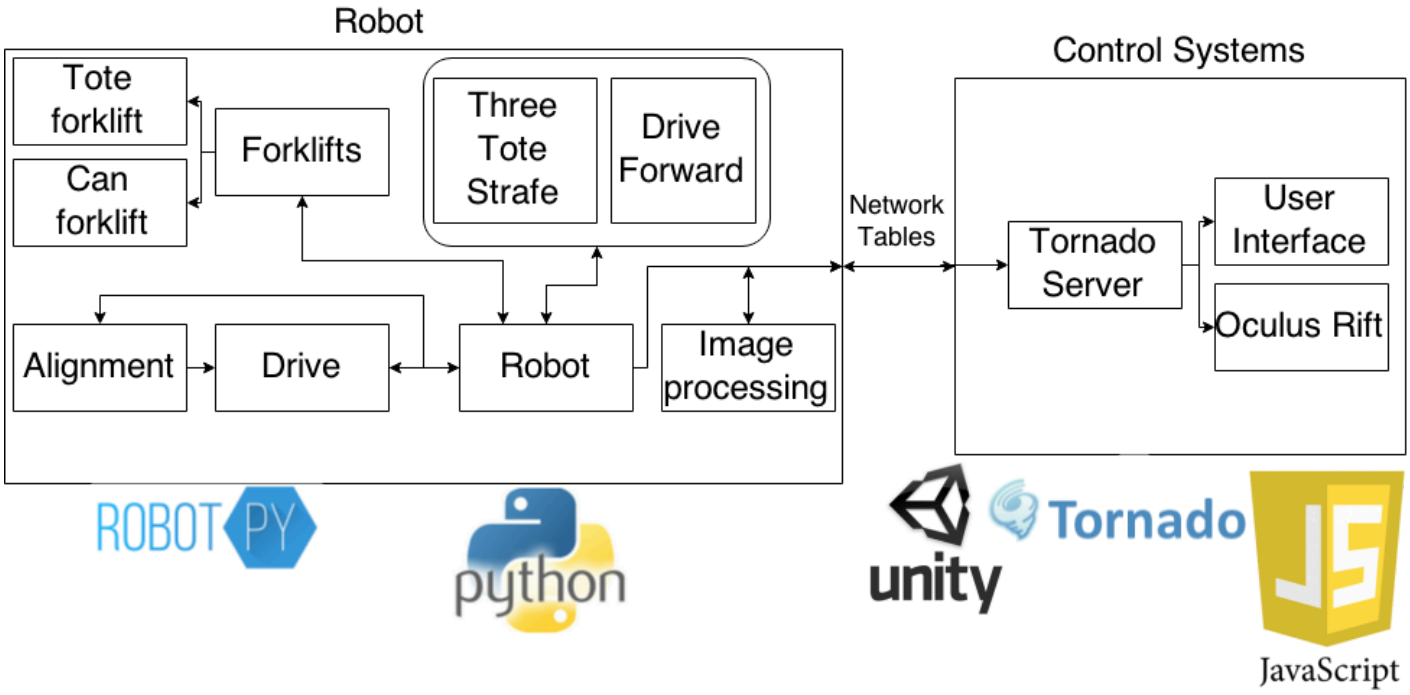
FRC1418 PROGRAMMING TEAM -- 2015 FACTSHEET

https://github.com/frc1418



Automation	Sensors	Control	Languages
20+ point autonomous	2 Encoders	2 Joysticks to drive	Python
Auto-Alignment	5 Limit switches	Touchscreen GUI	C#
Auto tote pickup	4 Distance sensors	Oculus HUD (not in use)	HTML5/Javascript
Preset Positions			

Mentors	Robot Team	UI Team	Vision/Oculus Team
Dustin Spicuzza	Matt Puentes	Leon Tan	Carter Fendley
	Tim Winters	Aki Maher	Ben Rice
	Katherine Reinke	Jacob Hanse	
	Rachel Baek	Tyler Gogal	
		Cami Borja	

Robot Code

- Three tote autonomous (20+ points)
  - Rear distance sensor to align with wall, gyro keeps robot straight
  - Front distance sensors detect when robot crosses in front of tote
  - Ends in the scoring zone with a stack of three yellow totes
- Driving
  - Mecanum drive using two joysticks, one for strafing and forward movement and one for rotation.
  - Can automatically orient parallel to a tote using distance sensors.
- Forklifts
  - Two forklifts, one for cans and one for totes
  - Encoder-based PID control allows operator to pick up and deposit totes/cans quickly and accurately
  - Limit switches used for calibration
- Image Processing
  - Can recognize fallen-over cans for pickup
  - Developed code to recognize yellow totes using on-board camera (not currently used)

Operator Control Interface

- HTML5+Javascript User Interface
  - Touchscreen web browser interface provides richer control interface for secondary robot operator
  - Provides full access to robot functionality
    - Can raise or lower the forklifts to any given position
    - Enable and disable automatic functions of the robot
    - Tune autonomous modes and other robot parameters in the pits
  - Select one of multiple autonomous modes
  - Live streaming camera view to assist operators when view is blocked
- Tornado web server
  - Forwards Network Tables communication to operator interface
  - Released as open source project (pynetworktables2js)

Driver Wearable Oculus Rift (written using C#)

- Webcam mounted on top allows for normal, unrestricted vision
- 3D HUD for operator
  - Shows tote + angle of tote detected by distance sensors
  - Shows current position of forklifts
- Can show robot camera stream
- Sadly, declared illegal for FRC use towards the end of build season
  - Using it to inspire STEM in students and for fundraising

All code available week after competition at https://github.com/frc1418