

Projects

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PLC-Controlled Ball Handling System (Weekend project with one friend)

An automated ball handling system was implemented using a Beckhoff softPLC and ladder logic in TwinCAT. Control was structured as a state machine with filling, operating, and launching states.

Two inductive proximity sensors were used to detect the fill level of the tube. When full, the system entered a waiting state requiring an operator button press before transitioning to the launch state. LEDs were used to indicate the active system state.

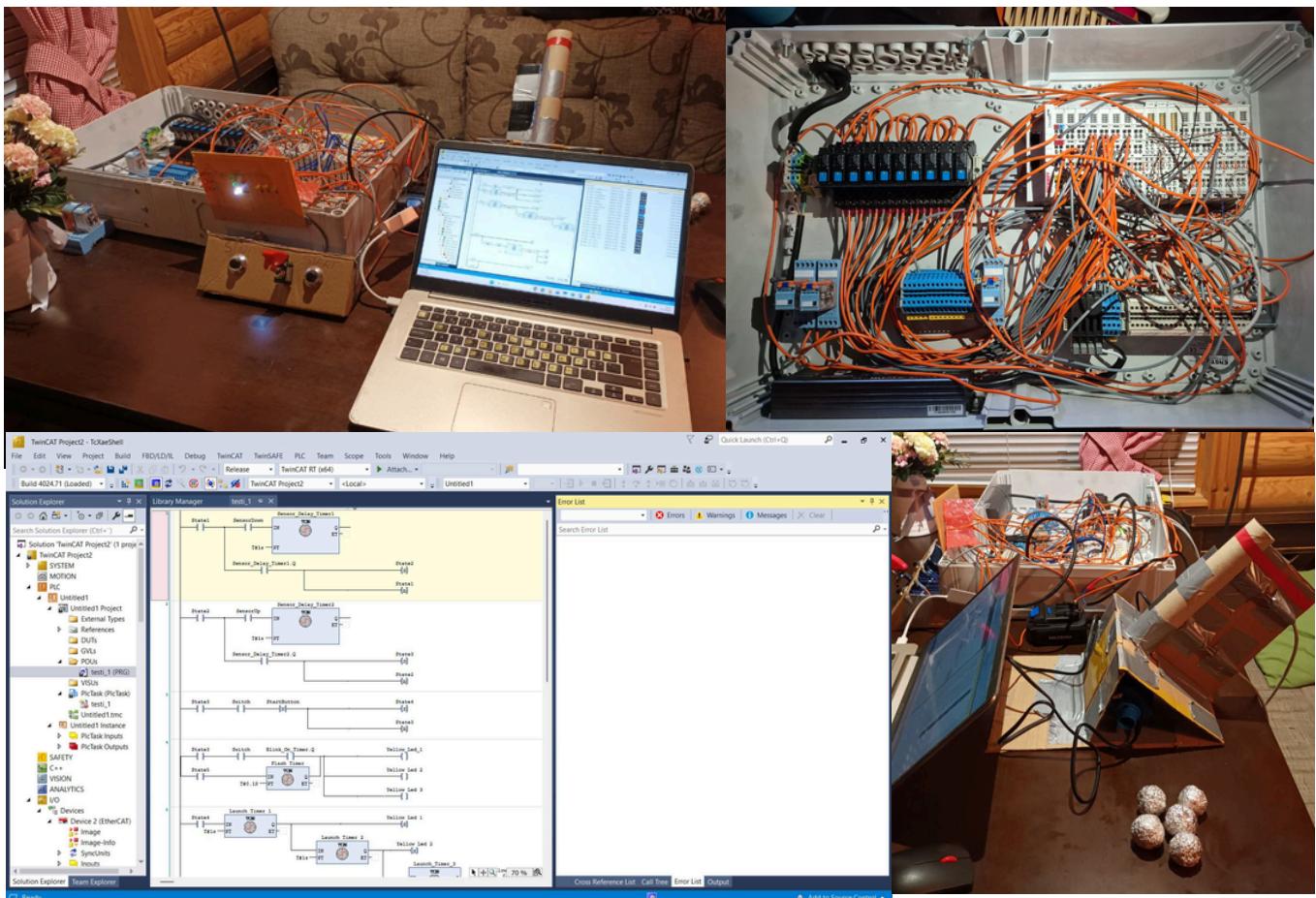
After confirmation, a battery-powered air pump was activated to discharge the balls. Component datasheets were used to ensure correct wiring and required voltage levels.

System and Tools

- Beckhoff EtherCAT Coupler with analog and digital I/O
- Ladder-logic state machine (TwinCAT)
- Inductive sensors, operator push-button, LEDs as state indicators
- Battery-powered air pump actuator

Outcome

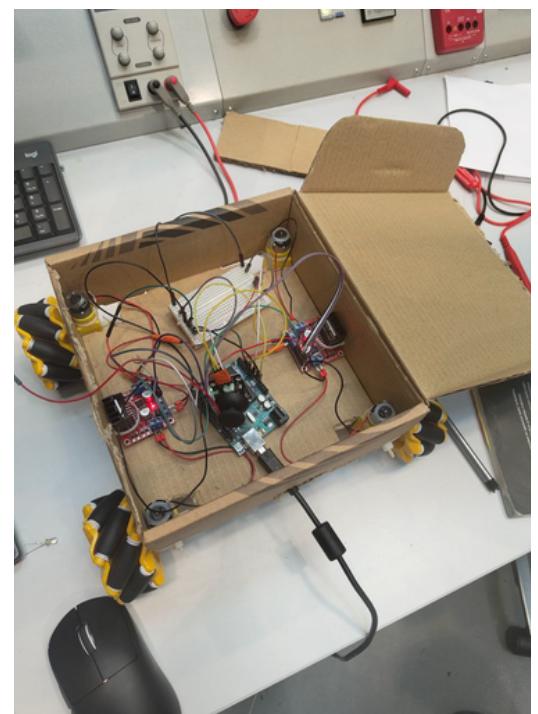
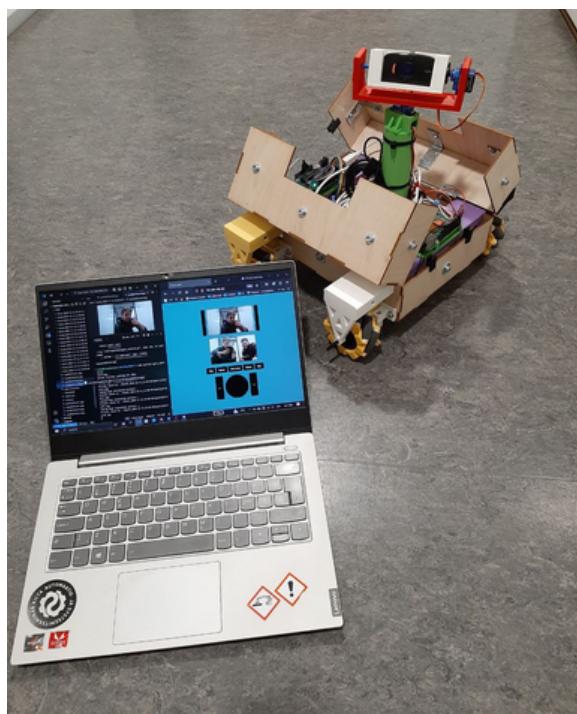
- Clear, deterministic state-based control
- Operator-confirmed launch sequence
- Stable operation during repeated tests



Camera-car (school project, 3 people)

My area of responsibility covered all Raspberry Pi-related development, including both backend and frontend user interface implementation, as well as transmitting driving commands to the Arduino over USB, where motor control was implemented. The user interface was accessible through a web browser when the operator device was connected to the same Wi-Fi network as the robot.

- Linux command line and Visual Studio Code Remote Development (SSH)
- Communication between Raspberry Pi and Arduino via USB
- Python, JavaScript, HTML and CSS
- Half a year project taught me cooperation and consistency



Ampelmann – The German teacher Telegram Bot

- Experimenting with different llama.cpp weights while trying to create a bot to correct grammatical mistakes in chat
- Learning about cybersecurity while connecting my spare PC running the bot to the internet (configuring the firewall and router)
- Learning about services in Linux to make the bot start automatically on OS startup



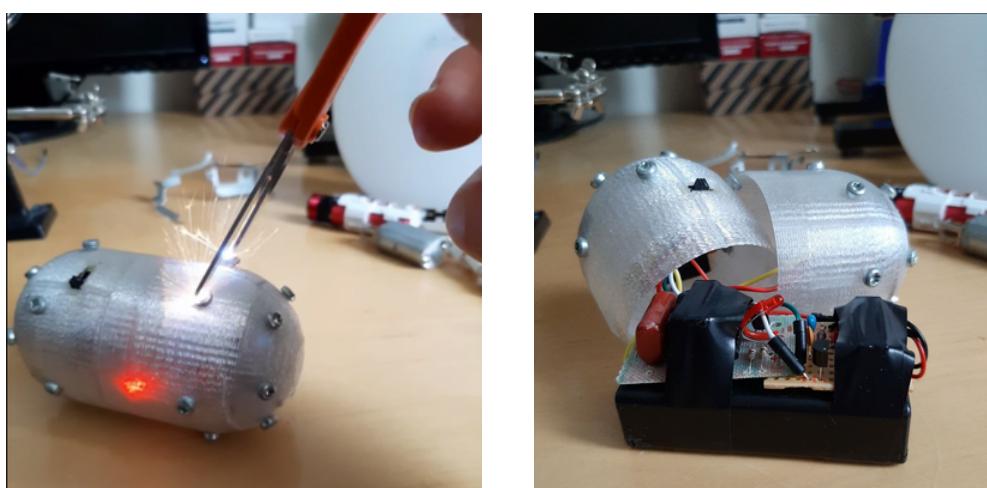
Electric safe

- PIC microcontroller programmed with C
- Passcode is stored in EEPROM so it can be changed
- Had to solve how to manage 16 buttons with 8 wires without dedicated libraries
- Powered with old battery from RC-car and case made of laminated wood



Electric Hot Potato

- Classic Hot Potato game but it gives electric shocks
- Voltage riser circuit from electric fly swatter connected to my own control circuit
- C programmed PIC-microcontroller that supplies voltage to screw heads on the surface
- Self 3D modelled and printed plastic casing



Logic with buttons

- Left display shows how many of three buttons are pressed and the reading can be saved to the right display by pressing the fourth button
- Made with logic integrated circuits (AND, OR etc.)
- Powered through USB and fused
- 3D modelled and printed casing

