# Sagnik Ghatak

# Robotics & Al Researcher

Aspiring AI and Robotics Engineer with a strong foundation in autonomous systems and advanced AI methods. Passionate about applying cutting-edge technologies to solve real-world challenges.

sagnikghatak22@gmail.com

+491755538219

linkedin.com/in/sghatak5

github.com/sghatak5



# **EDUCATION**

# Master's Degree - Al Engineering of Autonomous Systems

Technische Hochschule Ingolstadt

10/2023 - Present

Ingolstadt, Bavaria, Deutschland

# **Bachelor's Degree - Electrical Engineering**St. Thomas' College of Engineering & Technology

08/2017 - 06/2021

Kolkata, West Bengal, India.

Thesis

 Speed Control of DC Motor using Fuzzy Logic

## **EXPERIENCE**

# **Student Research Assistant**

AI Motion, Technische Hochschule Ingolstadt

03/2025 - Present

Ingolstadt, Bavaria

#### Tasks

- Analyze and evaluate various Deep-Reinforcement Learning (DRL) methods for mobile robot control, focusing on convergence rate, stability, and real-time performance.
- Implement an RL-based control policy in Gazebo using ROS2 and the Stable Baselines package, enabling autonomous navigation and behavior optimization in dynamic environments.

# **Team Member - Driverless** Schanzer Racing Electric e.V

10/2023 - 08/2024

Ingolstadt, Bavaria

### Achievements/Tasks

- Designed and implemented Camera Perception Stack using Yolov8 and RansacPnP.
- Designed a dual Extended Kalman Filter (EKF) system for robust sensor fusion, integrating steering angle sensors, wheel odometry, and GPS data to enhance vehicle state estimation.
- Designed a path planning algorithm for autonomous driving in dynamic environments to generate optimized paths for acceleration and maneuvering, ensuring precise and adaptive navigation.
- Simulated and validated the autonomous system components within a ROS2 workspace, ensuring seamless inter-node communication and real-time performance in a production-like environment.

# **Programmer Analyst**

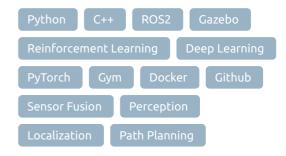
Cognizant

01/2021 - 09/2023 Kolkata, India

Achievements/Tasks

- Engineered ETL processes with Informatica PowerCenter, cutting data processing time by 30%.
- Automated tasks with UNIX and Python scripts, reducing manual intervention by 60%

# **SKILLS**



# **PERSONAL PROJECTS**

### **EKF Sensor Fusion for Localization**

- Simulated px4vision drone in Gazebo using PX4 Autopilot and ROS2 using MicroXRCEAgent as communication protocol.
- Implemented multi-modal sensor fusion approach integrating IMU and GPS data using EKF, enhancing the robustness and reliability of localization system.

### Echo-bot

- Developed an autonomous bot with SLAM capabilities using ROS2 and simulate it in Gazebo.
- Integrated sensor plugins like Depth Camera, LiDAR and control plugins like ros2control.
- Implemented Nav2 module to integrate autonomous capacities.

### Reinforcement Learning: Tower of Hanoi

- Designed and implemented a custom environment for the Tower of Hanoi using the Gymnasium framework
- Developed a Q-learning agent to solve the Tower of Hanoi problem.

### Local Path Plannar of Autonomous Vehicle

- Developed a local path planner for executing robust evasive maneuvers around obstacles, utilizing a bicycle model and PID controller.
- Achieved improved navigation accuracy and enhanced obstacle avoidance in dynamic environments.

### **CERTIFICATES**

Deeplearning.AI - Advanced Learning Algorithms

# **LANGUAGES**

English

Full Professional Proficiency

German

Elementary Proficiency