

Tekkotsu Open Source Cognitive Robotics

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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

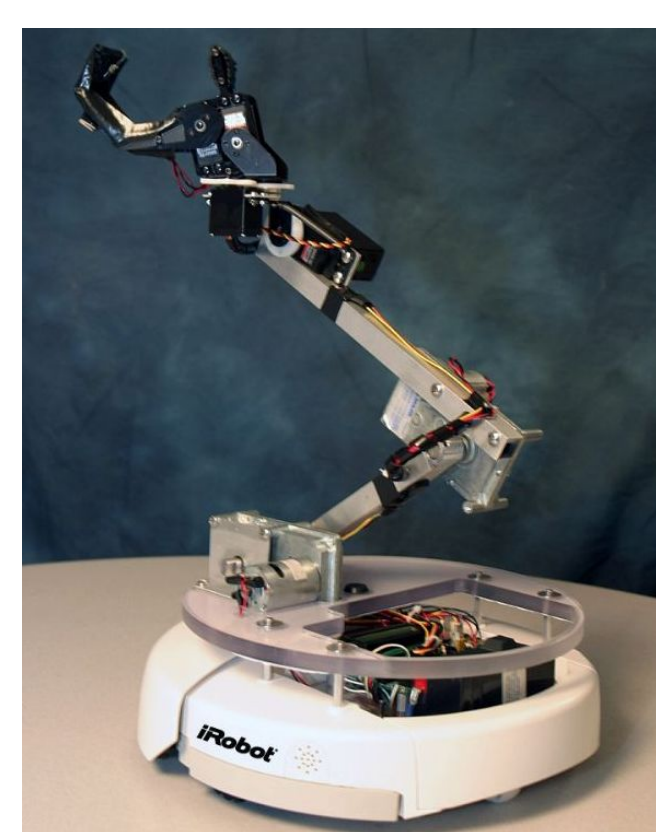
- Free, open-source, LGPL'ed
- Runs on Linux and Mac OS
- Event-based, message-passing architecture
- Can combine on-board and remote processing
- Pipelined vision system
- Forward & inverse kinematics solvers
- Hierarchical state machine formalism
- GUI tools for teleoperation and monitoring
- Simulator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



Qwerkbot+ (TeRK project; Nourbakhsh et al., CMU)



Lynx Motion 6-dof arm



iRobot Create with experimental arm



Tekkotsu Project

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.