

# Karan Bajpai

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## EDUCATION

**B.S. in Computer Science - Pacific University**, Forest Grove, OR

August 2020 - May 2024

**GPA:** 3.7

**Awards:** Dean's List, Recipient of Future Connect Scholarship

**Honors:** Magna Cum Laude

**General Education - Portland Community College**, Portland, OR

September 2018 - June 2020

**GPA:** 3.90

**Awards:** President's List, Dean's List, Recipient of Future Connect Scholarship

**Relevant Courses:** Data Structures / Object Oriented Programming / Operating Systems / Computer Networking / Computer Security / Web Development / Mobile Development / Object Oriented Design / Algorithms / Databases

## SKILLS

### Robotics Hardware:

- Basic hardware tools including oscilloscopes and VOMs / Hardware protocols including SPI, I2C, and PWM / Sensors including IMU, LIDAR, GPS, and Depth Cameras / Actuators including servos and PWM motor control / UI elements including gamepads, audio output, text displays, and LEDs / Single Board computers including Raspberry Pi & Arduino

### Robotics Software - ROS2:

- Low level integration to ROS topics / Located and coded nodes for camera, lidar, 9-axis IMU, DC motor control, gamepad / Launch files / Gazebo simulation

### Embedded Linux:

- Process creation and management / Simple interprocess communication / File I/O

### Web Interfaces:

- Static websites using HTML and CSS / Interactive UIs using Javascript

### Programming:

- Languages (C, C++, Python, SQL, Java, JavaScript) / Advanced Object Oriented Design / Event driven programming / TCP client & server programming / Tools including Git, Visual Studio Code, & Wireshark

## PROJECTS

### RC Car with Multi-Sensor Integration (Ongoing) - C++, Python, ROS2, Raspberry Pi, LiDAR, IMU

- Building an autonomous RC car using real-time LiDAR and IMU data for obstacle detection and navigation
- Developing ROS2 nodes for sensor fusion, motor control, and system coordination
- Demonstrated embedded integration of hardware and software in a mobile robotics platform

### Chess-playing Robot - C++, Python, Arduino Mega, Raspberry Pi

- Engineered a robotic arm that plays chess by communicating with Stockfish AI API
- Programmed precise motor control using Arduino and system logic in Python on Raspberry Pi
- Showcased multi-device embedded coordination and real-time physical actuation

### Online Bank System - C++, File I/O, UML

- Designed a backend system for managing account logic, transactions, and file persistence
- Used OOP principles to model checking / savings operations with error handling
- Strengthened structured system thinking, data integrity, and embedded-safe file management

### Shell Emulator - C, Linux System Programming

- Built a UNIX-style shell with support for piping, redirection, and background processes
- Used system calls to handle process creation and inter-process communication
- Reinforced embedded Linux and OS-level control critical for low-resource environments

### TCP Socket Server - C, Linux, Wireshark

- Created a TCP client-server system capable of persistent data packet exchange
- Implemented custom protocol logic and validated integrity using Wireshark
- Applied low-level networking knowledge relevant to embedded device communication

## General Work Experience

### Ace Hardware - Cashier / Sales Associate

November 2024 - Present

- Supported customers with hardware tools and product troubleshooting, reinforcing real-world problem solving

### Material Handler - Analog Devices

July 2020 - December 2020

- Handled sensitive components, inventory logistics, and assembly tasks in a semiconductor environment