

Sergey Bashkirov

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Summary

Firmware engineer with 12+ years of professional experience in firmware and software in areas related to RTOS, bare metal, Linux, hardware interfaces, drivers, USB, networking; worked closely on actuators control, signal acquisition and processing, user interface design, robotics; machine learning; electrical engineering, PCB design; good background in math and physics.

Areas of expertise

Firmware design: Embedded systems, signals acquisition, RTOS and bare metal firmware, embedded Linux

Crossplatform programming: GUI, hardware communication

Visualization: Widgets design, Spatial, 3D geometry, 2D/3D visualization

Scripting and automation: Scripting languages, embedded scripting, bare metal firmware scripting

Electrical engineering: PCB design, digital and analog circuits, signal filtering

Math: Computer vision, machine learning, statistics, data, image processing, Kalman / Extended Kalman filter

Most recent professional achievements

- Reduced development time and eased prototyping by implementing hardware embedded real time scripting language and scriptable GUI builder.
- Created full control solution for pneumatic mechanism of variable complexity by designing expandable stackable PCB set consisting of identical PCBs, designed GUI for embedded Linux, communication library based on XMPP protocol, made real time firmware for ~10 interconnected by common bus microcontrollers.
- Achieved high precision with equipment made of the lowest cost components by applying machine learning techniques to calibration process.
- Reduced hardware design time by making expandable PCB solutions consisting of identical PCBs with identical firmware.
- Simplified "find the same place" task for AFM after sample reinstallation by making video aligning and navigation by video mode via applying regression by recognizable points.
- Reorganized production and supplies purchase processes by performing statistical predictive contracts analysis. Made business control software for warehouse keeping, product assembling, purchasing and contracts tracking.

Most recent work experience

Aist-NT Inc.

Software Engineer, April 2007 - present

Designed firmware for all hardware solutions, created embedded real time scripting language, designed AFM software, integrated a number of 3rd party devices

Novato, CA

Transmag

Contract, USB interface design, August 2013 - December 2013

Designed USB based BLDC motor controller's interface. Designed firmware, user interface, suggested proper USB schematics.

Santa Rosa, CA

IPM RAS

Contract, remote position, pneumatic mechanism control module, April 2012 - February 2015

Created firmware, software and schematics for pneumatic robot control modules, developed scriptable SDK, programmed movement algorithms.

Moscow, Russia

Education

Moscow Institute of Physics and Technology

Master of Science in Applied Mathematics and Physics, February 2004

Moscow, Russia

Moscow Institute for Problems in Mechanics

Courses in robotics, control theory and stability, June 2004

Laboratory of Robotics and mechatronics.

Moscow, Russia

Detailed technical proficiencies

Platforms: Embedded systems, Linux OS, Windows OS, ChibiOs, FreeRTOS, familiarity with Buildroot, Raspbian, OpenWRT, Android

Programming: C, C++, Java, microcontroller assembly language

Devices: Avr8, Cortex-M, NXP ARM7TDMI, AD Shark DSP, Altera FPGA/CPLD Verilog programming and testbench, familiarity with Microchip PIC

Interfaces: USB, Ethernet, TCP/IP, UDP, I2C, SPI, UART, SMBus, PWM, DAC, ADC, JTAG debugging

Scripting: Lua, Ruby, Python, R, MATLAB/Octave, SQL, Shell scripting, Pawn

Applications: data acquisition, signal processing, FIR/IIR filtering, Kalman filtering, automation, drivers design

Frameworks: Qt, Boost, OpenCV, VTK, CMake, Qt Unit Test Framework

Electrical: PCB design, electrical engineering and debugging, soldering skill, knowledge of Oscilloscopes, multimeters digital meters, logic analyzers, frequency analyzers, signal generators

Software, tools: Git, Subversion, TFS, Keil, MPLab, Eclipse, KiCAD, Eagle, NGSpice, familiarity with Altium, OrCAD, LTSpice VisualDSP, VisualStudio, GitHub, SourceForge