Dong Heon Han

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Portfolio: https://dongheonhan.github.io/website/

EDUCATION

University of Michigan, Ann Arbor, MI   May 2025
  Master of Science, Mechanical Engineering
Georgia Institute of Technology, Atlanta, GA   August 2021
  Bachelor of Science, Mechanical Engineering

WORK EXPERIENCE

Republic of Korea Army, Signal Corpsman   Jan 2022 – Present
Seoul, South Korea
- Serving mandatory military service for 18 months as a signal corpsman in the Republic of Korea Army.

Visiting Research Assistant   Aug 2021 – Dec 2021
Seoul National University, Seoul, South Korea
- Worked as a project leader in ORED lab developing an algorithm for a tractor's autonomous path tracking algorithm.
- Assisted a week-long tractor system's noise/vibration test by using Simcenter Testlab's digital signal processing.
- Was in charge of conducting text mining for Korean government's agricultural technical reports and emphasized the importance of an AI research.

Heat Transfer Tutor   May 2021 - Aug 2021
Georgia Institute of Technology, Atlanta, GA
- Taught Georgia Tech undergraduates in a tutoring program sponsored by Shell Oil Company and Air Products.

Undergraduate Researcher, Project leader of VIP (Vertically Integrated Projects)   Sep 2019 – Aug 2021
Georgia Institute of Technology, Atlanta, GA
- Led a team as a product leader in the LIDAR lab designing, manufacturing, and controlling a humanoid robot's neck.
- Integrated the robot's neck with its upper body and conducted a dynamic simulation model for upper body robot by using MATLAB and Drake.
- Was involved in designing Cassie robot foot's soft contact pad that estimates terrain geometries, stiffness, and granular media properties by using embedded sensors and terrain classification algorithm.

Research Intern   June 2018 - Aug 2018
KIMM (Korea Institute of Machinery and Materials), Daejeon, South Korea
- Was involved in developing a new technology using GPS, IMU, LiDAR, and cameras which let agricultural and construction machines perform path planning, particularly in the open field.
- Used C++, Simulink, and sensor fusion technology to manage signals from environmental recognition sensors.

Physics I Undergraduate Teaching Assistant   Jan 2018 - May 2018
Atlanta Metropolitan State College, Atlanta, GA
- Assisted students in labs and classrooms with coursework and the professor with grading assignments.

SKILLS

Computer Languages	Java (advanced), Arduino (advanced), C++ (advanced), Python
Software	MATLAB/Simulink (advanced), SolidWorks (advanced), Siemens NX (advanced), ANSYS, LabView
Technical	Robot Kinematics, Low/High-Level Control, Control Theory, FEA, CFD, Object-Oriented Programming, Machine Learning, System ID, Circuit Design, Digital Signal Processing
Languages	English (fluent), Korean (native)

PROJECTS

Seoul National University, **Artificial Intelligence Project for an Autonomous Agricultural Vehicle**
  Project Leader   Aug 2021 – Dec 2021
  "Development and Implementation of a Tractor's Path Tracking Algorithm Based on Dynamic Target Control"
- Developed an autonomous path tracking algorithm that adapts to the working environment for a self-driving tractor.
- Used dynamic target control to decrease the error of the tractor's head and the distance from the desired path.
- Used Object-oriented programming in both C++ and MATLAB to implement the path tracking algorithm.
- Applied machine learning technique to optimize the tractor's turning trajectory and to increase target accuracy.

Georgia Tech, **ME 4056 – Senior Capstone Design**

Analytics Branch Leader   May 2021 – Aug 2021

"Blower Tip's Variable Nozzle Design Sponsored by TTI (Techtronic Industries)"
- Creatively designed a variable nozzle attachment's mechanism for a DIY homeowner that reduced the cross-sectional area of the nozzle's tip. Integrated 3 mechanisms – jet nozzle, vegetable steamer, and gear-cam mechanism.
- Conducted the CFD to find out what effect the nozzle prototypes' head loss had on the velocity of the wind and the CFM flow rate by using Siemens NX Flow.
- Verified whether the variable nozzle could withstand 5,000 cycles of opening and closing, using S-N diagram and the max stress found by the FEA. Verified design is now patent-pending at the U.S. Patent.

Georgia Tech, **Undergraduate Research Project**

Project Leader   Jan 2021 - May 2021

"Computer-Aided Manufacturing and Dynamic Analysis of a Six Degree of Freedom Stewart Platform Manipulator"
- Attached 6 DOF Stewart Platform manipulator on a humanoid robot to implement human-like neck movement.
- Conducted an inverse kinematics to determine dynamic parameters of a 6 DOF parallel mobile structure.
- Performed PID tuning through the Simulink's System ID tool and controlled the square waves' duty cycle of the linear actuators.
- Designed a circuit for the Stewart platform with an Arduino MEGA, P16 Actuators, and H-Bridge Motor Drivers.
- Developed controlling algorithm in Arduino and C++ that synchronized and controlled 6 manipulators within 5% of the desired position and developed a simulation program using MATLAB based on the kinematic analysis.

Georgia Tech, **ME 4042 – Interactive CAD & CAE**

Project Leader   Aug 2020 - Dec 2020

"Structural Analysis of Horizontal-axis Wind Turbine base on CFD and FEA"
- Modeled the complex design of the wind turbine's skin and shear web using S809 airfoil on Siemens NX.
- Obtained the lift and drag coefficients that change according to the velocity of wind by conducting CFD.
- Found the blade's maximum stress and deformation that vary depending on the blade's web design, materials, and wind speed and calculated the factor of safety by conducting FEA.

LEADERSHIP EXPERIENCE

Drone Club, President   Aug 2018 - Dec 2018

Atlanta Metropolitan State College, Atlanta, GA
- Established the drone club and held the weekly meetings as the club president.
- Designed and built an Arduino-controlled quadcopter drone, while also developing a code that controls the 4 motors stabilizing the drone.

AWARDS

VIP Innovation Competition - 1st Place in Hardware, Devices & Robotics Track   April 2021
- Awarded to the most innovative and active research team in Georgia Tech. Received award as a member of LIDAR's Athena team.

President's Undergraduate Research Awards (PURA)   Oct 2020
- Received scholarship stipend as an undergraduate student who is conducting research with a Georgia Tech faculty member or a Georgia Tech Research Institute scientist.

Georgia Korean American Grocers Association (GA KAGRO) Scholarship Award   Dec 2016
- Was awarded scholarship for academic excellence and community leadership.

PUBLICATIONS

Dong Heon Han; Seo Jung Byeon; Kyeong-Dae Kim; Gyu Ha Han; Moo Hyun Cha; Young-Jun Park. *Development of Path Tracking Control Algorithm for Tractor Autonomous Driving.* Proceedings of the Korean Society for Agricultural Machinery Conference, 2021.

PATENTS

Dong Heon Han, Hang Man Choi, Michael Coltharp, Peter Kaminski, Graham Langford, Peyton Lee. 2021 *Blowers with variable nozzles.* U.S. Patent 17,520,578 filed November 5, 2021. Patent pending.

RELEVANT COURSEWORK

Dynamics of rigid bodies, System Dynamics, Control of Dynamic Systems, Computing Techniques, Machine Design, Interactive CAD & CAE, Intro to Object-Oriented Programming, Intro to C++ Programming, Discrete Mathematics