Pierre Bockner

B.Sc.

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Education

10.2010–04.2015 **Bachelor**, *Chemnitz University of Technology*, *Grade: 2,0*
Computer Science, Subsidiary subject: Physics

08.1997–07.2009 **High school diploma**, *Roman-Herzog-Gymnasium*, Schmölln, *Grade: 1,8*

Bachelor Thesis

Topic *Methods for Object Tracking with Depth Sensing Cameras*

Abstract Compared to classic image-based object localization, depth cameras enable tracking algorithms to use an additional parameter: The distance of the object to the camera plane to determine the position. Object paths can only be meaningfully processed if they can be localized reliably over time. Due to the nature of the camera's signals however objects may appear out of nowhere, merge to form a meta-object, two closely neighboring objects split into individual objects or appear to change their shape by overlapping.

Projects

11.2024–today **Senior Softwareengineer**, *Embedded Systems*, Zühlke Engineering GmbH

Project Protective System for a class C IVDR Medical Device.

Develop safety critical features for a class C medical device. A protective system on the basis of a custom real time operating system must monitor, shutdown the device and alarm the user in case of device misbehaviour. This is done within context of functional safety requirements.

Languages C
Tools CMake, Docker, DOORS, Azure DevOps
System Custom Real Time OS
Tests GoogleTest, HIL
Norms ISO 13485, ISO 14971, IEC 62304, IEC 60601

10.2022–today **Senior Softwareengineer**, *Embedded Systems*, Zühlke Engineering GmbH

Project OS Development for Solar Plant Control

A central managing unit of a solar power plant, that is responsible to collect data from inverters. The device is also connected to the electric supply mains and must therefor be able to manage power feed in. The work is focused on supporting the development of an embedded Linux utilizing Yocto.

Languages C, Modern C++, Python, Shell, Ruby
Tools CMake, Docker, Ansible, Doxygen
CI/CD Gitlab
System Linux, Yocto, U-Boot, Secureboot, BSP-Integration
Tests GoogleTest, pytest

05.2024–07.2024 **Softwareengineer/Tech-Lead**, *Embedded Systems*, Freelanceing

Project Implementation of a communication stack/protocol for RS232.

This task includes system design with subsequent implementation of the stack layer in C

Languages C
Tools CMake, GitServer, Doxygen
System CubeIDE, STM-HAL

10.2022–06.2024 **Senior Softwareengineer**, *Embedded Systems*, Zühlke Engineering GmbH

Project Aspirating Smoke Detector

Develop a firmware for a smoke detector using light sensors. The smoke detector conforms to the EN54-20 standard to ensure reliable smoke detection and high sensitivity. My work was focused around developing a firmware with bootloader (for updates) and communication with the control unit of the smoke detector center (ASD). Additionally, CI and hardware in the loop tests had to be build up.

Languages C, Modern C++, Python, Shell
Tools CMake, Docker, Ansible, Doxygen
CI/CD Teamcity
System LittleFs, MCUBoot, FreeRTOS, CubeMX
Tests CppUTest, pytest, HIL
Norms EN54-20

07.2018–09.2022 **Softwareentwickler**, *Embedded Systems*, Zühlke Engineering GmbH

Project Connect self-driving farm vehicles to a farm management system

Develop an electronic control unit, which collects several vehicular data from CAN (ECUs) and Isobus (Implements). The collected data is aggregated on the device, compressed and transferred to a cloud hosted farm management system (Azure IoT Hub) via MQTT.

Additionally, the device functions as a GPS receiver for self-driving purposes. To achieve a higher precision, the position is corrected via NTRIP base stations. The ECU operating system is an embedded Linux utilizing Yocto.

Languages C, Modern C++, Python, Shell

Tools CMake, Docker, MQTT, Doxygen

Interfaces Protobuf, AT-Commands (Modem), Isobus, CAN-Bus, GPS+NTRIP

CI/CD Jenkins, OSS-Licenses

System Linux, Yocto, U-Boot, Secureboot, Azure IoT Hub, Azure Blob Storage, OTA Update

Tests GoogleTest, GMock, behave

01.2017–07.2018 **Softwareengineer**, *Embedded Systems*, Diehl Metering GmbH

Project Firmware for Smart Meters

Develop firmware for low powered battery driven water and warm water smart meters. Smart meters last up to 12 years without being replaced. They measure the flow of water and in cases of warm water meters the energy dissipation too.

The device measures water as per the regulations proposed by EN 1434. The firmware has a custom operating system and drivers. A bootloader ensures update via a wireless interface (IrDA). The device operates in a very energy efficient way. The correctness of its calculations and calibration is done via extensive testing on a specialized test stand.

Languages Asm, C, C++, Python, Batch

Tools svn, Eclipse (Code Composer Studio), MPLAB X, QT, ldscript, UML (Visual Paradigm), Doxygen, Latex, Jira

Controller MSP430FR6989, PIC16f1719

04.2016–12.2016 **Softwareentwickler**, *Embedded Systems*, D+H Mechatronic AG

Project Center for smoke detection and ventilation of a building

The project is focused on providing a firmware for several modules of a control center including a custom bootloader. The modules were fitted with different microcontrollers, including a STM32F4xxx for an embedded GUI (touchgfx).

The center reacts to digital inputs and triggers outputs or alarms. The whole unit is expandable and configurable depending on the outfitting of a building.

Windows are automatically opened or closed, depending on sensory input from the environment. The project conforms to the ISO 21927-9 standard.

Languages Asm, C, C++, VB, Batch

Tools git, Eclipse, Atmel Studio, Touchgfx, FreeRTOS, gcc, gdb, ldscript, make, Eagle, cppcheck, Doxygen

Controller STM32L4xxx, STM32F4xxx, AT32UC3B0512

04.2013–06.2013 **Research Assistant**, *University Communications*, TU-Chemnitz

Implementation of a remote control (mobile, Android, Java) for the humanoid robot NAO (server, C++). Support for the presentation of the robot in public.

Internships

04.2015–07.2015 **Study Project**, *Chair of Computer Engineering*, TU-Chemnitz

Project Implementation of a robot controller using an FPGA (Xilinx Spartan6)

1. Synthesize a predefined microcontroller on the FPGA (VHDL)
2. Addition of a UART interface (RS-232) to the microcontroller for communication with the robot arm (VHDL)
3. Implementation of collision handling for controlling the arm as software (C)

Tools C, VHDL, Xilinx ISE+ISim, Eclipse, gcc, gdb

10.2013–02.2014 **Study Project**, *Chair of Operating Systems*, TU-Chemnitz

Project Implementation of a simple multitasking-capable operating system on an ARM based architecture, use of the display and the serial interface

1. Implementation of a debugging unit via the serial interface
2. Implementation of an interrupt handler
3. Configuration of the system timer, triggering of interrupts
4. Separation of kernel and user mode
5. Syscall interface
6. Cooperative process switching
7. Signals, mutexes, drivers, ...

Tools C, Assembler(Armv4), gcc+ldscript, gdb

Languages

German Mother Tongue

English Fluent

Skills

Operating Systems	Linux, Yocto, FreeRTOS, Android, Windows
Bootloader	U-Boot, Secureboot (HAB-NXP), MCUBoot
Programming	Assembler (x86, STM, AVR32, MSP430, PIC), C/++, Python, Batch, Shell, C#, Java, VHDL, Angular, Typescript, Javascript
Library	LittleFS, OpenCV, Protobuf, Flatbuffers, ,Qt, curl, Openssl, Touchgfx (Embedded GUI)
Controller	STM32L/F4xxx, AT32UC3B0512, MSP430FR6989, PIC16f1719, ...
IDEs	VsCode, CubeIDE, Eclipse, TI - CCS, Atmel Studio, Visual Studio, MPLAB X, Xilinx ISE+LSim, ModelSim
Tools	git, svn, gcc, gdb, ldscript, make, CMake, Doxygen, Visual Paradigm (UML)
Office	AsciiDoc, Markdown, LaTeX, Microsoft 365, LibreOffice, Jira, Confluence, Polarion, DOORS
Standards	Medical Devices (ISO 13485, ISO 14971, IEC 62304, IEC 60601), Aspirating Smoke Detectors (EN54-20) Smoke and heat extraction (ISO 21927-9), Warm-water Smart Meter (EN 1434), Isobus (11783)
Miscellaneous	Certificate - iSAQB-CPSA-F