

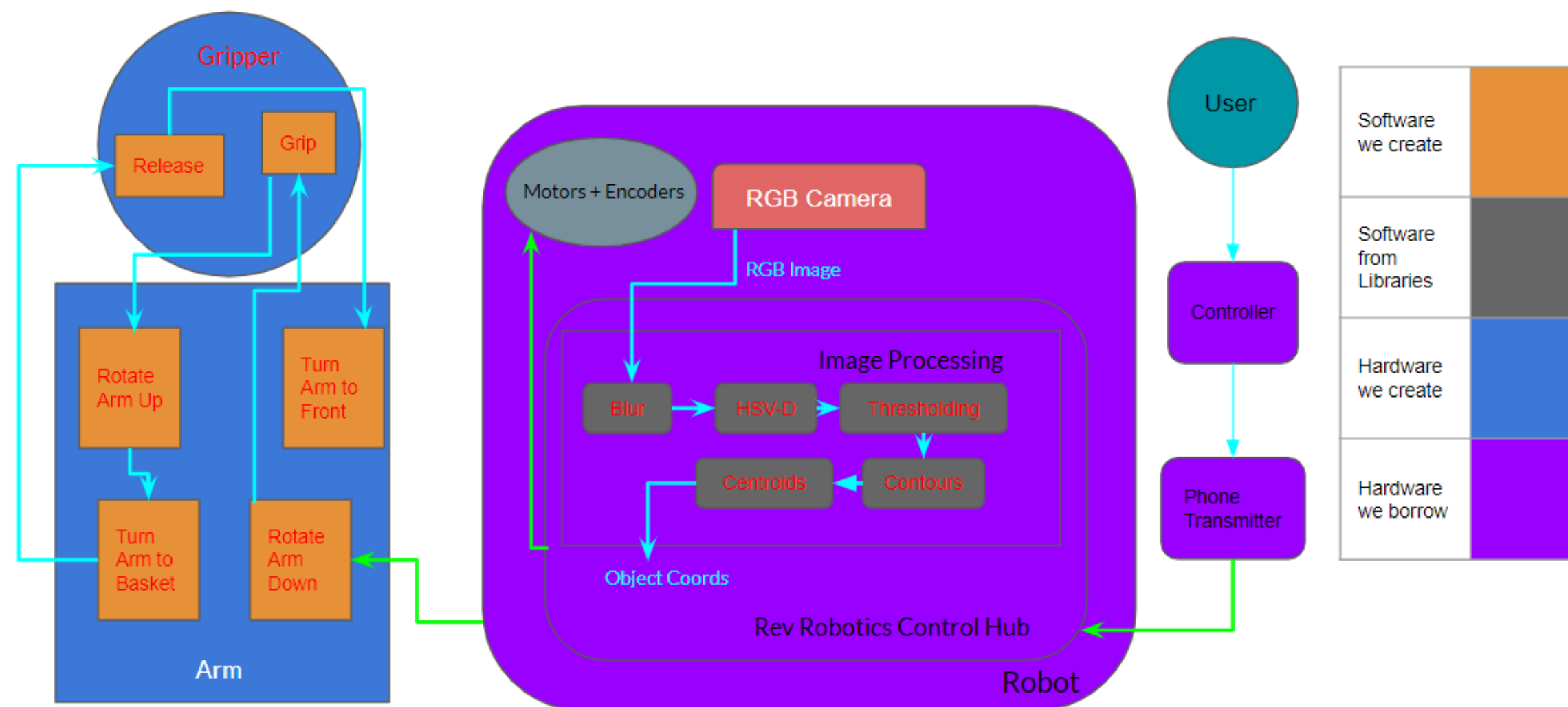
### Product Pitch

As people get older their motor skills as well as their eyesight worsens to a point where they have difficulties in picking up small objects. This issue becomes dangerous when people with motor/eye problems work with small tools that fall on the floor.

Our solution to this problem is an easy-to-control robot that can pick up small objects that are difficult to detect using computer vision to aid the user.

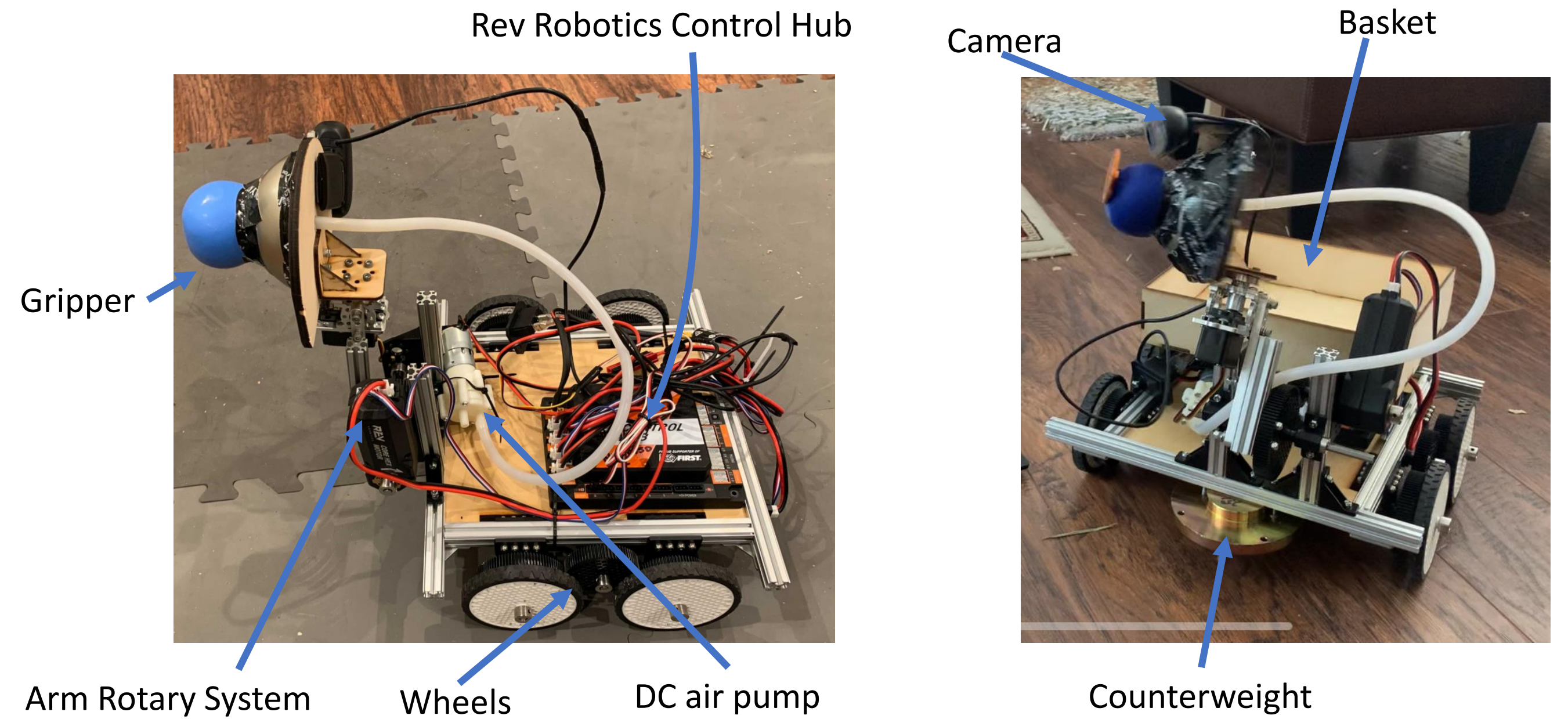
### System Architecture

#### EDC System Specifications



The system is split up into three major components: User input, Robot Body, Arm + Gripper system. As the robot detects objects to collect using its camera and computer vision, that information is displayed to the user who uses the controller to transmit controls for the robot and the gripper.

### System Description



### System Evaluation

#### Testing & Metrics shown in table

Requirements	Testing	Metrics	P/F	Performance
Reliable item pickup	Robot picks up item on attempt	> 90% success rate picking up items that are < 0.7kg and 10 cm in length	Green	>95% success rate picking up items
Item collection	Robot can carry multiple items	15 Items picked up	Green	Can hold 25 - 30 0.7 kg items reliably
Robot speed .4m/s	2m dash	Completes the dash within 5 seconds	Green	Completed 2 meter dash in 3.05 seconds
Fast Image Processing	Item recognition code testing	Runtime <= 10ms	Yellow	33.48 milliseconds on average over 3000 iterations
Reliable Image Processing	Color Thresholding Item Recognition	0% false positive rate < 7% false negative rate	Yellow	< 8% false positive rate and < 3 % false negative rate under bad lighting conditions < 1% false positive/negative in bright lighting conditions
Sufficient Battery Life	Robot operation duration after full charge	30 minute operation time	Green	37 minute operation time