Allow me to introduce:
Allow me to introduce:

DRUM ROLL. . . . .
Allow me to introduce:

DRUM ROLL. . . . . . . . . . . . .
Allow me to introduce:

DRUM ROLL.
Allow me to introduce:

**DRUM ROLL**

![AIBO Image]

- **Color camera**
  - Resolution: 208 x 160
  - 30 frames per second

- **On-board processor**
  - 576 MHz
  - 64 MB RAM

- **OS**: Aperios + Open-R
- **Programming Language**: C++

- **Wireless ethernet**
  - (802.11b)
This Course

- Start with **out-of-the-box** Aibo robots
This Course

- Start with **out-of-the-box** Aibo robots
- Learn how to create a **team** of soccer robots
This Course

- Start with **out-of-the-box** Aibo robots
- Learn how to create a **team** of soccer robots
- Build on our **existing team code**
My Goals

- Teach the *technical details* behind programming an autonomous robot
My Goals

• Teach the **technical details** behind programming an autonomous robot

• Find one or two students interested in on-going contributions to the **team** and ultimately **research**
My Goals

• Teach the **technical details** behind programming an autonomous robot

• Find one or two students interested in on-going contributions to the **team** and ultimately **research**

• And I’d be lying if I didn’t add . . .
My Goals

- Teach the **technical details** behind programming an autonomous robot

- Find one or two students interested in on-going contributions to the **team** and ultimately **research**

- And I’d be lying if I didn’t add . . .

---

Win RoboCup!
Today

- An introduction to RoboCup
- An introduction to Aibos
- An introduction to the class
- Initial assignments
- Lab tour
Autonomous Intelligent Agents

- They must **sense** their environment.
- They must **decide** what action to take (“think”).
- They must **act** in their environment.
Autonomous Intelligent Agents

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*Complete Intelligent Agents*
Autonomous Intelligent Agents

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**Complete Intelligent Agents**

- Interact with other agents  

(Multiagent systems)

Peter Stone
Autonomous Intelligent Agents

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**Complete Intelligent Agents**

- Interact with other agents  **(Multiagent systems)**
- Improve performance from experience  **(Learning agents)**

Peter Stone
Autonomous Intelligent Agents

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**Complete Intelligent Agents**

• Interact with other agents  (**Multiagent systems**)  
• Improve performance from experience  (**Learning agents**)  

Autonomous Bidding, Cognitive Systems, Traffic management, **Robot Soccer**
Today

• An introduction to RoboCup
• An introduction to Aibos
• An introduction to the class
• Initial assignments
• Lab tour
Sony Aibo ERS-7 Specs

- Electrostatic sensors
- Speaker and microphone
- Infrared range sensors
- 3 acceleration sensors (x, y, and z)
- Switch sensors
Sony Aibo ERS-7 Specs

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  - 64 MB RAM
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  - Programming Language: C++
20 degrees of freedom

- head: 3 neck, 2 ears, 1 mouth
- 4 legs: 3 joints each
- tail: 2 DOF
Warnings!
Warnings!

- They are **delicate**
- They are **expensive**
Creating a team — Subtasks
Creating a team — Subtasks

- Walking
- Ball manipulation (kicking)
- Vision
- Localization
- Individual decision making
- Communication/coordination
Creating a team — Subtasks

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- Ball manipulation (kicking)
- Vision
- Localization
- Individual decision making
- Communication/coordination
Some History

- Barely “closed the loop” by American Open (May, ’03)
Some History

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- Improved significantly by Int’l RoboCup (July, ’03)
Some History

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- Improved significantly by Int’l RoboCup \textit{(July, ’03)}
- Won 3rd place at US Open \textit{(May, ’04)}
- \textbf{Quarterfinalist} at RoboCup \textit{July, ’04}
Some History

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- Improved significantly by Int’l RoboCup (July, ’03)
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2004 Highlights:
  - Many saves: 1; 2; 3; 4;
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  - Many saves: 1; 2; 3; 4;
  - Lots of goals: CMU; Penn; Penn; Germany;
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2004 Highlights:
- Many saves: 1; 2; 3; 4;
- Lots of goals: CMU; Penn; Penn; Germany;
- A nice clear
- A counterattack goal

2005 Highlights: coming on Tuesday
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- Barely “closed the loop” by American Open (May, ’03)
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- 2004 Highlights:
  - Many saves: 1; 2; 3; 4;
  - Lots of goals: CMU; Penn; Penn; Germany;
  - A nice clear
  - A counterattack goal
- 2005 Highlights: coming on Tuesday

Now...
Some History

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- Won 3rd place at US Open (May, ’04)
- Quarterfinalist at RoboCup July, ’04

2004 Highlights:
- Many saves: 1; 2; 3; 4;
- Lots of goals: CMU; Penn; Penn; Germany;
- A nice clear
- A counterattack goal

2005 Highlights: coming on Tuesday

Now... take a breath
The Flip Side

- There are probably too many of you
The Flip Side

- There are probably too many of you
  - There is a limit on robots and lab space
  - So now I’ll try to scare you away
The Flip Side

- There are probably too many of you
  - There is a limit on robots and lab space
  - So now I’ll try to scare you away

- Yes, working with the robots will be a lot of fun
The Flip Side

● There are probably too many of you
  – There is a limit on robots and lab space
  – So now I’ll try to scare you away

● Yes, working with the robots will be a lot of fun

● But it will also be quite frustrating
  – Debugging can be very tedious
The Flip Side

• There are probably too many of you
  – There is a limit on robots and lab space
  – So now I’ll try to scare you away

• Yes, working with the robots will be a lot of fun

• But it will also be quite frustrating
  – Debugging can be very tedious

• Largest grade predictor: probably hours spent in lab
The Flip Side (cont.)

- Class will be loosely structured
  - Some lectures/discussions
  - Often *show and tell* in the lab
The Flip Side (cont.)

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  - Class will require maturity, self-motivation
The Flip Side (cont.)

• Class will be loosely structured
  – Some lectures/discussions
  – Often show and tell in the lab
  – Class will require maturity, self-motivation

• Bottom line: if you’re worried about time management or grades, especially in other classes, the class is probably not for you.
Logistics

- Decide quickly if you’re up for the course
  - Indicate status on roster
  - I need to decide who can register
  - We need to make computer accounts
Logistics

• Decide quickly if you’re up for the course
  – Indicate status on *roster*
  – I need to decide who can register
  – We need to make computer accounts

• Be on the mailing list
Grading and First Assignments

- See syllabus
The Lab

- TAY 2.144, 471-9787
- Currently 9 computers
  - How many people don’t have laptops with wireless access?
The Lab

- TAY 2.144, 471-9787

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  - How many people don’t have laptops with wireless access?

- Accounts on vieri same as cs accounts, pwd is username
  - Use space on vieri efficiently
The Lab

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- My research group is sharing the lab with you
The Lab

- TAY 2.144, 471-9787

- Currently 9 computers
  - How many people don’t have laptops with wireless access?

- Accounts on vieri same as cs accounts, pwd is username
  - Use space on vieri efficiently

- My research group is sharing the lab with you
  - Feel free to get to know them, ask questions
  - Especially Dan and Mohan
The Lab

- Until there’s reason to change the policy, we will start with **24-hour access** for class members.
The Lab

- Until there’s reason to change the policy, we will start with **24-hour access** for class members.

- No non-class members allowed

- Access by combination; **LOCK IT** when you leave!
The Lab

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- Keep it neat
The Lab

- Until there’s reason to change the policy, we will start with 24-hour access for class members.
- No non-class members allowed
- Access by combination; LOCK IT when you leave!
- Keep it neat
- Let me know ASAP if there are logistical problems
Next Meeting

- Tuesday at 2pm
- Here unless email to class list
Next Meeting

- Tuesday at 2pm
- Here unless email to class list

Now, down to the lab