

嵌入式系统设计制作

机器人系统

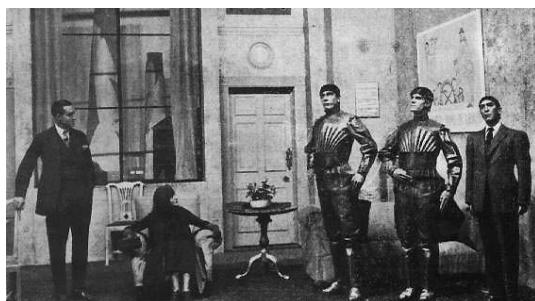
邢超

<EC.1>

1 机器人介绍

1.1 历史

A scene from Karel Capek's 1920 play R.U.R. (Rossum's Universal Robots), showing three robots



<EC.2>

A scene from the play, showing the robots in rebellion.



<EC.3>

1.2 现状

The Intelligent Robotics Lab, directed by Hiroshi Ishiguro at Osaka University, and Kokoro Co., Ltd. have demonstrated the Actroid at Expo 2005 in Aichi Prefecture, Japan.



DER 01, a Japanese actroid

<EC.4>

KITECH researched and developed EveR-1, an android interpersonal communications model capable of emulating human emotional expression via facial "musculature" and capable of rudimentary conversation, having a vocabulary of around 400 words.



Asimo

EveR-2, the first android that has the ability to sing

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勇气号/机遇号



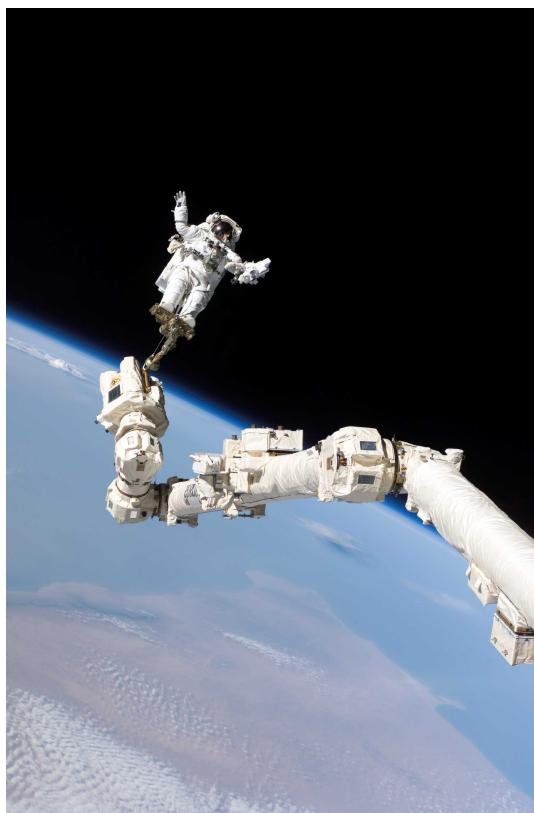
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Asimo

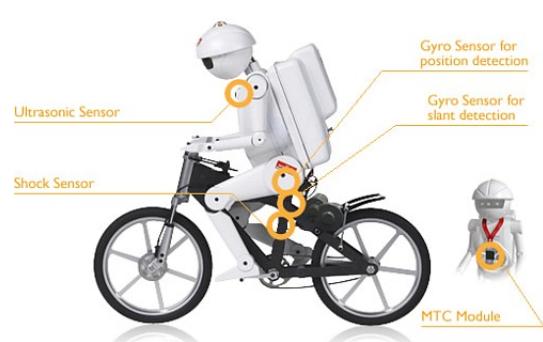


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空间站机械臂



MURATA BOY



MURATA BOY is a bicycle-riding robot.

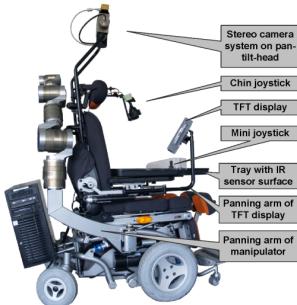
We will introduce you to MURATA BOY's capabilities, and the 'Murata Technologies' that made MURATA BOY possible.

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<EC.10>

FRIEND

The Care-Providing robot FRIEND is a semi-autonomous robot designed to support disabled and elderly people in their daily life activities, like preparing and serving a meal, or reintegration in professional life.



The Care-Providing robot FRIEND

<EC.11>

2 移动机器人 DIY

移动机器人组成

- 机械设备
- 电机
- 电源
- 驱动电路
- 传感器
- 计算设备
- 通信设备

<EC.12>

2.1 轮式

2 轮小车



<EC.13>

2 轮小车



<EC.14>

2 轮小车



<EC.15>

4 轮小车



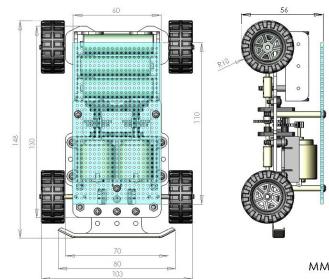
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4 轮小车



<EC.17>

4 轮小车



<EC.18>

2.2 履带式

履带机器人



<EC.19>

履带机器人



<EC.20>

履带机器人



<EC.21>

履带机器人



<EC.22>

履带机器人



<EC.23>

2.3 关节式

5自由度机械臂



<EC.24>

5自由度机械臂



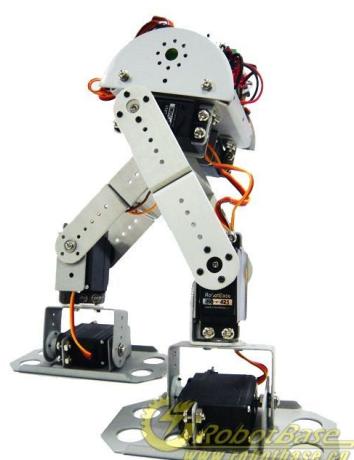
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5自由度机械臂



<EC.26>

6自由度双足机器人



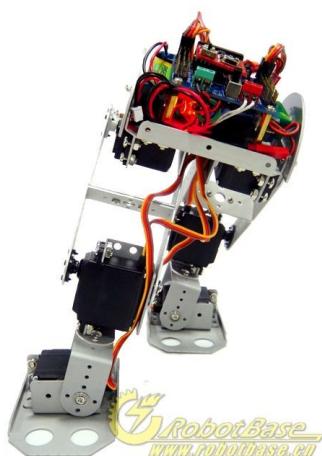
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6自由度双足机器人



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6 自由度双足机器人



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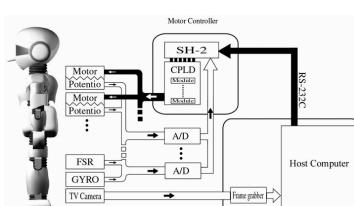
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PINO



<EC.31>

PINO



<EC.32>

2.4 部件

直流减速电机



舵机



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电池

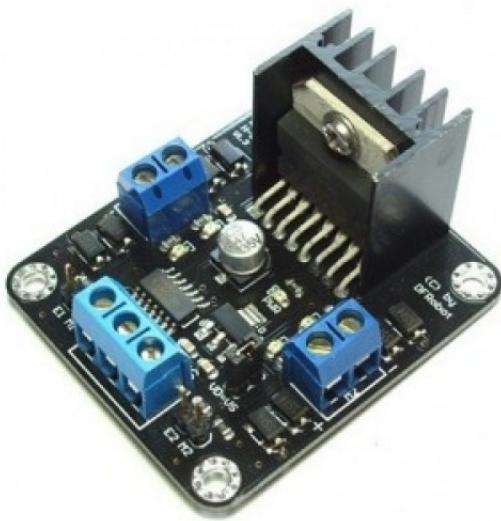


<http://www.societyofrobots.com/batteries.shtml>

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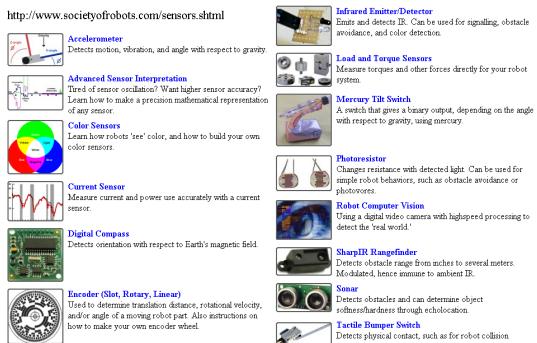
驱动器

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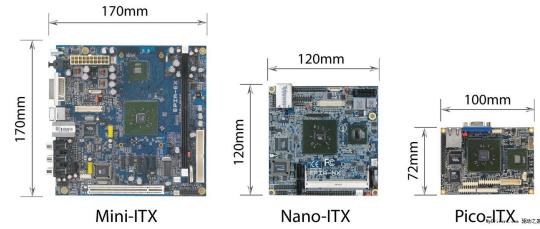


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传感器



mini,nano,pico itx



<EC.40>

pico itx



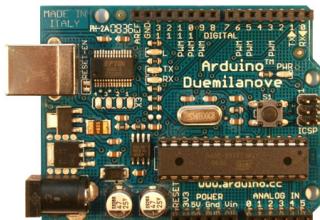
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3 机械工具



<EC.37>

Arduino



<EC.38>

xbee



<EC.42>

<EC.43>



<EC.39>

<EC.44>



<EC.45>



<EC.46>



<EC.47>

4 软件设计

移动机器人软件设计

- 运动控制
- 人工智能
- 通信

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Arduino

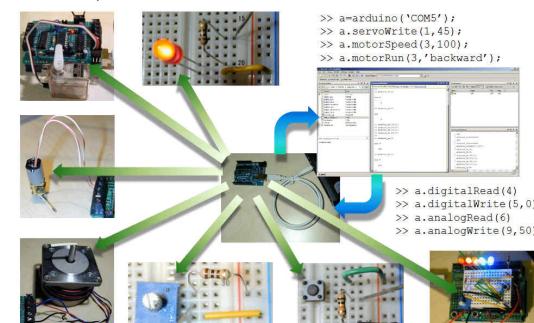
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/*
 * Blink
 *
 * The basic Arduino example. Turns on an LED on for one second,
 * then off for one second, and so on... We use pin 13 because,
 * depending on your Arduino board, it has either a built-in LED
 * or a built-in resistor so that you need only an LED.
 *
 * http://www.arduino.cc/en/Tutorial/Blink
 */

```

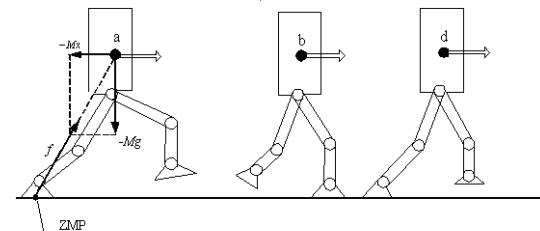
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Arduino, Matlab



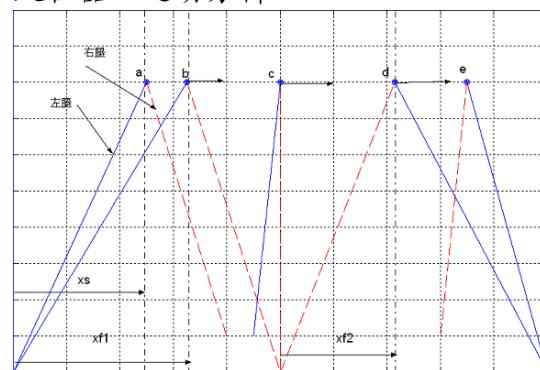
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双足机器人运动分析



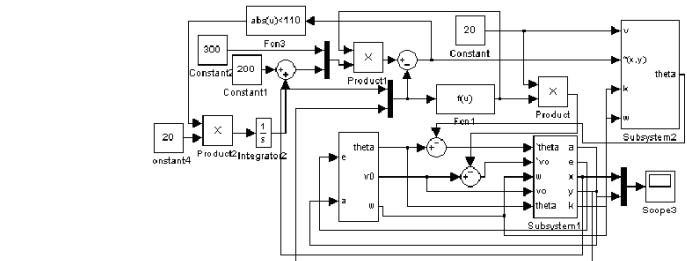
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双足机器人运动分析



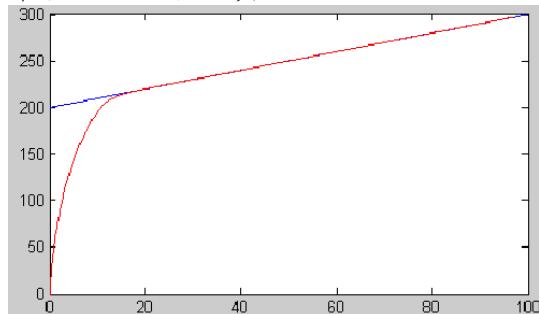
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履带机器人运动仿真



<EC.53>

履带机器人运动仿真



<EC.54>

5 示例

5.1 x86 based

x86 based



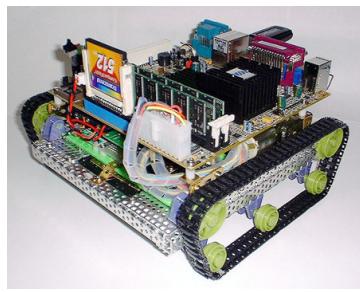
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x86 based



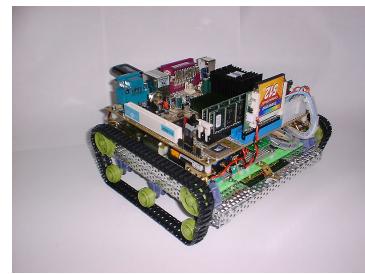
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x86 based



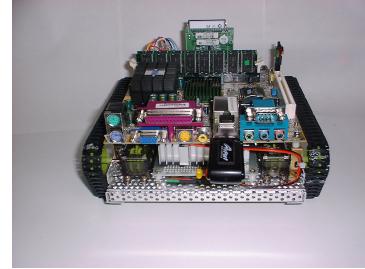
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x86 based



<EC.58>

x86 based



<EC.59>

x86 based



<EC.60>

5.2 blackfin

blackfin



<EC.61>

blackfin



<EC.62>

blackfin



<EC.63>

blackfin



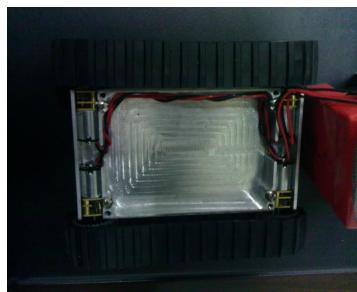
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blackfin



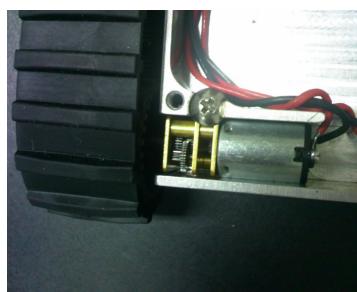
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blackfin



<EC.66>

blackfin



<EC.67>

blackfin

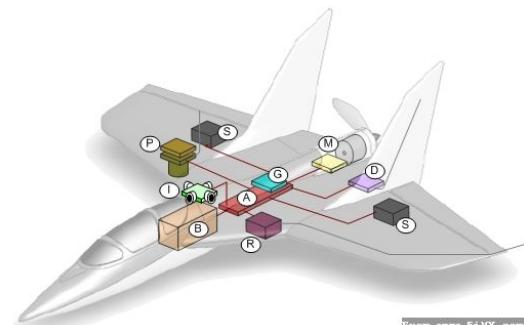


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5.3 UAV

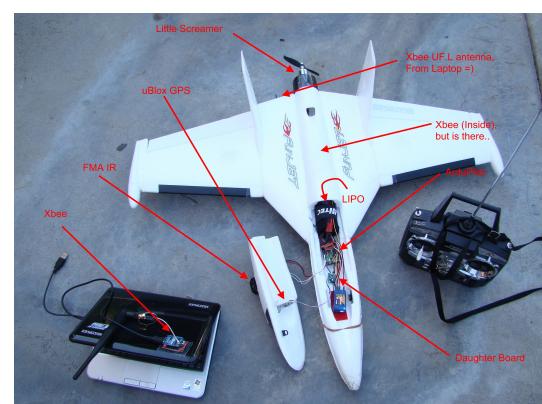


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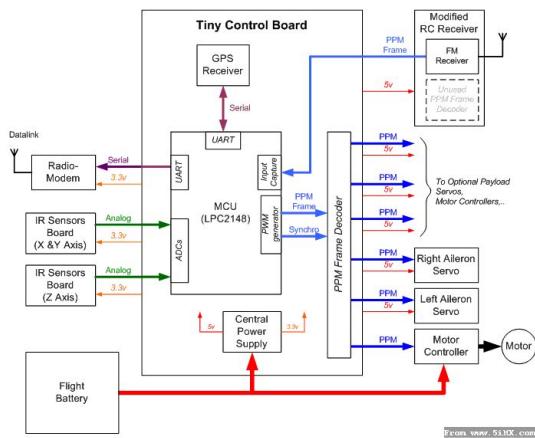
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Ardupilot



<EC.71>

Tiny Control Board



<EC.72>

6 思考

思考

- 嵌入式技术在控制系统中有哪些作用？
- 如何设计一个嵌入式系统？

<EC.73>