Sergey Bashkirov

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Summary

Application software engineer with experience in robotics, actuators control, data acquisition and processing; strong background in math and physics; active open source community participant; have good development time management and project tracking skills; obtained wide R&D experience in scientific tools design and programming; good knowledge of application programming, UI, real time firmware, RTOS, machine learning, computer vision, 3d geometry; obtained experience in PCB development, electrical debugging.

Areas of expertise

Crossplatform programming: GUI, hardware communication

Firmware design: Real time firmware, actuators control, physical properties measurement, RTOS and bare metal firmware

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

RPC design: Sockets, XMPP, ICE, XMLRPC

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

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

Personal achievements

- Created robot SDK with microcontroller embedded Pawn scripting language for real time algorithms and single board computer based Python SDK for complex logic tasks; made it expandable by making PCB set stackable.
- 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 stackable PCB solutions consisting of identical PCBs.
- 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.
- Created from scratch software for controlling Atomic Force Microscope.
- Reduced AFM modes development time and eased prototyping by implementing scriptable GUI builder and hardware embedded real time scripting language.
- Reorganaized production and supplies purchase processes by perforing statistical predictive contracts analysis. Made business control software for warehouse keeping, product assembling, purchasing and contracts tracking.

Technical proficiencies

Programming: C, C++, Java, microcontroller assembler

Platforms: Linux, Windows, ChibiOs, FreeRTOS

Frameworks: Qt, Boost, Swing, WxWidgets

Devices: Avr8, Cortex-M, NXP ARM7TDMI, AD Shark DSP, some experience in Altera FPGA/CPLD Verilog programming

Scripting: Lua, Ruby, Python, R, MATLAB, SQL, Shell scripting

Web technologies: Ruby-on-rails4, Javascript, Bootstrap

Various: FTDI/CPLD Verilog simulation, PCB design, electrical debugging, soldering skill

Aplications: Stepper, BLDC, DC motors control; piezoceramics, temperature, humidity control, data acquisition, signal processing, filtering, automation

Most recent work experience

Aist-NT Inc. **Novato, CA**

Software Engineer

AFM software development, firmware development, image processing, AFM modes design, AFM-Raman coupling, actuators control, data acquisition

Transmag **Santa Rosa, CA**

Contractor

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

IPM RAS **Moscow, Russia**

Contractor, remote position

Pneumatic robot control module design, scriptable SDK development, movement algorithms programming, firmware and software creation

Education

Moscow Institute of Physics and Technology **Moscow, Russia**

Master of Science in Applied Mathematics and Physics

Moscow Institute for Problems in Mechanics **Moscow, Russia**

Courses in robotics, control theory and stability

Laboratory of Robotics and mechatronics.

Most recent courses taken: Circuits & Electronics, Machine learning, SAAS, Autonomous navigation, Statistics with R, Node.JS, Angular.JS, Booststrap, JavaScript.

Open source projects participation

grambo-pi.com: Created expandable stackable PCBs set for RaspberryPi computer for robot prototyping.

xonotic.org: Created Blend2map Blender3D to MAP exporter.

chibios.org: Submitted I2C slave mode driver, IWDG driver.

QtLua: Provided a patch making Object::connect() work in the same way as in Qt.

Gaw: Provided a patch fixing crashes with default configuration file for gaw waveform viewer.