Connect your device to application
Be “Android”

Robocat: robot control system

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Agenda

Motivation
Robocat
Architecture
HW
HAL
JNI
Case Study
Demo
每個宅男的夢想
Robocat
Robocat

- Google Android / GNU Linux 下的機器人控制系統

- 整合於 Oxdroid

- 可同時控制多組伺服馬達

- 無痛開發反饋機器人系統

- 可支援多種伺服馬達
Architecture

Apps
- Robocat
- librobocat-jni
- librobocat
- libcatcan

BB Mouse
Hardware Platform

Bluetooth dongle

OMAP3530 Beagleboard

BB Mouse - I2C Level Translator
1V8 ↔ 5V

SS-14+ Servo
Libcatcan, User mode I2C driver

- Libcatcan is an user space driver for device catcan ss14+
- Catcan SS14+
  - I2C interface
  - Power: 6v2~7v5
  - Dynamic PID setting
  - Plug and play
  - Group call
    - Asynchronous
    - Synchronous
Libcatcan (cont)

- No kernel driver needed, but enabling I2C bus 2 is requisite
- Easy and convenient to integrate with application
- Features:
  - Seek/get position
  - Group action
  - Change I2C address
- Abstract robot control system
- Position aware
- Sync and Async control
- Grouping cats
Robocat (cont)

- **Robocat**
  - Cat: 0x10 ...
  - Cat: 0x12 ...
  - Cat: 0x14 ...
  - Cat: 0x16 ...

- Group: 0x11 Sync
- Group: 0x12 Async
- Group: 0x03 Sync
• Very thin layer glues librobocat and Robocat Java API
Robocat Java API

- Java library controls the libroboocat
- Work flawlessly with Android API
Case Study
- 0xSpider -
0xspiderClient: UI

select a device to connect
Paired Devices
mattspider
00:22:43:FA:CA:FE

Scan for devices

Tickle
We need a simple protocol for remote controlling

Lightweight data interahcnage: serialize/de-serialize

Natively support in Android

Easy to have extension
Synaptic

Initial

Stand by

Sit Down

Stand up

Move Forward

Move Backward

Turn Right

Turn Left
Inverse Kinematics

Cosine Law

\[ a^2 = b^2 + c^2 - 2bc \cos A \]
\[ b^2 = c^2 + a^2 - 2ac \cos B \]
\[ c^2 = a^2 + b^2 - 2ab \cos C \]
Reference

- Robocat Project: http://code.google.com/p/0xrobocat/
- Robocat Source: http://gitorious.org/robocat/robocat
- 0xdroid: http://code.google.com/p/0xdroid/
- Board: http://beagleboard.org/
- Servo BBMouse: http://www.catcan.com.tw/
- Inverse Kinematics: http://freespace.virgin.net/hugo.elias/models/m_ik.htm
- Bluetooth Module: http://www.azurewave.com/
- Camera Module: http://www.azurewave.com/
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