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

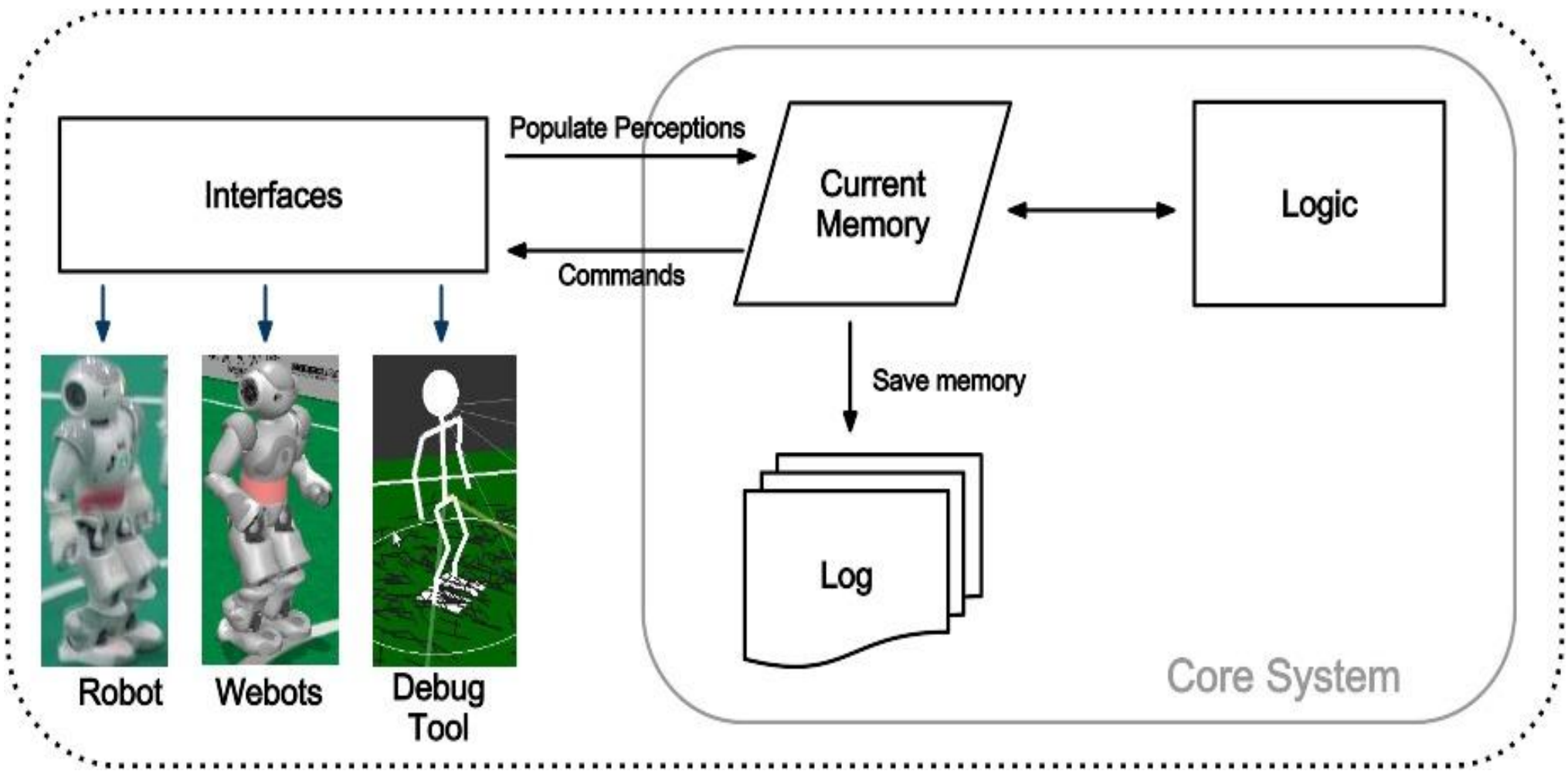
UT Austin Villa Codebase

- 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

UT Austin Villa Architecture

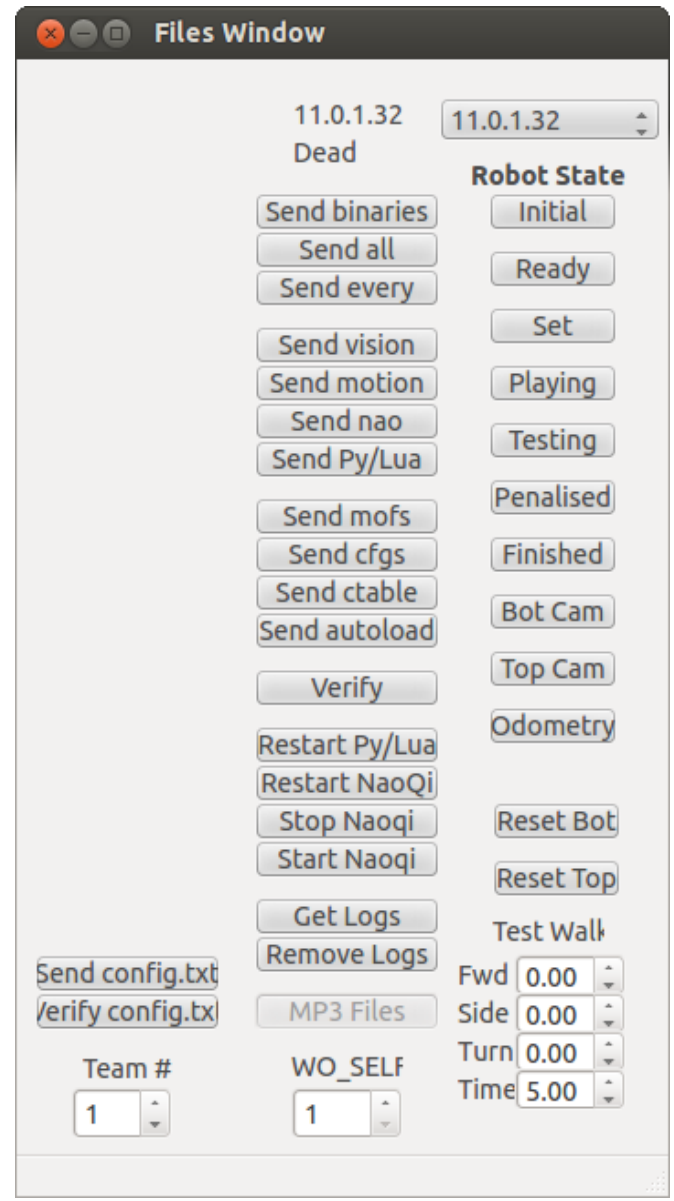
- You will be writing Nao behaviors in Python
- You will be writing vision (and later localization) code in C++
- Behaviors
  - Receive events (sensor signals, buttons, images, etc)
  - Create motion commands (motor commands)
  - Can also create events (state transitions)
- Vision Module
  - Classification is provided
  - Segmentation and detection are not
- Localization Module
  - Framework will be provided
  - Core implementation will not

UT Austin Villa Architecture



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?