Robotics and Embedded Systems

Technische Universität München

Task assignment to the lab course of Snake Robot

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The Task

- Design an interface to control the snake robot locomotion
- Develop achieved simulation in Gazebo (Better with experience)
- Head orientation composition in slithering gait
- Downhill slope estimation based on IMU

Task 1

- Build up a user interface for locomotion control
  - o Connect joystick with ROS
  - o Send command to ROS
  - o ROS publish command to V-rep
  - o Control the snake to move forward or backward
  - o Build a user interface to show the command

ROS

Open Source Robotics Foundation

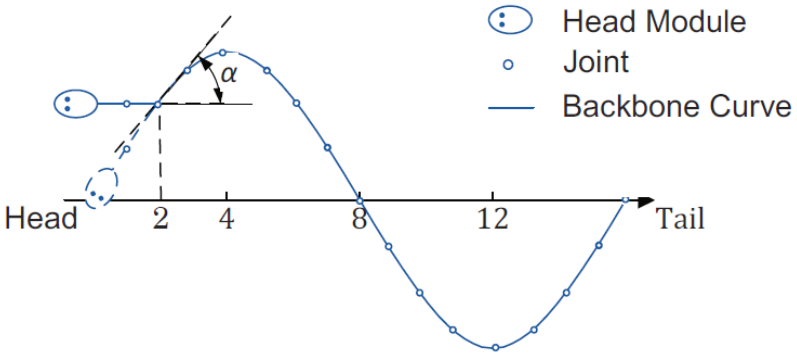
v-rep pro edu

Task 2

- Develop achieved simulation in Gazebo
  - Build simple snake model in Gazebo
  - Control it via ROS via Matlab
  - Realize achieved gait in Gazebo
  - Blender the Gazebo model

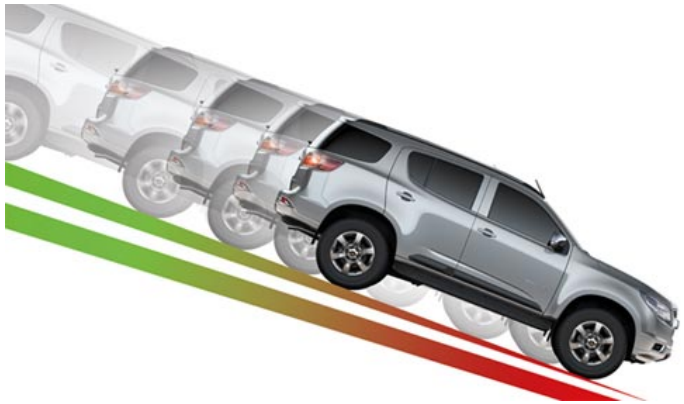
Task 3

- Head orientation composition in slithering gait
  - Calculate the swing angle of the first two head modules
  - Use optimization method to composite the swing
  - Simulate in Vrep
  - If possible with the real snake robot.



Task 4

- Downhill slope estimation based on IMU
  - Use a car to simulate the downhill in V-REP
  - Use EKF (Extened Kalman Filter) to predict the slope angle.
    - Lear KF and EKF
    - Build reasonable model to predict the angle



Available Thesis

- Each of the four topics could be directly transferred and extended into a thesis. If you are interested in doing thesis related to snake-like robot.

  Find more information on my homepage:

  www6.in.tum.de/Main/Bing

Vrep Operation Demo

Start a simple demo