CS 393R - Fall 2013

Lab Introduction

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Original slides created by Todd Hester, and Katie Genter
Outline

● The Lab: GDC 3.710A
● Website
● Software
● Robots: Aldebaran Nao V4
● Assignment 1
● Lab Rules
My information

● Office hours
  ○ Mondays, Wednesdays 3:30pm to 5:00pm, appointment
  ○ GDC 3.710A
● jmenashe@cs.utexas.edu
Lab information

● The lab has 10 workstations + 1 server
● Wireless access to robots through the server
● The server: adler.csres.utexas.edu
  ○ Avoid using
  ○ Do not reboot!!
● Workstations (ie, any machine but luigi)
  ○ Okay to reboot if needed
  ○ /home and /usr/local are NFS mounted
● The lab is still being set up.
Lab information

- Machine login
  - Username: your cs user name (____@cs.utexas.edu)
  - If you want a new password, let me know
- Permissions
  - Your directories and files will be readable by classmates by default
  - Your responsibility to change permissions and protect your work
Lab information

● Lab security
  ○ Be aware when leaving anything unattended in the lab
  ○ Never leave the robots unattended!
  ○ Always lock up your robots when you leave
  ○ Do not give out the room code to anyone
  ○ Set the key locker code to 0, 0, 0, 0 when you’re done with it

● Let me know of the following issues:
  ○ Wireless network latency
  ○ Workstation unavailability
  ○ Lack of supplies
  ○ Hardware issues
UT Austin Villa Codebase

- Assignments will use a stripped version of the UT Austin Villa codebase
  - C++ modules
  - Python behaviors
- Contains many built in features you will need:
  - Color image segmentation
  - Pre-programmed walks
  - State machine
- To get started, see webpage resource section for:
  - Nao setup
  - Nao tutorial
You will be writing Nao behaviors in Python
You will be writing vision (and later localization) code in C++

Behaviors
- Receive events (sensor signals, buttons, images, etc)
- Create motion commands (motor commands)
- Can also create events (state transitions)

Vision Module
- Classification is provided
- Segmentation and detection are not

Localization Module
- Framework will be provided
- Core implementation will not
UT Austin Villa Architecture

Interfaces

Populate Perceptions

Current Memory

Logic

Commands

Save memory

Log

Core System

Robot

Webots

Debug Tool
UT Austin Villa Tool

- View of camera and segmented image
- Can alter robot game states
- Can view and transfer files and logs
Aldebaran Nao H25

- Multiple Sensors
  - Vision
  - Touch sensors
  - Accelerometers
  - Sonar
- Multiple Effectors
  - Arms/Legs with 5 DOF
  - Head with 2 DOF
  - Pelvis, Hand, LEDs
- 1.6 GHz Intel Atom Processor
- Communication over LAN/WLAN
Robots

- Each team locker contains:
  - One Nao
  - One charger
  - You are responsible for returning these items in working order
- 4 official orange robot soccer balls, two blue goals, and 6 beacons are stored in the lab
- Do not remove any equipment from the lab!
Battery Management

- A battery will last up to 45 minutes depending on its actions
- Each Nao has its own charger
- Keep the Nao charging whenever possible
- The bottom left eye LEDs indicate power. White is good, orange is medium, red is bad.
Robot Care

- Robots are fragile
  - Don't set them on tables or chairs
  - Be aware of where they are at all times
    - Don't step on them or roll your chair into them
  - Don't let them walk into anything repeatedly
  - Don't force the joints to move once stiffness is enabled

- Let me know if you think your robot is broken or breaking
Assignment One Goals

● Establish contact between your machine and the Nao
● Demonstrate you can read the sensors and display them
● Make the Nao move its head and walk
● Get started using color identified through the camera image
● Write a couple of simple control programs
  ○ Control the Nao’s gaze to track the ball
  ○ Walk towards a blue goal
Assignment One

- Worth 1-2 points each:
  - Demonstrate the ability to read and display the changing values from the Aibo's sensors as useful data in your program
  - Same for camera image
  - Demonstrate the ability to detect and track a pink blob in the camera image with the head held still
  - Demonstrate that you can control sitting, standing, and head-turning
  - Demonstrate that you can control walking: forward and turning
  - Demonstrate that your Nao can walk in an arc: forward and turning at the same time
  - Demonstrate that your Nao can move its head to keep the visible blob from an orange ball near the center of the image
  - Demonstrate that your Nao can spot a colored patch in the distance and walk towards that patch until it fills half the camera image, and then stop.
Assignment One

● Some hints
  ○ Good blob identification will be an essential aspect of future assignments
  ○ The provided color table should work for most situations, but you may want to specialize it for this room and these assignments
  ○ Read through the Nao Tutorial
  ○ Ask questions!
Assignment One

- You should switch behaviors during your demo to show different things
  - Each checkpoint can be a different script
  - Upload scripts and restart python to switch
- Evaluations are done in person
  - Monday 3:30pm-6pm
  - Tuesday 8am-10:30am
- You will turn in your code and memo
  - By email before class time
  - One email per team
Lab Rules

- Lab environment
- No food or drinks
- Cleanup any mess when you leave.
- Throw away trash in the garbage cans in the hallway.
- Leave the key lock combination at 0,0,0,0
- Keep the lab door locked if you’re the last one out
Lab Rules

● Security
  ○ Do not leave your robots unattended!
  ○ Robots can only be used in the lab. They are never allowed to be removed for any reason.
  ○ If no team members are present, the team's robot must be locked in its locker.
  ○ Never give your locker key to anyone outside your group.
  ○ Never tell the door combination to anybody outside of class.
  ○ Double check that your locker is secure if you are the last of your team to leave.
  ○ Make sure the lab door locks if you are last to leave.
  ○ Never give your robotics machine password to anyone.
  ○ People who are not enrolled in cs393r:
    ■ May not be in the lab unless a class member accompanies them.
    ■ May not use any of the lab computers.
    ■ May not use any of the robots.
Administrative

- Form a team and send me your info if you haven’t
  - You will receive a robot, locker, and padlock combination
  - Lockers already contain Nao/Charger
Questions?