Alligator Inspired Robot Report

Group 4 :-
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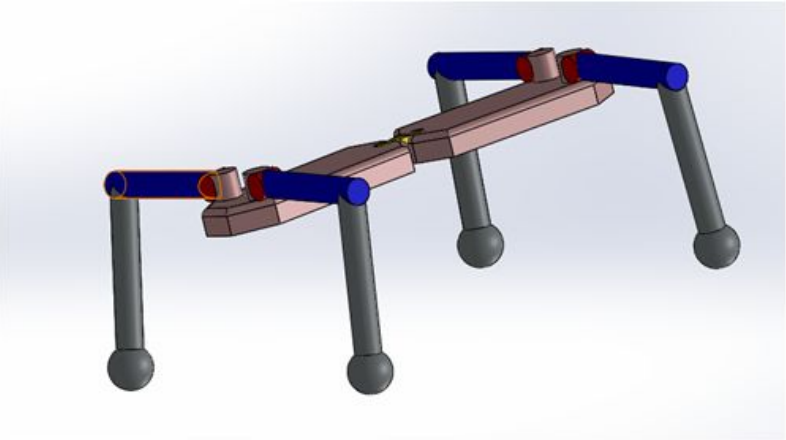
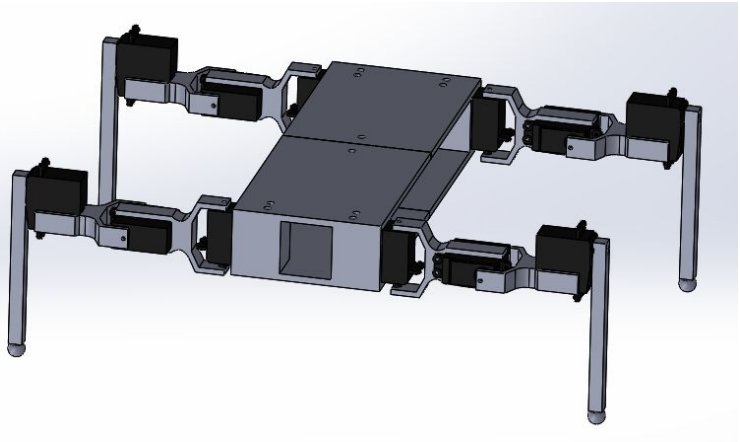
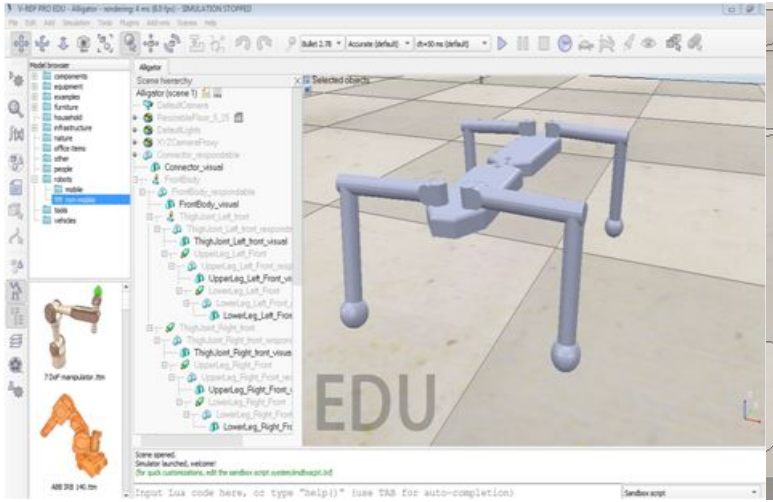
Arya Das 1701CS11

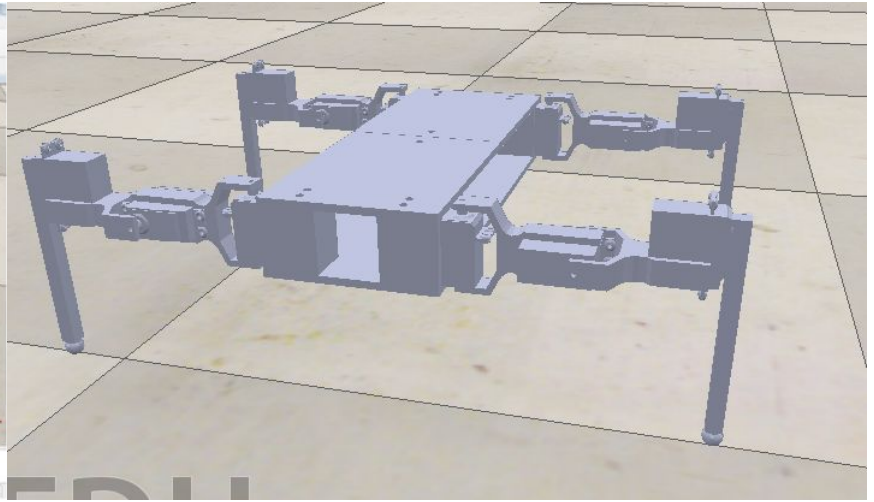
CAD Design (Changes)



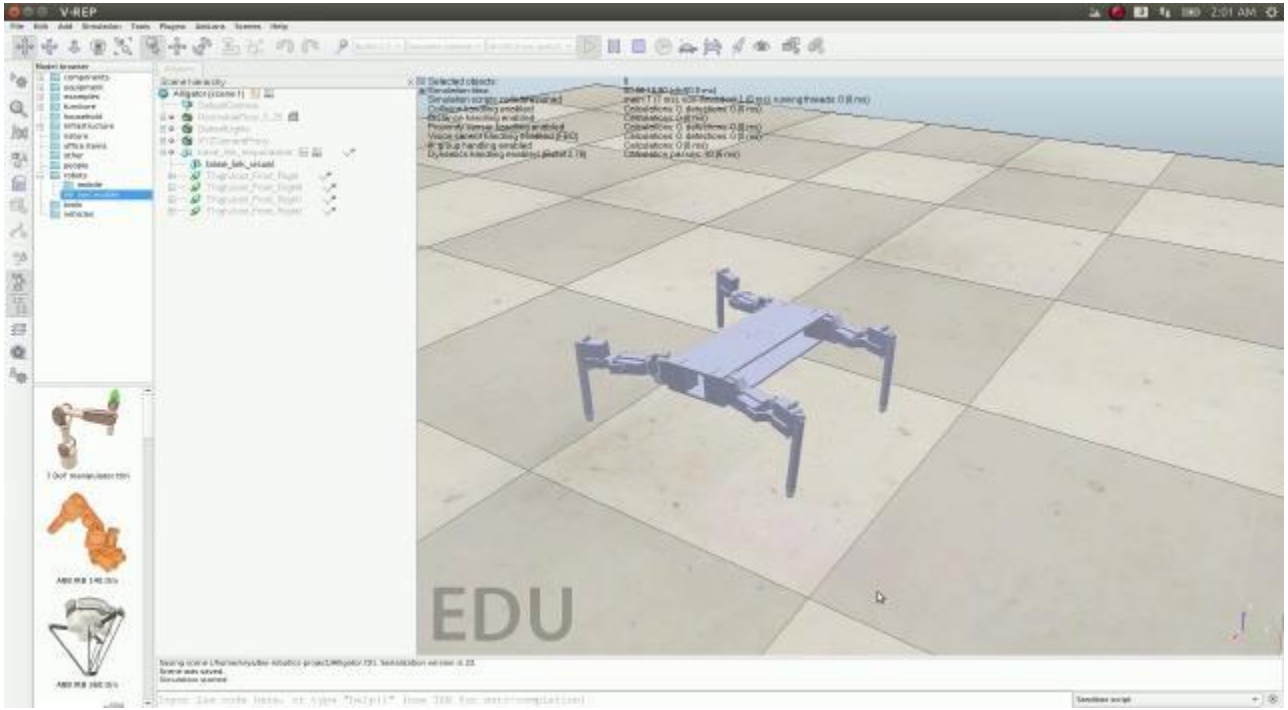


Simplified V-REP Model (Changes)

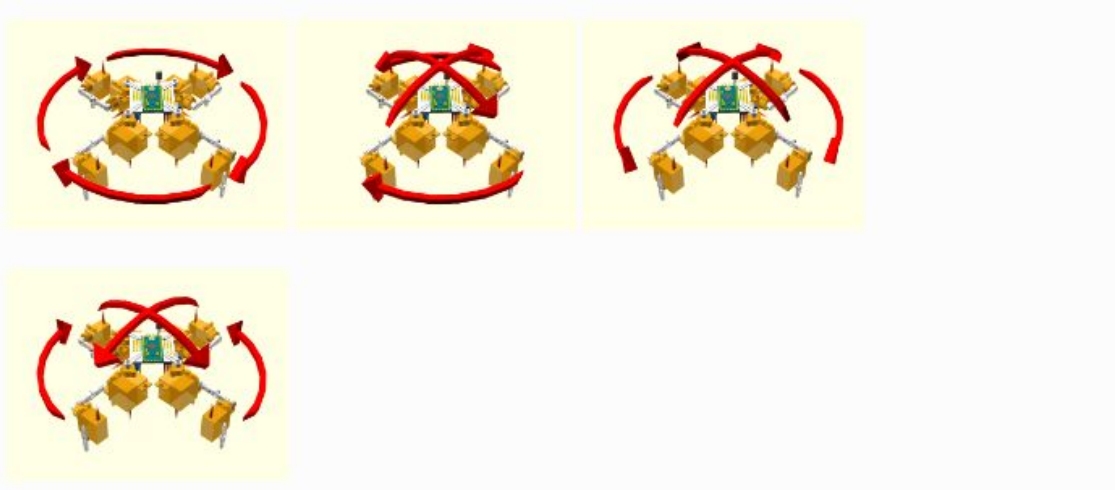




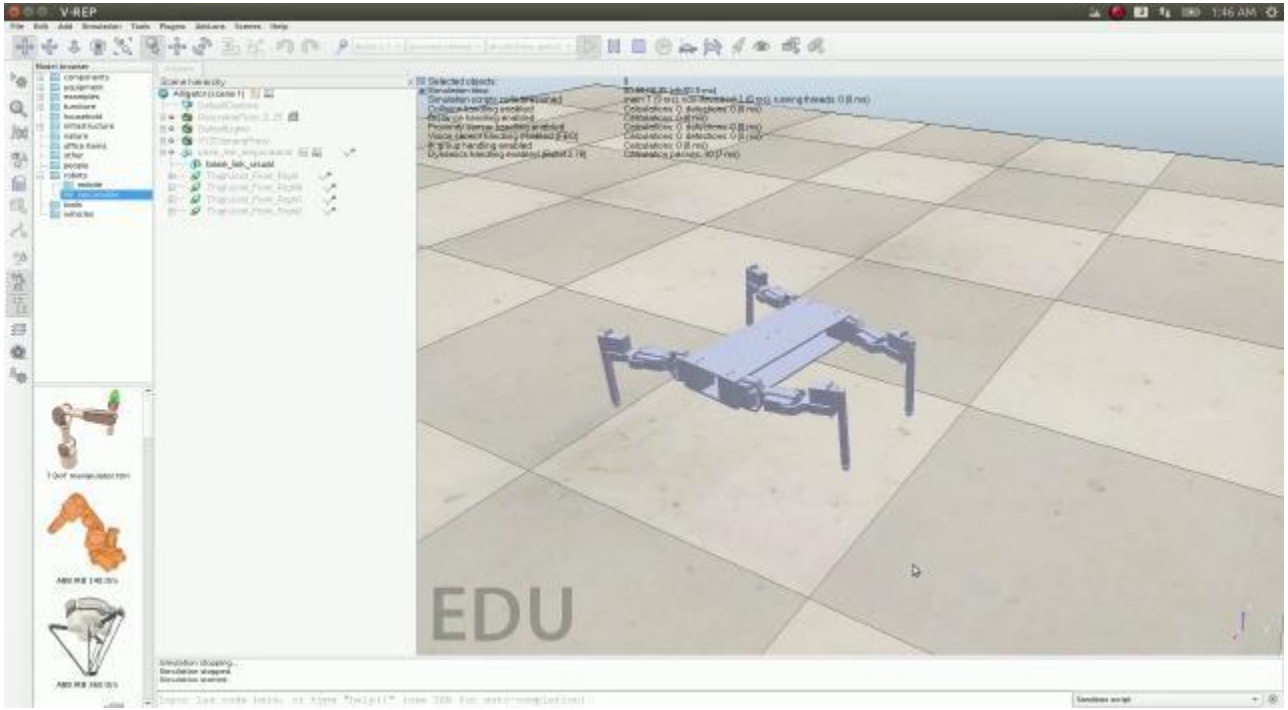
Creep Gait



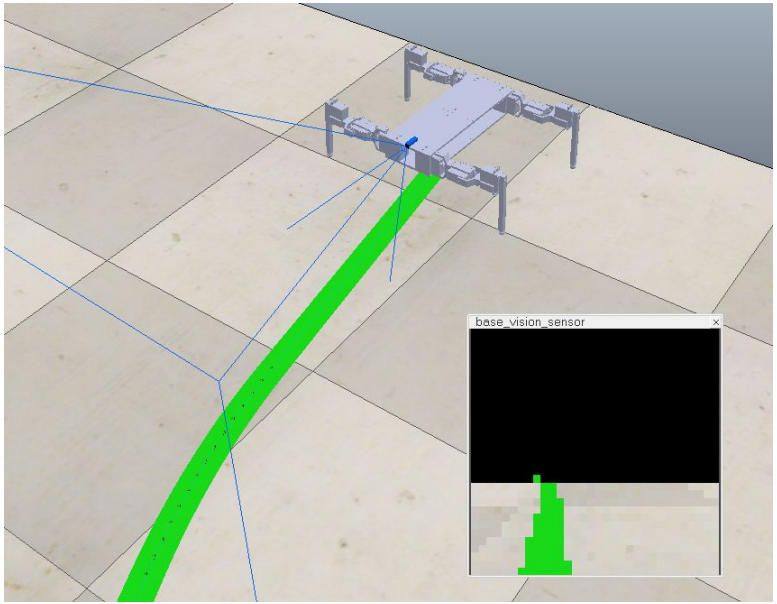
Order of Legs in Creep Gait



Trot Gait



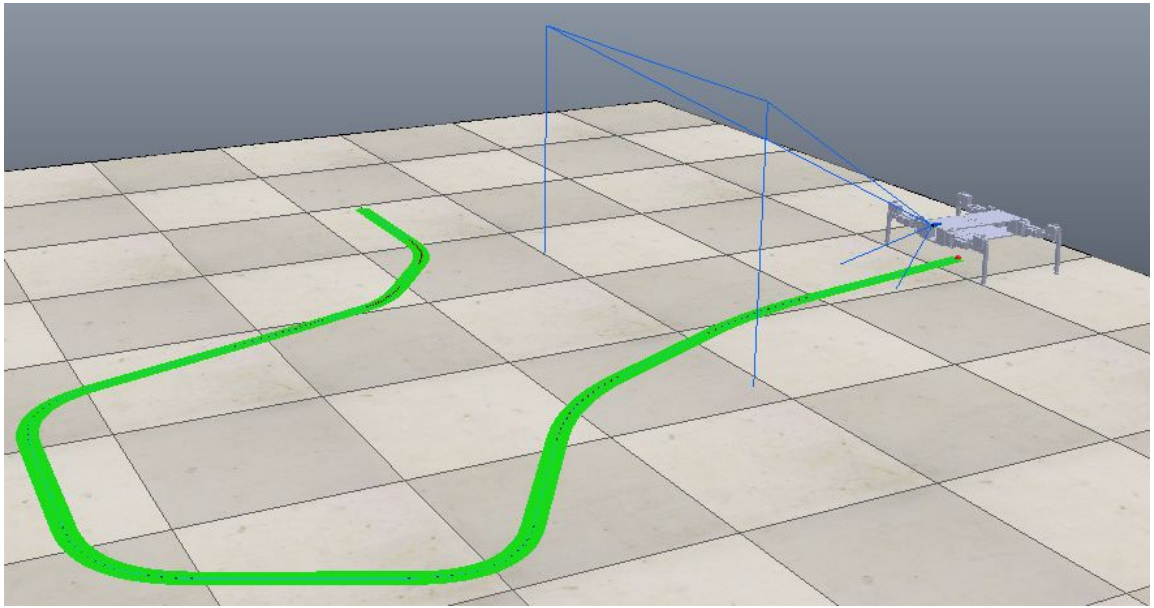
Camera

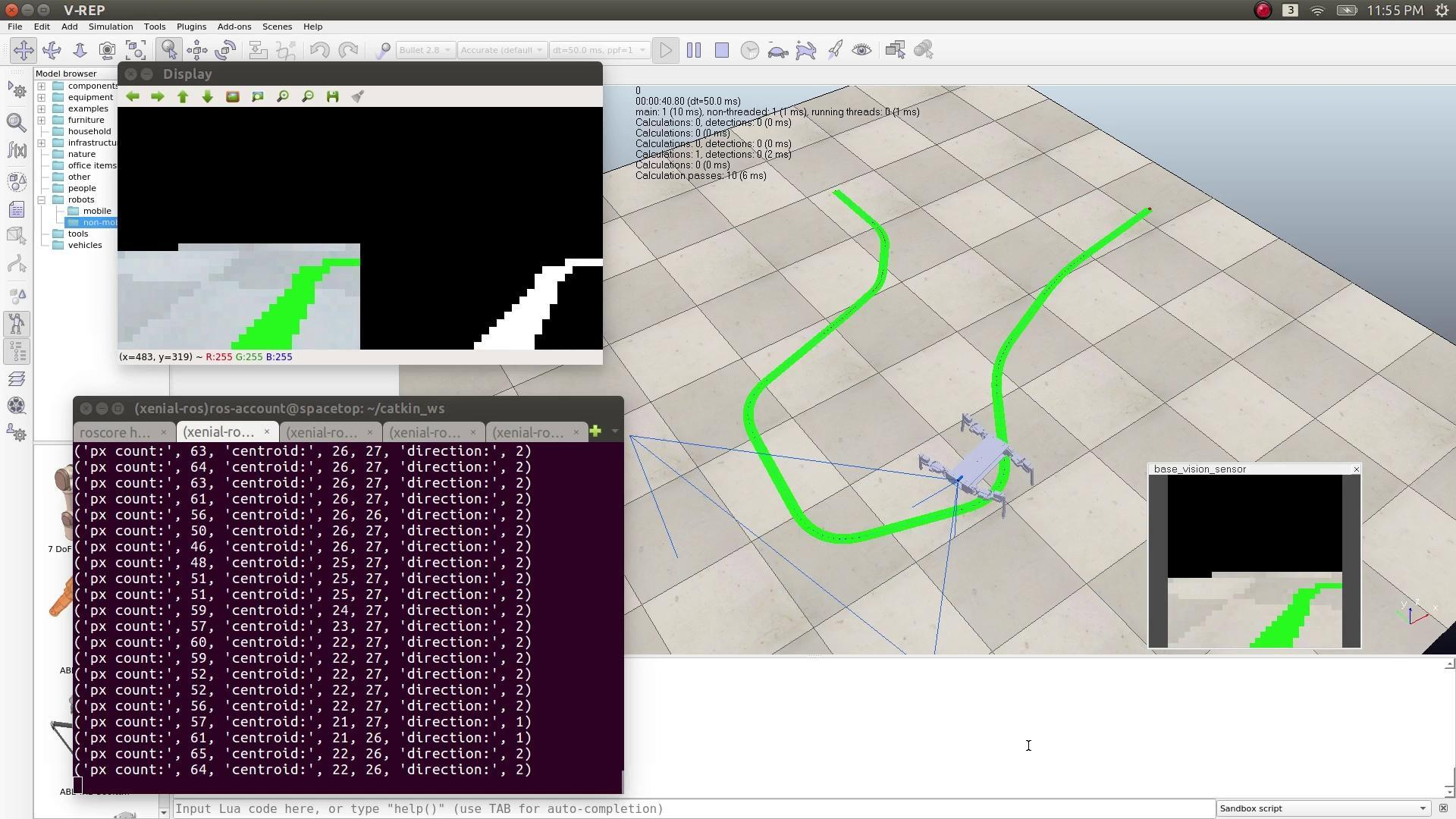


Camera properties:

- Type: Perspective
- Resolution: 32x32
- FoV: 60°

Environment




V-REP
File Edit Add Simulation Tools Plugins Add-ons Scenes Help
Model browser
components
equipment
examples
furniture
household
infrastructu
nature
office items
other
people
robots
mobile
non-mob
tools
vehicles
Display
(x=483, y=319) ~ R:255 G:255 B:255
0
00:00:40.80 (dt=50.0 ms)
main: 1 (1.0 ms), non-threaded: 1 (1 ms), running threads: 0 (1 ms)
Calculations: 0, detections: 0 (0 ms)
Calculations: 0 (0 ms)
Calculations: 0, detections: 0 (0 ms)
Calculations: 1, detections: 0 (2 ms)
Calculations: 0 (0 ms)
Calculation passes: 10 (6 ms)
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(xenial-ro...
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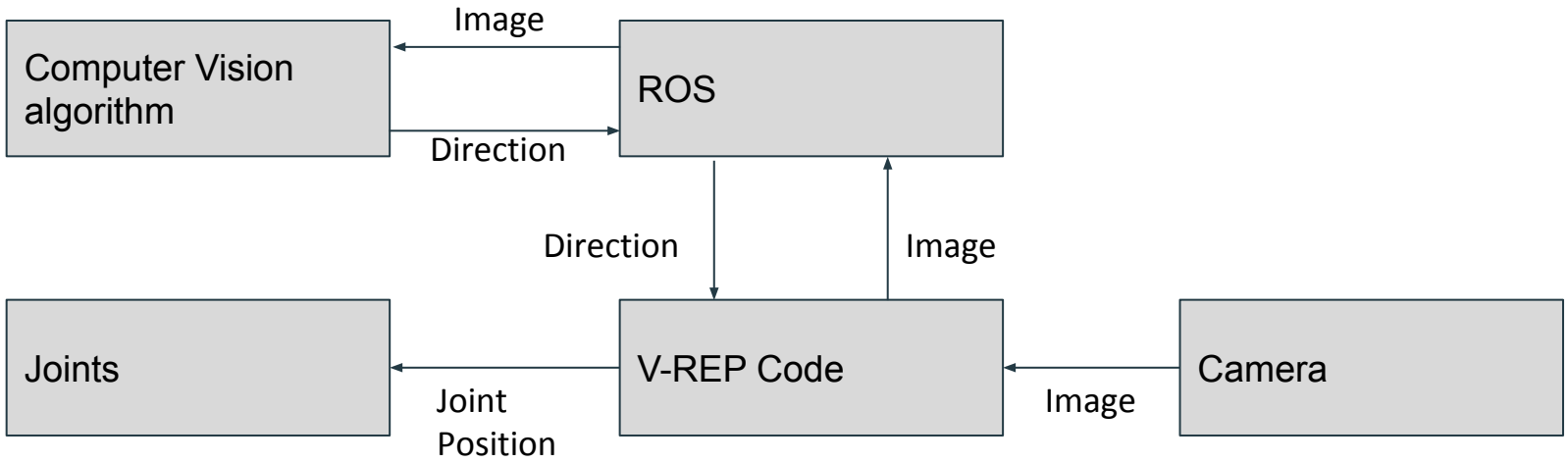
Input Lua code here, or type "help()" (use TAB for auto-completion)
Sandbox script

Control System Overview



Low level instructions

The trot gait algorithm has been implemented in Lua on V-REP. The overall control system is a bang-bang controller. There are 4 high-level instructions the robot can follow:

- Move forward
- Turn right
- Turn left
- Stop

For moving forward, right and left the parameters of the trot gait are modified slightly. Then the corresponding joint angles are calculated and finally the target joint positions are set. For stopping, all joints are set to their default position.

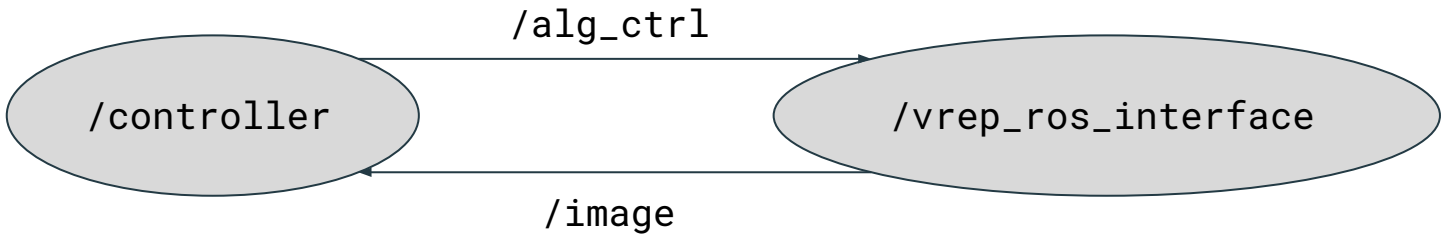
Communication over ROS

The system has 2 ROS nodes - one is `vrep_ros_interface` (V-REP) and the other is `controller` (the computer vision program).

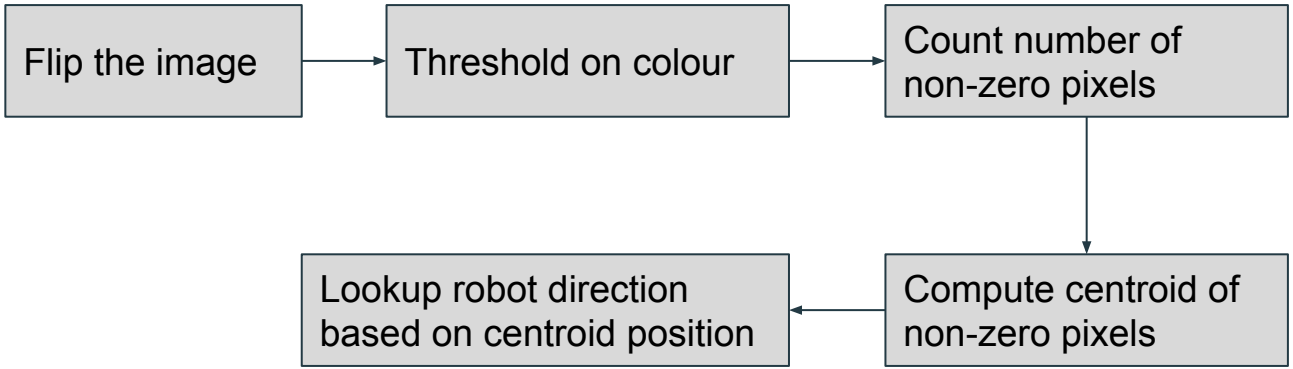
They communicate over 2 channels - `image` (to transfer the image captured by the camera) and `alg_ctrl` (to send a high level instruction back to V-REP).

`vrep_ros_interface` subscribes to `alg_ctrl` and publishes to `image`.
`controller` subscribes to `image` and publishes to `alg_ctrl`.

Communication over ROS



Computer Vision algorithm



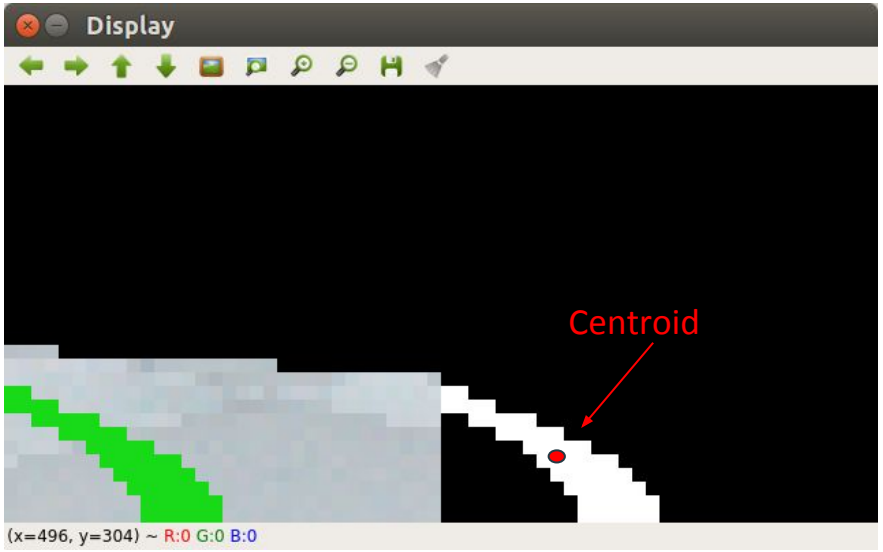
Computer Vision algorithm

Raw image

After thresholding

Computer Vision algorithm

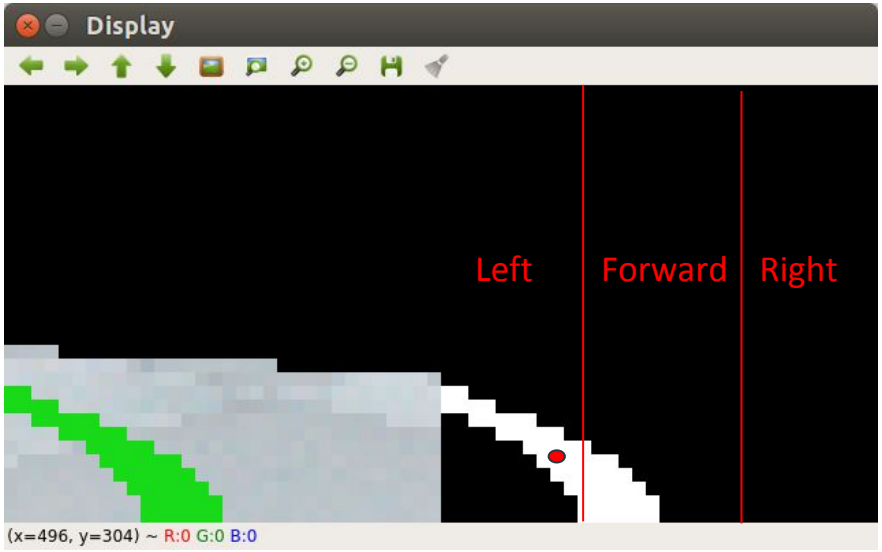
Raw image



After thresholding

Computer Vision algorithm

Raw image



After thresholding

Thank You!