# EE-381 Robotics-1 (Group 1)

# Project Ideas

1. Optical flow analysis using a mobile robot simulation (gazebo, webots, ignition, coppeliasim)
2. Optical flow for a manipulator with eye-in-hand configuration
3. Binocular stereovision in mobile robot for outdoor application
4. Visual servicing for robotic arm using static camera/mobile camera/eye-in-hand configuration
5. Investigation of robotics and AI tools in matlab for education and research
6. 3D localization using Lidar in robot simulation
7. Feature-based localization using vision and LIDAR GPS-derived environments for a wheeled robot
8. Comparison of SLAM methods in ROS (Gmapping, SLAM toolboxes, Catographer)
9. Navigation of mobile robot using potential fields in ROS
10. Design of an agricultural mobile robot for fruit-picking and pesticide spraying via 3DOF arm
11. Challenges in deployment of robots for agricultural applications (ploughing, harvesting, seeding, spraying)
12. Analysis of mechanics of various models in the turtlebot series
13. Effects of modification of design aspects of popular commercial robots (wheel radius)
14. Comparison of ROS 1 and ROS 2 for robotics in the domains of research, education and industry
15. Comparison of various robotic simulators and their integration and compatibilities with ROS
16. Deep learning for a robot platform
17. Leader-follower robotics system using imitation learning
18. Localization using event cameras
19. Environmental effects on performance of event cameras
20. Connected robot path planning
21. Game theory+ Reinforcement Learning for path planning/localization
22. Driver readiness state evaluation

## Instructions:

- Chose one of the project and submit your project proposal by 5$^{th}$ April via LMS
- You can discuss these projects with your Lab Engr. or with me.
- Project proposal should include the names of the group members, title of the project, along with a 6-7 lines description of the project.