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| Shin Hyeonhak    CONTACT  Address:  1326, Jangdeok-dong, Gwangju, South Korea  Phone:  +82) 10 5687 0661  Email:  [imur.navigator@gmail.com](mailto:imur.navigator@gmail.com)  Github:  [https://github.com/ Carpediem324](https://github.com/Carpediem324)  LANGUAGES  Korean – Native  English – Business Level |  | OBJECTIVE  To leverage my expertise in C++, Python, and robotics to develop reliable and efficient software systems, thereby contributing to the advancement of autonomous driving and robotics.  WORK EXPERIENCE  01/2024 - 06/2024  Research Intern,  Korea Atomic Energy Research Institute (KAERI), Daejeon, Korea  Responsibilities:   * Built a data visualization panel for robot operations * Used Isaac Sim to test and evaluate 3D SLAM open-source software * Conducted extreme-environment experiments with a Unitree Go1 quadruped robot to improve SLAM performance   07/2022  Administrative Intern,  Yeosu City Hall, Yeosu, Korea  Responsibilities:   * Sorted and recorded incoming mail with attention to detail * Assisted citizens with inquiries, providing polite and efficient support   EDUCATION  2018 - 2024  Bachelor Degree of Computer Science,  Korea University of Technology and Education (KOREATECH)  2015 - 2018  High School Diploma, Yeocheon High School, Yeosu, Korea  Academic Awards / Achievements  • Grand Prize in the Unmanned Mobility Category at the 2023 University Creative Mobility Competition  (Awarded by the Ministry of Land, Infrastructure and Transport)    • Excellence Award in the Embedded Robotics Track at the Samsung Youth Software Academy (SSAFY)  (Recognized by Samsung Electronics)  ADDITIONAL SKILLS  Programming Languages: C++, Python, JavaScript  Web Technologies: HTML, CSS, Node.js  Robotics: ROS, ROS2 |

ACTIVITIES

07/2024 – 01/2025

SAMSUNG SW ACADEMY FOR YOUTH(SSAFY)

Embedded Robot Track

PROJECTS

1) STUDENT CREATIVE MOBILITY COMPETITION 2023 Unmanned Mobility part

- Team Composition: 12

- Role: Localization Lead

- Details:

• Vehicle position and heading estimation using RTK GPS and IMU

• Conversion from WGS-84 coordinate system to UTM

• Creation of Global Path using JOSM

• Autonomous mission execution on the K-City track (avoiding static, small, and large obstacles, delivering in shaded areas, etc.)

- Video: https://www.youtube.com/live/g-u4luKR8nU?si=1tMJbcV1\_7eGXlJx&t=16490

- Article: https://www.yna.co.kr/view/AKR20231017031600003

2) Nanosaur Line Tracing

- Team Composition: 3

- Role: Motor Control & Line Detection

- Details:

• Creation of a tracked Nanosaur vehicle using the Jetson Nano board

• Line detection using OpenCV and conversion to HSV

• Implementation of motor control algorithm and line following logic in C++

- GitHub: https://github.com/Carpediem324/nanosaur\_robotprogramming

3) Web Panel for Space Exploration Rover

- Team Composition: 2

- Role: WebRTC & ROS Integration

- Details:

• Implementation of a web panel to share the robot camera using WebRTC, with external deployment via Ngrok

• Real-time visualization of ROS topics (e.g., motor RPM data) on the web panel using roslib.js

4) Indoor SLAM Evaluation in Extreme Environment

- Team Composition: 3

- Role: Network and SLAM Parameter Analysis

- Details:

• Establishment of an internal network using OpenVPN

• Measurement of Round-Trip Time (RTT) and estimation of Network Budget using Action Programming in both ROS1 and ROS2

• Tuning and experiments with HDL Graph SLAM parameters

• SLAM performance testing using NVIDIA Isaac Sim (PhysX Lidar, RTX Lidar)

• Creation of corridor, circular, and rectangular maps using SolidWorks and performance evaluation in various environments

• Indoor SLAM experiments and evaluations using the Unitree Go1 robot

• Combination of 3D maps with radiation data and creation of 2D radiation maps using PyQtGraph

5) Mock Interview Website with STT

- Team Composition: 4

- Role: Backend & Prompt Engineering

- Details:

• Setup and deployment of authentication and database using Firebase

• Implementation of STT using webkitSpeechRecognition

• Extraction of keywords and spell checking using npm packages (keyword-extractor-korean, hanspell)

• Automatic generation of interview answers and follow-up questions using the OpenAI GPT API (Prompt Engineering)

- GitHub: https://github.com/toodox/kut\_stt

- Web Link: https://koreatechsttmockinterview.web.app

6) RAG-based Chatbot Service

- Team Composition: 4

- Role: LangChain & Upstage RAG Pipeline

- Details:

• Construction of a LangChain and Upstage RAG pipeline (using UpstageEmbeddings)

• Extraction of keywords from user queries via LLM (Solar)

• News search related to the query using the Naver News Search API (or Google SERP API when necessary)

• Top-K similar document retrieval using Chroma DB

• Generation of responses by feeding the extracted news articles back into the LLM (using a RAG structure)

- GitHub: https://github.com/haerim-kweon/newchats

7) Dobot Magician Project

- Team Composition: 2

- Role: ROS Programming & Digital Twin

- Details:

• Control of Dobot in a ROS environment (via socket communication)

• Transmission of joint angle data between RoboDK and Dobot (Sim to Real to Sim)

• Panel recognition using Yolov8 → Socket communication via Raspberry Pi → Operation of conveyor belt & object classification

- GitHub: https://github.com/Carpediem324/ssafy\_project

8) ROBOCOP (Unmanned Security Robot Control System)

- Team Composition: 6

- Role: Autonomous Driving Implementation in Simulation

- Details:

• Transmission of robot data and reception of commands based on web socket communication

• Remote web-based control of the robot

• Creation of a Global map and publishing heading based on the robot’s current location

• 3D Lidar-based object detection and issuance of emergency stop commands upon obstacle detection

• Global Path Planning based on the A\* algorithm

• Robot driving control based on Pure-Pursuit

• Robot state control using custom Topic messages and Services

9) Home-based Intelligent Voice Assistant System: Distributed Voice Event Detection and AI Assistant Integration (in collaboration with Samsung Electronics’ DA Division ~ing)

- Team Composition: 6

- Role: Embedded On-Device Keyword Recognition

- Details:

• Establishment and operation of a Docker container environment based on Raspberry Pi 5 (Ubuntu 24.04)

• Implementation of a wakeup keyword recognition module for real-time learning and processing of user voice commands

• Transmission of voice data to the AP via MQTT protocol upon keyword recognition

• Packaging into a Docker container for stable operation in various environments, with plans for future deployment on Docker Hub

Licenses & Certifications

1. Vocational Competency Development Instructor

Issuing Organization: Ministry of Employment and Labor

Registration Number: Teacher Level 3 - No. 96945

Acquisition Date: 2024.08.14

2. Information Processing Engineer

Issuing Organization: Human Resources Development Service of Korea

Registration Number: 24202060700U

Acquisition Date: 2024.09.10

3. Microsoft Certified: Azure AI Fundamentals (AI-900)

Issuing Organization: Microsoft

Registration Number: wdJJw-H9uh

Acquisition Date: 2023.12.06

4. Word Processor Level 2

Issuing Organization: Korea Chamber of Commerce and Industry

Registration Number: 11-I9-003537

Acquisition Date: 2011.01.28

5. Class 1 Driver's License

Issuing Organization: Jeonnam Provincial Police Agency

Registration Number: 18-18-600455-90

Acquisition Date: 2018.01.05