SIDDHARTH KHANNA

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Self-starter with a strong foundation in Robotics and AI, specializing in automation, machine learning, and intelligent systems. Experienced in leading projects, deploying real-time control and perception pipelines, and collaborating across disciplines in dynamic environments. Passionate about building scalable, innovative solutions at the intersection of hardware and intelligence.

PROFESSIONAL SKILLS

Programming Skills: Python, VB.Net, SQL, Git, Docker, MATLAB, JavaScript (TypeScript, Node.js), HTML/CSS, React, Next.js, Flask, Neo4j, API
Robotics/ML/AI Skills: PyTorch, TensorFlow, Keras, Scikit-learn, Transformers, LLMs, RAG, GraphRAG, OpenCV, ViT, CNN, YOLO), ROS, SLAM

EDUCATION

University of Toronto   *2020-2025*

Bachelor of Applied Science and Engineering: Major in Engineering Science (Robotics)
- **Dean's Honour List every semester.**
- **Relevant Courses**: Mobile Robotics and Perception, Robotics Capstone, Computer Vision for Robotics, Deep Learning, Control Systems, Robot Modelling and Control, Mathematics for Robotics.
- **Thesis**: Optimizing 3D metal printing with 316L stainless steel powder using Laser-Directed Energy Deposition (LDED). Applying machine learning to refine melt pool dynamics and key parameters, reducing defects like porosity and cracks, and enhancing material quality through real-time monitoring and Bayesian optimization.

WORK EXPERIENCE

Mold Master LTD   Georgetown, Ontario

Automation Developer   *May 2023 - Present*
- Managed multiple projects simultaneously, while effectively prioritizing tasks.
- Developed automation tools with VB.Net, streamlining complex CAD model creation for in-house and client use.
- Collaborated with engineers and managers, integrating feedback-driven improvements that increased tool adoption.
- Pioneered improvement initiations for existing automation tools, driving process efficiency and quality, by 20%.
- Automated data analysis from SQL databases, creating real-time reports with the use of VBA, improving speed by 30%.

EXTRA CURRICULAR ENGAGEMENTS

Robotics For Space Exploration (RSX)   UofT, Toronto, Ontario

Software and Automation Engineer   *April 2022 – October 2022*
- Set up the Lidar and Inertial Measurement Unit using ROS and Python for the Rover.
- Developed and implemented codes for the movement of the rover arm using Arduino.
- Simulated Path Planning, State Estimation, and Obstacle Avoidance, improving efficiency by 10%.

University of Toronto Blue Sky Solar Racing team)   UofT, Toronto, Ontario

Chief Manufacturing and Structural Engineer + Fabrication Member   *May 2021 – November 2023*
- Led a cross-functional team of 15, overseeing manufacturing operations and ensuring structural integrity of components.
- Reduced material waste by 17% through lean manufacturing principles in the plug manufacturing process.
- Managed procurement, budgets, and sponsorships, facilitating our participation in the World Solar Challenge 2023.
- Applied ANSYS for structural simulations, optimizing the design and ensuring structural integrity.

PROJECTS

Golf Ball Tracking Drone
- Developed a real-time golf ball tracking system using both YOLOv11 and traditional OpenCV-based HSV filtering, comparing performance across lighting and motion conditions (YOLO: 92% precision, HSV: 86% tracking accuracy).
- Integrated the drone with ROS2, enabling modular and scalable control architecture for autonomous operation.
- Implemented autonomous waypoint navigation using PoseStamped, MAVROS, and custom services/subscriptions.
- Designed a robust state machine using sensor fusion and PID-based control, for stable flight and position tracking.

"ingrAIdients" ML Project (ViT + LLM for Recipe Generation)
- Implemented a Vision Transformer (ViT-B/16) model for feature extraction and ingredient prediction, utilizing self attention and data augmentation to improve accuracy over CNN-RNN approaches, improving accuracy by 50%.
- Collected a diverse test set via web scrapping, ensuring robust and better generalization of the model to real-world images.
- Extended the course project by integrating a Large Language Model (LLM) via OpenRouter API, to generate step-by-step recipes from ViT-predicted ingredients, building a seamless end-to-end vision-to-language pipeline.

AI Story Studio (Next.js + Flask + LLM)
- Built a full-stack AI story using Next.js (frontend), Flask (backend), and OpenRouter LLM APIs (Mistral-7B).
- Designed a multi-step interactive flow with memory-based story context, tone selection, and voice-driven generation.
- Implemented dynamic prompt chaining, adaptive temperature control, and session persistence for coherent, personalized storytelling
- Integrated Tailwind CSS + Framer Motion for responsive, cinematic UI and seamless creative experience.

Sid-Portfolio Chat (GraphRAG + Neo4j + Next.js) - *Available at sid-portfolio-chat.vercel.app/*
- Developed an AI-powered personal portfolio chatbot using Graph-RAG and a Neo4j knowledge graph to deliver context-aware answers about projects and skills.
- Connected LangChain, OpenRouter APIs, and structured project triples to enable semantic retrieval and reasoning.
- Built with Next.js + Tailwind CSS, featuring conversational UI, graph-driven retrieval, and real-time project insight generation.
- Designed a graph-based retrieval schema linking 80+ project nodes, allowing semantic cross-referencing.
- Deployed with Edge Functions and API routing for fast, low-latency responses.