What is Cognitive Robotics?

- A high level approach to robot programming ...
- Drawing inspiration from cognitive science.
- Sources of ideas include:
  - Visual routines (Ullman 1980)
  - Dual-coding theory (Paivio 1986)
  - Affordances (Gibson 1977, 1979)
  - Motor schemas (Schmidt, 1975)
- What high-level primitives to provide?
  - Object recognition
  - Map building, Localization, Navigation
  - Dextrous manipulation
  - Inter-robot communication
  - Human-robot interaction
- A cognitive robotics curriculum for undergraduates is available at Tekkotsu.org.

Tekkotsu Development Framework

- Free, open-source, LGPL'ed
- Runs on Linux and Mac OS
- Event-based, message-passing architecture
- Can combine on-board and remote processing
- Pipelined vision system
- Forward & inverse kinematics solvers
- Hierarchical state machine formalism
- GUI tools for teleoperation and monitoring
- Simulator allows debugging on a PC
- Implemented in C++ with extensive use of templates, inheritance, & operator overloading
- GUI tools implemented in Java

Support for New Hardware Platforms

We are moving beyond the Sony AIBO to support a variety of new platforms:
- Qwerkbot+ (TeRK project; Nourbakhsh et al.)
- Lynx Motion 6-dof arm
- iRobot Create with Qwerk controller board
- Our own platform based on:
  - Lynx Motion rover and arm kits
  - “Goose neck” maneuverable webcam arm
  - Gumstix computer (600 MHz, 128 MB)
  - Wireless ethernet

You Can Build This Robot!

- We are developing our own prototype robot designs using off-the-shelf components, and will publish assembly instructions.
- Tekkotsu's hardware interface abstraction facilitates support of new platforms.
- Design your own; program it with Tekkotsu.