

Assefinew Wondosen Belaygibaw

✉ wondebly@pusan.ac.kr

🌐 <https://wondesenb.github.io/about/>

🔍 <https://scholar.google.com/citations?hl=en&user=LxyDFboAAAAJ>

🌐 <https://www.linkedin.com/in/wondesen-assefinew-0526225b/>



Employment History

- 2024 – **Research and Development** at PNUDRONE, Busan, South Korea.
- 2015 – 2018 **Lecturer.** Department of Electrical and Computer Engineering, School of Engineering, Adama Science and Technology University, Adama, Ethiopia.
- 2010 – 2011 **Graduate Assistant.** Department of Electrical and Computer Engineering, School of Engineering, Adama Science and Technology University, Adama, Ethiopia.

Education

- 2018 – 2024 **Ph.D. in Aerospace Engineering**, Pusan National University, Busan, South Korea.
Research area: Sensor fusion, UAV navigation and guidance, Embedded systems, and Machine learning.
- 2012 – 2015 **M.Sc. in Control Engineering**, Addis Ababa Institute of Technology, Addis Ababa, Ethiopia.
Thesis title: *Intelligent Controller for Autonomous Mobile Robot Outdoor Navigation: Fuzzy Logic Approach*
- 2006 – 2010 **B.Sc. in Electrical Engineering**, Arba Minch University, Arba Minch, Ethiopia.
Thesis title: *Computer Based Remote Controlled Mobile Robot Design and Implementation.*

Projects

- 2023 – 2024 **Ship Tracking and Docking Support using AI-Powered Drone**
The project involved preparing a dataset and training a machine-learning model using the YOLOv5 framework. The model detects ships and extracts information, such as relative location, orientation, and dimensions, from live onboard camera views. The software developed in C++, was deployed on the Modalai VOXL 2 autopilot. It grabs live video frames from the camera stream, overlays detection results onto the input video, and streams the output to a ground station.
- 2021 – 2022 **Inertial Navigation Sensor (INS) Design and Development**
This project encompasses developing sensor drivers for IMU, magnetometer, and barometer on a Texas Instruments microcontroller, implementing an Extended Kalman Filter-based sensor fusion algorithm to estimate attitude and altitude, and integrating Mavlink protocol support for communication with external systems.
- 2020 **UAV Flight Controller (Autopilot software) Design and Programming**
This project centers on developing driver code for interfacing EEPROM and SD cards with a TI microcontroller and setting up a logging protocol for efficient data management and retrieval.

Projects (continued)

- 2019  **Vision Based UAV Localization and Navigation**
This project centers around developing an object detection and recognition system using Yolo3 on the Jetson Xavier platform. The system integrates a ZED stereo camera to enhance depth perception and accuracy. Additionally, the project entails interfacing the Jetson Xavier with a Pixhawk flight controller to enable localization and navigation capabilities in an indoor environment.
- 2018  **LiDAR Sensor Based Obstacle Avoidance Feature Integration to PX4 Firmware**
The project entails modifying the navigation module of the PX4 code, so as to add obstacles avoidance feature to PX4 algorithm based on LiDAR sensor object distance measurement.

Research Publications

Journal Articles

- 1 Debele, Y., Shi, H.-Y., **Wondosen, A.**, Warku, H., Ku, T.-W., & Kang, B.-S. (2024). Vision-guided tracking and emergency landing for uavs on moving targets. *Drones*, 8(5).  doi:10.3390/drones8050182
- 2 **Wondosen, A.**, & Shiferaw, D. (2024). Fuzzy logic controller design for mobile robot outdoor navigation. arXiv: 2401.01756 [cs.R0]. Retrieved from  <https://arxiv.org/abs/2401.01756>
- 3 Debele, Y., Shi, H.-Y., **Wondosen, A.**, Ku, T.-W., & Kang, B.-S. (2023). Deep learning-based robust actuator fault detection and isolation scheme for highly redundant multirotor uavs. *Drones*, 7(7).  doi:10.3390/drones7070437
- 4 **Wondosen, A.**, Debele, Y., Kim, S.-K., Shi, H.-Y., Endale, B., & Kang, B.-S. (2023). Bayesian optimization for fine-tuning ekf parameters in uav attitude and heading reference system estimation. *Aerospace*, 10(12).  doi:10.3390/aerospace10121023
- 5 Debele, Y., Shi, H.-Y., **Wondosen, A.**, Kim, J.-H., & Kang, B.-S. (2022). Multirotor unmanned aerial vehicle configuration optimization approach for development of actuator fault-tolerant structure. *Applied Sciences*, 12(13).  doi:10.3390/app12136781
- 6 **Wondosen, A.**, Jin-Seok, J., Seung-Ki, K., Yisak, D., & Beom-Soo, K. (2021). Improved attitude and heading accuracy with double quaternion parameters estimation and magnetic disturbance rejection. *Sensors*, 21, 5475.  doi:10.3390/s21165475
- 7 Abera, T., Endale, B., **Wondosen, A.**, & Ho-Yon, H. (2021). Machine learning approach to real-time 3d path planning for autonomous navigation of unmanned aerial vehicle. *Applied Science*, 11, 4706.  doi:10.3390/app11104706

Conference Proceedings

- 1 **Wondosen, A.**, Yisak, D., Seung-Ki, K., Jin-Seok, J., & Beom-Soo, K. (2014). Real-time uav attitude and position estimation error identification using fuzzy. In *KSAS 2020 fall conference* (pp. 895–896). Jeju, South Korea. Retrieved from  https://www.dbpia.co.kr/pdf/pdfView.do?nodeId=NODE10526349&mark=0&useDate=&ipRange=N&accessgl=Y&language=ko_KR&hasTopBanner=true

References

Prof Beom-Soo Kang

Professor
Department of Aerospace Engineering,
Pusan National University,
Busan, South Korea
 bskang@pusan.ac.kr

Dr. Dereje Shiferaw

Professor
School of Electrical and Computer Engineering,
Addis Ababa Institute of Technology,
Addis Ababa, Ethiopia
 dnderejesh@gmail.com