Incorporating Robotics into Electrical Engineering Capstone

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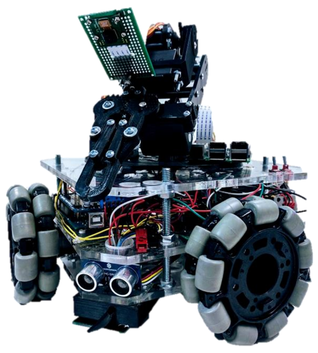
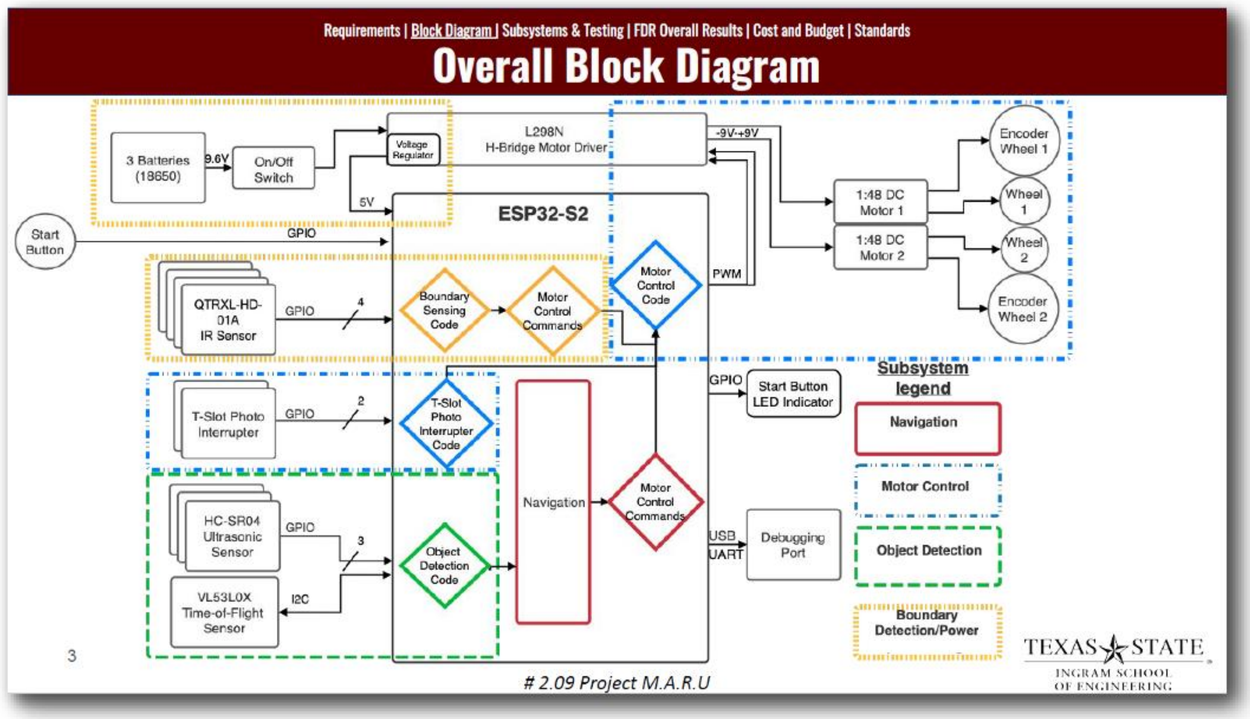
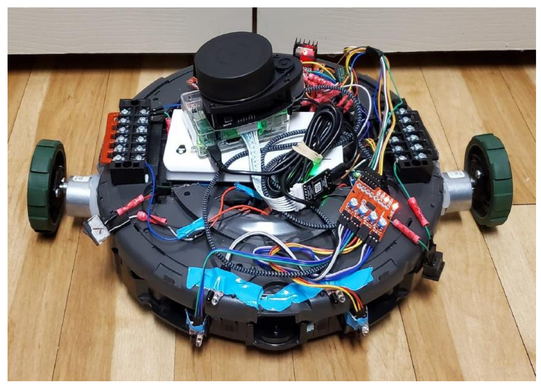


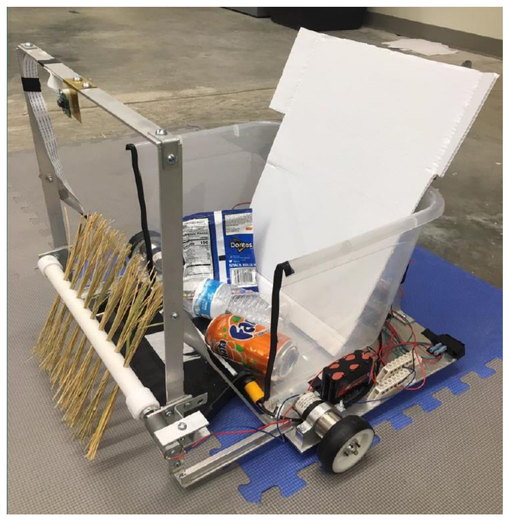
IEEE Region 5 Robotics Competition 2017
Maze navigation and object inspection



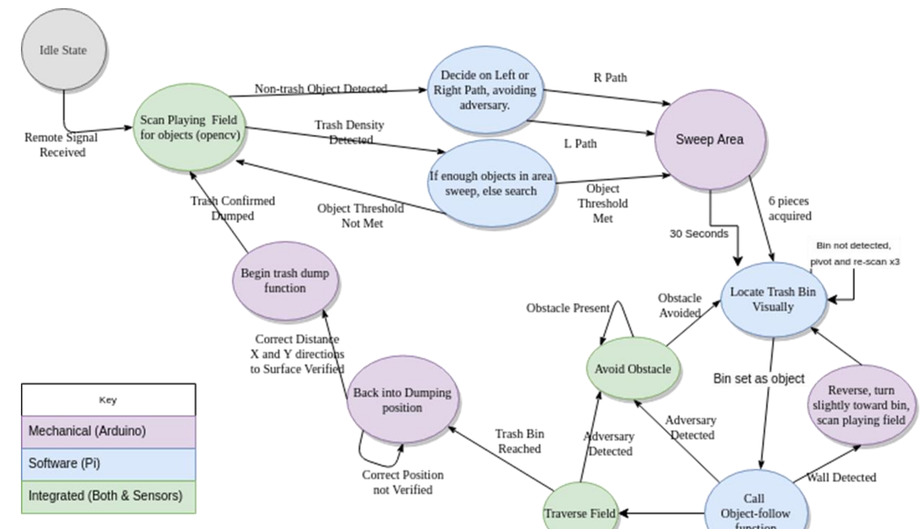
Example FDR Block Diagram – 2022 Sumo Bot



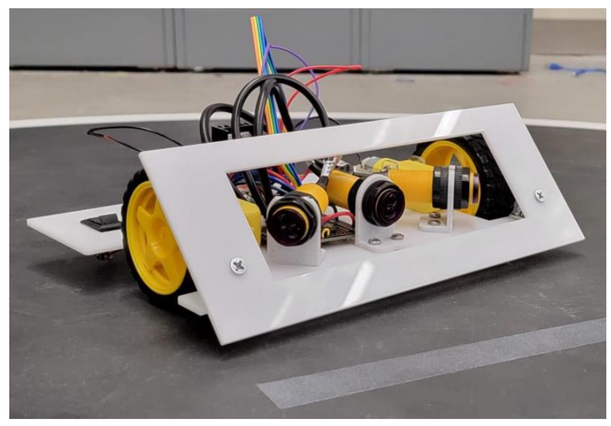
Automated Floor Cleaning Robot 2020
Add capability to existing robot chassis



IEEE Region 5 Robotics Competition 2020
Identify, pick-up, and dispose of trash



Example FDR Navigation State Machine – 2020 Trash Bot



Sumo-Bots 2021
Detect opponent and push off ring

Key Learnings

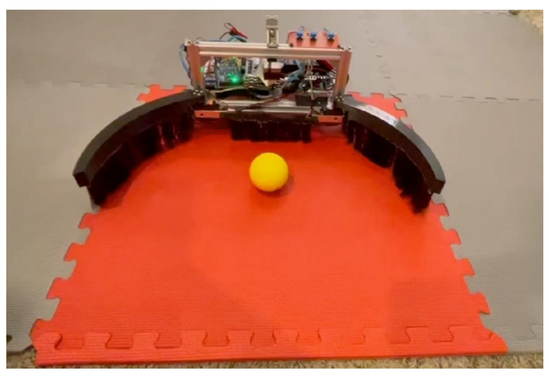
Consider mechanical complexity carefully!
- Use partial or inadequate starter kits
- Set clear expectation - kits are not enough

Challenging constraints are good (and help w/ ABET)
- Bill-of-Material cost
- Size, weight, battery life

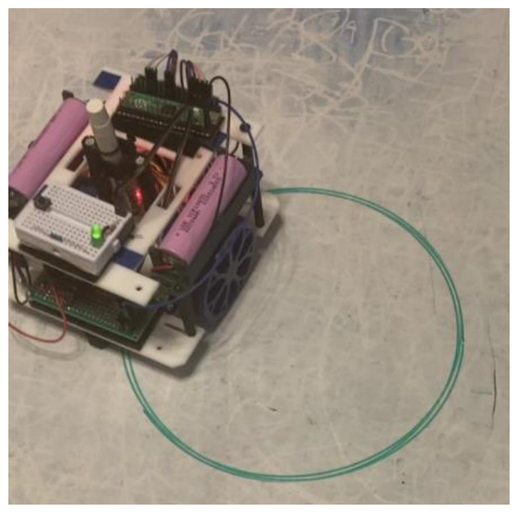
Each student's subsystem must be considered
- Subsystems should include HW + SW if possible
- Power…trivial? Navigation…overlooked?
- "Chassis" cannot be only subsystem for an EE

Require multiple performance demonstrations
- Increasing in difficulty over two-semesters
- Each subsystem should be exercised

Form multiple teams, each with own design
- Encourage "co-op-etition"
- Peer pressure is real
- Competitions are popular with students & guests



Robo-Fetch 2020
Retrieve a thrown ball



Pen-Bots 2022
Stepper motor based line-drawing robots

ISoE Senior Design Website

TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

YouTube
Sumo Robot Trial