Silard Gal

Embedded System Engineer

+381 63 886 4022 contact@silardgal.com LinkedIn GitHub Website

Experience

Embedded System Engineer | HTEC Group **May 2022 - Present**

IoT Developer | Pierre - DotLab **Nov 2020 - May 2022**

- Maintained, developed and added new features to the Pierre Firmware. Used ESP-IDF with C++20.
- Modified the Pierre hardware to pass CE and AAA certification.
- Design a test board with pogo pins for the Pierre main board with hardware/software tests.
- Design special purpose relay board to minimize costs.
- Design special purpose 0-10V control board for light and other peripheral control.

Product Development | Freelance **Jun 2016 - Present**

- **Athlete Rehabilitation** - I designed a custom 12-channel wireless haptic feedback sensor using KiCAD and AVR C software. The nRF24L01+ connected it to a custom 2.4GHz network for control. I also developed Raspberry Pi API software to manage all modules.
- **LED Controller** - I designed a PCB using KiCAD, which housed an ESP32, isolated power and isolated digital communication to pass CSA certification. The firmware feature was to control the LEDs with special effects and to communicate with the API through MQTT. It was based on the esp-idf and used C++20. The product was manufactured in 500 units and installed on-site.
- **Medical Research** - I created prototypes for sensor setups in a specialized medical device, testing various sensors in different positions and comparing their output using designated algorithms. This required the use of specialized hardware, firmware, and analytical PC-based programs.
- **Industrial Food Machine Automation** - I created a cost-effective automation solution for a client's potato sorting machine. The board, featuring 10 inputs for sensors and 4 outputs for lifting system control, was installed next to the machine. A readily available 12V power supply was used, and an Arduino Nano controlled the board with simple code.
- **Power Supply** - I designed two power supply boards using KiCAD. The first board included an ideal diode, two regulators, and a component for measuring current and voltage. The second board was built around a 4-channel power supply chip.
- **Boxing Robot** - I designed hardware and software for a boxing robot project. Two custom PCBs were used: the first controlled four stepper motors with PID control, while the second acted as the master board, controlling motors, actuators, and LEDs, and connecting to a PC running Qt software.
- **Smart Retail** - Collaborating with nanobile, I developed a prototype for a major food supply chain. It enabled wireless price updates using a smart retail display with e-ink displays and Bluetooth communication, designed with KiCAD and C++. Achieving a low-power design was challenging. We also created a shelf to measure product weight and alert workers when stock was running low.
- **Water System Controller** - I designed the water controller project using KiCAD, resulting in 50,000 units manufactured. The device controlled a valve while consuming minimal power, powered by a 9V battery with custom connectors. The board included voltage monitoring functionality to alert users when the battery was running low. The final version being the most cost-effective, thanks to a cheaper MCU that saved almost $1 per unit.
- View projects on personal Website

Research and Development Manager | nanobile **Mar 2019 - Nov 2020**

- Nanobile was a startup focused on smart parking, utilizing bollards and sensors.
- Developed LoRa technology-based communication between the sensors and servers, utilizing magnetometers and custom-tuned algorithms for car detection.
- Designed bollards with sensors and mechanism to reserve a parking spot.
- Responsible for overseeing hardware and mechanical aspects of the device as a main team member.
- Attended conferences and meetings with investors, customers, and partners.

Embedded Engineer - Co Founder | SENSA **Jun 2018 - Jun 2020**

- Developed a heating controller board equipped with relays, display with an encoder, multiple switch inputs, AC motor control, DC motor control, and weight scale reading capabilities at SENSA. Iterative design process achieved desired robustness and was designed using KiCAD.
- I developed an innovative cost-effective and compact design PLC, which featured 8 inputs, 8 outputs, ethernet and USB. The board was powered by an STM32 microcontroller and designed using KiCAD, making it compatible with standard DIN rail casings.

- As one of the founders of SENSA, I had the opportunity to mentor and sponsor our robotics team, Elektropioneer, as SENSA grew from that team. In addition to providing legal and financial assistance, we also offered technical expertise to help with the development of their robots.

Member - Team Leader - Mentor | Elektropioneer Robotics Club **Sep 2014 - Sep 2020**

- Joined the Elektropioneer robotics club as a member in 2014. This is where I was introduced to embedded systems, firmware development, PCB design ect.
- After gaining experience I became the team leader for the electronics and firmware part of Elektropioneer, where I had the opportunity to learn more about management.
- 2018 was the year I co-founded SENSA and that way next to being a sponsor I also became a mentor, meaning I was helping, teaching and navigating the new members of the Elektropioneer robotics club.

Internships

Embedded Software Intern | IRNAS **Jun 2018 - Aug 2018**

- Developed drivers for various I2C and SPI sensors.
- Developed the firmware for an agriculture sensor product. I used the STM32L0 and CAN Bus for communicating between modules.

Embedded Software Intern | IRNAS **Jul 2017 - Aug 2017**

- Combined LoRa and GPS data to create a LoRa signal strength mapper. View blog post here.

Projects

CUBE Project | **View it** **2022**

- Consisting of three individual boards, each with a specific function, the CUBE project's components are connected using high-speed connectors, alongside a battery and casing.
- When fully assembled, the product measures a compact three cubic centimeters.
- This project was completed using Altium Designer, with FreeCAD utilized for the casing. The Altium Designer multiboard feature was used to ensure that all boards align perfectly.

Skills

Hardware: High Speed Design, Power Design, Antenna Design, Digital Design, Product Design, Manufacturing Optimization, BOM Optimization
Firmware/Software: C, C++, Python, HTML5, CSS, JavaScript
Hardware Tools: Soldering Iron, Hot Air Gun, Reflow Oven
Software Tools: VS Code, Atmel Studio, MPLAB® X IDE, KiCAD, Altium Designer, LTSpice
Version Control: Git, SVN
Business/Management Skills: Data Analysis, Strategic Planning, Time Management
Other: Linux, CI/CD

Publications

- **Optimizing Power Consumption in Battery-Powered Devices** - Embedded Artistry

Language

- **English** - Highly Proficient
- **Hungarian** - Native Speaker
- **Serbian** - Native Speaker

Education

ETŠ Mihajlo Pupin **Sep 2014 - Jul 2018**

Telecommunications Engineering *Novi Sad, Serbia*