

YUVRAJ CHAHAL

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TECHNICAL SKILLS

Languages: C, C++, Python, Java, JavaScript, HTML/CSS, MATLAB

Embedded & Hardware: ESP32, Raspberry Pi, PWM motor control, PID control, brushless DC motor control, I²C, SPI, UART, ultrasonic and IMU sensor integration

Tools & Frameworks: Git (branching, pull requests, code review), Linux CLI, VS Code, OpenCV, Spring Boot, REST APIs, Microsoft Excel and Access

Design & Modelling: SolidWorks, Autodesk Fusion 360, 3D modelling and assemblies, system modelling and simulation

EXPERIENCE

Volunteer Data Entry Assistant

2023

Surrey, BC

- Maintained and updated records across Microsoft Excel and Access databases by standardizing entry formats and cross-referencing source documents, reducing duplicate and inconsistent entries.
- Cleared assigned data-entry backlogs ahead of deadline by batching similar record types, earning supervisor recognition for accuracy and reliability.

TECHNICAL PROJECTS

Mecanum-Wheel Obstacle-Sensing Robot

May 2026 – Present

Personal Project

- Designed a four-wheel mecanum drive platform around an ESP32 microcontroller with ultrasonic obstacle detection, enabling omnidirectional movement and automatic stopping before collisions.
- Implemented a PID control loop in C++ for autonomous route-following, achieving stable closed-loop navigation without manual correction.
- Programmed motor driver and sensor-polling routines and established a Bluetooth serial command protocol, allowing full wireless operation of the robot from a remote device.

Upsolve.io – Knowledge-Management Web Application

January – April 2026

Introduction to Software Engineering (CMPT 276), SFU

- Led front-end development of a knowledge-management platform for competitive programmers, building the problem-tagging interface, user dashboard, and solution-submission flow in HTML, CSS, and JavaScript to deliver a fully functional interface by the project deadline.
- Coordinated REST API contracts with back-end teammates developing a Spring Boot service, preventing integration rework during final assembly.
- Established a Git branching strategy and reviewed teammates' pull requests against agreed code standards, keeping the main branch stable throughout development.

Snake Game – Embedded C

January – April 2026

MSE 152, SFU

- Developed the core game loop, collision detection, level progression, and delta-time tick control in C for an embedded target, producing consistent gameplay speed independent of processor timing.
- Designed an input-queue buffer to capture keystrokes between ticks, eliminating dropped inputs and enabling smooth multi-key directional sequences during fast gameplay.

- Built a multiplayer mode with independent lives and per-player scoring, and co-developed a high-score system serialized to non-volatile storage so results persisted across power cycles.
- Directed task allocation and integration as team lead, delivering all planned features by the submission deadline.

Brushless DC Motor Build

January – April 2026

PHYS 141, SFU

- Designed and assembled a functional brushless DC motor from raw components by applying electromagnetic induction and Lorentz-force analysis, producing a working prototype from first principles.
- Wound stator coils and set rotor magnet spacing to control commutation timing, achieving continuous self-sustaining rotation.
- Measured output rotational speed and compared it against theoretically calculated RPM targets, confirming the build matched predicted performance.

AutoCurve Assistant – AI Vehicle Valuation Tool

February 2026

SFU Hackathon

- Developed a hybrid used-vehicle valuation engine combining historical market data with an AI condition assessment, returning both a fair-value estimate and a physical condition report from a single user submission.
- Designed a statistical pricing model over scraped historical listing data to generate current fair-value ranges by vehicle make, model, and year.
- Integrated a vision-language model to analyze user-uploaded photographs and output structured condition flags, replacing manual inspection notes with automated assessment.
- Built the Python backend and REST API layer connecting the valuation engine to the AI evaluation module, completing a working end-to-end demonstration within the hackathon window.

RELEVANT COURSEWORK

Autonomous Vision-Guided Robot Platform

September – December 2025

Mechatronic Design Studio I, SFU

- Co-programmed a HiWonder Raspberry Pi robot in Python to perform real-time obstacle avoidance using ultrasonic sensing and depth estimation, enabling autonomous navigation through a cluttered course.
- Built computer vision pipelines in OpenCV for face and object detection on a live video stream, allowing the robot to identify and track targets in real time.
- Interfaced expansion boards with Raspberry Pi GPIO and configured PWM signals for multi-axis servo and brushless DC motor control, achieving coordinated arm and drive movement.
- Wrote firmware-level Python covering sensor-polling loops and interrupt-driven input handling, reducing missed sensor events during continuous operation.

EDUCATION

Bachelor of Applied Science, Mechatronic Systems Engineering

September 2024 – April 2029

Simon Fraser University, Burnaby, BC

- Dean's Honour Roll: Fall 2025, Spring 2026

INTERESTS

Film and documentaries, badminton, cricket, swimming