Assefinew Wondosen Belaygibaw

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Employment History

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, and Embedded systems.

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 **Ship Tracking and Docking Support using AI-Powered Drone**

- Dataset preparation and training with Yolov5 and Yolov8
- Software development in C++ for ship detection and information (ship relative location from drone, orientation, and dimension) extraction based on the live onboard camera view.
- Deploying the software in Modalai VOXL 2 autopilot
- Grabbing live video frames from a camera stream
- Streaming the detection result overlayed onto the input video to the ground station

2021 - 2022 **Inertial Navigation Sensor (INS) Design and Development**

- IMU, magnetometer and barometer sensors driver code writing for TI microcontroller
- Extended Kalman Filter (EKF) based sensor fusion algorithm for attitude and altitude estimation
- Mavlink protocol support feature integration

Projects (continued)

2020 **UAV Flight Controller (Autopilot software) Design and Programming**

- EEPROM to TI microcontroller interfacing driver code writing
- SD card to TI microcontroller Interfacing driver code writing and logging protocol setup

2019 **Vision Based UAV Localization and Navigation**

- Object detection and recognition using Yolo3
- ZED stereo camera integration to Yolo3
- Jetson Xavier to pixhawk interfacing
- Localization and navigation algorithm development

2018 **LiDAR Sensor Based Obstacle Avoidance Feature Integration to PX4 Firmware**

- PX4 code navigation module modification
- Simulation test on Gazebo
- Field flight test

Research Publications

Journal Articles

1. 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
2. **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
3. 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
4. **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
5. 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

Skills

Languages — Strong reading, writing and speaking competencies for Amharic and English. Reading and writing for Korean.

Coding — C/C++, MATLAB, Python, Java, C#, LaTeX, …

Misc. — Academic research, teaching, training, consultation, LaTeX typesetting and publishing.

Miscellaneous Experience

Certification

2021 **Certified Complete Blender Creator: Learn 3D Modeling for Beginners online course**. Awarded by Udemy.

Certified Learn to Speak Korean 1: an online non-credit course. Awarded by Yonsei University and offered through Coursera .

2019 **Certified Machine Learning with MATLAB MathWorks Training**. Awarded by MathWorks.

2017 **Certified E-learning Materials Content Development as subject matter expert**. Awarded by KOICA.

2014 **Certified Microcontroller Programming and Embedded System Design**. Awarded by Adama Science and Technology University.

2013 **Certified Electric Power Distribution System Design**. Awarded by Ethiopian Electric Power Corporation .

2011 **Certified Photovoltaic Stand Alone Systems Design and Installation**. Awarded by Adama Science and Technology University.

Certified Micro PLC LOGO! Programming. Awarded by Adama Science and Technology University.

References

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