Karthik D K

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Experience

Senior Software Engineer — *Bosch Global Software Technologies* — *August 2019 - Present*

Hubris OS RISC-V Port

- Currently porting the Hubris operating system to RISC-V architecture.
- Implemented kernel support, memory protection units (PMP), and task isolation mechanisms specifically for RISC-V cores, enabling secure multi-tasking in resource-constrained environments.
- Overcame critical hardware-specific challenges including RP2350 errata workarounds and Physical Memory Protection (PMP) configuration for secure task execution.

Predictive Emission Modelling for Motorcycles

- Conceptualized and implemented machine learning models to predict the emissions of nitrogen oxides (NOx), hydrocarbons (HC), and carbon monoxide (CO) in motorcycles, addressing critical challenges in vehicle emissions.
- Achieved superior R^2 scores and secured the runner-up position in a Bosch India AI hackathon, demonstrating predictive accuracy and expertise in emission data analytics.

MLLib DecisionTree Inference

- Developed an inference algorithm for DecisionTree in C for PowerTrain ECU.
- Utilized Flat Buffers for defining and parameterizing the model through calibrations.

E-Wastegate System Configuration

- Configured and integrated an electronic wastegate (e-wastegate) system into the powertrain ECU, enabling accurate control of turbocharger performance.
- Set up a PWM pin for e-wastegate actuation and an ADC pin to process the feedback signal from the e-wastegate position sensor.

Advanced Exhaust Temperature Management

- Developed a comprehensive component for reading temperature sensors via CAN and implementing sensor diagnostics to comply with EU7 standards.
- Implemented statistical analysis to monitor temperature distribution across catalyst, improving emission control efficiency.

Skills

Programming Languages: C, Python, Rust
Tools and Frameworks: Git, PyTorch, Linux, ASCET
Languages: Kannada, English, Telugu

Certifications

Machine Learning — Certificate
Coursera — 2020

Education

University Vishweshwaraya College of Engineering — **75.2%**
B.E in Electronics and Communication — 2019

Devaraja URS PU College — **94.5%**
PUC — 2015

Achievements

Awards and Honors

• One Time Award	Department Head
• Bronze Award	Group Manager
• Shout Out	Manager
• Extra Miler	Manager
• Hackathon Winner	AI/ML
• Participated twice in Chess championship	State Level
• Crowdsourcing Champ	Crowdsourcing Head

Blogging

- Documenting my knowledge with programming, software engineering and motorcycles to create a knowledge repository for future reference, aiding both emerging LLMs and my personal growth.

Open-Source Contributions

- Actively contributing to GitHub projects, including notable contributions to fastai and FluxML Deep Learning libraries.

Projects

Open Source Projects

ixv

- Developed a CLI application in Rust for verifying Intel HEX file(s).
- Published the binary on crates.io, receiving thousands of downloads from the community.

robot-hat-rs

- Developing the unofficial Rust implementation of the robot-hat Python library.
- Published the library on crates.io, receiving thousands of downloads from the community.

exhubris

- Built blinky demo application on RP Pico 2W Board.
- Demo works successfully on both ARM core Cortex-M33 and RISC-V core Hazard3.

picars

- Created an autonomous vehicle system using Raspberry Pi and PiCar-X kit, leveraging Rust and Python.
- Developed Rust bindings and interfaced with Python to optimize execution speed.

rprs

- Developed a CLI application in Rust for replacing file(s).

GeekyMicky

- Tackled the Micro-Mouse Maze Challenge using Arduino Uno and C programming.

Graduation Project

Closed-Loop Control of Anesthesia Administration

- Designed an automated closed-loop control system for General Anesthesia using a PID controller.
- Developed a system to regulate the depth of hypnosis using propofol administration and Bi-Spectral Index (BIS) as a controlled variable.
- Implemented the project using MATLAB/Simulink.