle spectrum.
  - *Neural Network quantization*:
    - Applied post-training quantization techniques for the neural networks - Tensorflow Lite.
    - Achieved 4x Size reduction in total model size and successfully demonstrated the whole pipeline with quantized neural net inference on Raspberry Pi 4.
  - Best abstract award in Austria based on Electronic Based Systems focusing on digital sovereignty and the European Green Deal, Awarded by 'The ECSEL Austria technology platform' with grant a of 2000 Euros.

**Digital design & Verification Intern** *Apr 2019 - Sep 2019*

- *Formal Verification*:
  - Formal verification of digital blocks from an active project using Onespin tool.
  - Concentrated on verifying SPI protocol and address decoder of Hi-Frequency Automotive Radar.

- **Technical University Kaiserslautern** Kaiserslautern, Germany
  **Master Thesis Student** *June 2021 - December 2021*
  - *Automated software tool for structurally analyzing RTL designs(RISC-V) to enhance verification and security evaluation*:
    - Using Verible, an open source SystemVerilog parser in C++ to analyze the SystemVerilog RTL files for register variable dependencies.
    - The generated analysis report by the tool can be used in verification to find presence of side-channel attacks and timing attacks (Spectre/Meltdown) and thereby enhancing the security confidence in Hardware.
    - Developed the tool in Python with unit testing and continuous integration with GitHub actions

- **German Research Center for Artificial Intelligence - DFKI** Kaiserslautern, Germany
  **Research Assistant** *Dec 2017 - Mar 2018*
  - *Research Assistant - High-Level-Synthesis*:
    - Used Xilinx Vivado to synthesis Computer Vision Algorithm (Semi-global Matching) into RTL.

## Projects

- Robust invisible watermarking for multimedia security in FPGA (Bachelor Thesis)
  - Digital Watermarking to authenticate and copyright protect the information in satellite images to increase robustness, imperceptibility, and security against various attacks.
  - Wrote efficient Pipelined synthesizable VHDL code for designing the architecture for Discrete Wavelet Transform.
  - Used HLS for implementing complex algorithms to RTL.
  - Funded by the Indian Space Research Organization with 17,000 Euros, Presented the project at two National Conferences.

## Programming Skills

- **Languages**: C++, Python, C, Matlab, VHDL, System Verilog Assertions, Assembly, Rust
- **Skills**: Firmware, Scrum, TensorFlow Lite, AI, High-Level-Synthesis, Formal Verification

## Course Work

- Architecture Of Digital Systems
- Operating Systems
- Real Time systems & Lab Work
- Embedded Processor Lab
- Embedded Systems Lab
- System C & Virtual Prototyping