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bLUEMOUE

Using Bluetooth to control a YaMoR modular robot
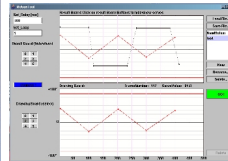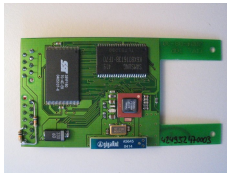
Kevin Drapel - Cyril Jaquier

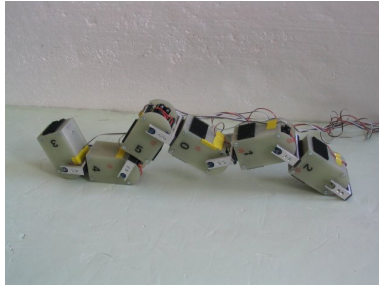February 11, 2005

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The YaMoR project

Previous work

YaMoR is a modular robot composed of wireless modules. A module contains three boards : a *Xilinx* FPGA, a *Zeevo* Bluetooth chip and a power board.

The YaMoR module was designed by Elmar Dittrich. Rico Moeckel added electronic boards. Jean-Philippe Egger is the author of Java-Motion, the tool used by Elmar to control the robot with wires.

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The YaMoR project

Project description

We had to :

- Find a cheap Bluetooth solution for a desktop computer

- Create a new application to control the robot

- Order components and mount more modules

- Reproduce the previous videos without the wires

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Solution

Communicating with the modules from a PC

A cheap, versatile, handy and easy to install solution on the desktop computer. Three ideas :

- Many Bluetooth devices connected to a FPGA which routes data coming from a serial port.
- Several serial ports with a Bluetooth device on each port.
- A Bluetooth USB stick connected to the PC.

Bluetooth stick is the winner : small, available everywhere, low price for good performance, handy, good for laptops

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Bluemove

Bluemove is our new application written in Java 1.5. It allows the user to control the robot in a powerful graphical interface.

Main features :

- Modules manager to maintain projects and modules settings
- Timelines interface for linear and smooth trajectories
- Support for several actuators / sensors per module
- Not only for YaMoR project but designed for other robots / protocols

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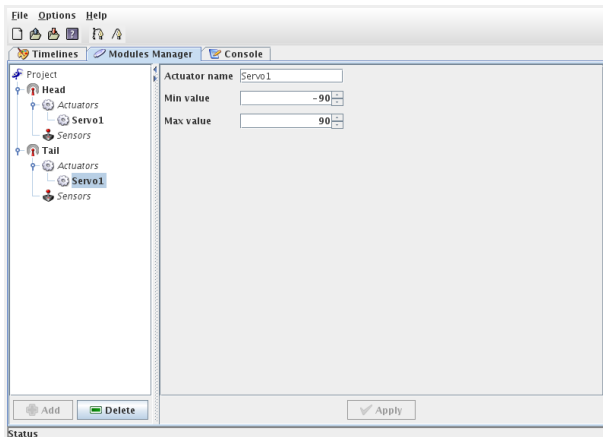Experiments
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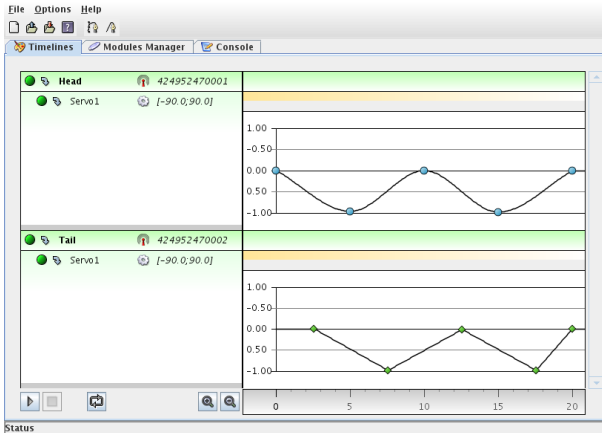
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Screenshot - Modules manager

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Screenshot - Timelines

Video

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Modules

New modules

We were in charge of mounting more modules to reach a total of 20 units. We have only two fully-working modules at this time.

What went wrong with hardware:

- Burnt components due to power board shortcut (solved by Fabien)

- Batteries did not fit into case (solved by Andre)

- Long delays between ordering and shipping of components (expected)

- Impossible to detect the new Bluetooth cards with the USB sticks (under investigation)

Bluetooth issues are blocking the project.

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Wireless robots

Experimenting with the wireless robot

With two active modules and a few inactive units, we were able to create some interesting configurations.

Compared to Elmar's videos, the modules have a different behaviour because they are heavier.

A module autonomy is about 30 minutes (full charge). Charging the battery is a matter of 45 minutes.

Wireless robots

Video

Future development

We will improve Bluemove and the modules. Rico Moeckel is working on a scatternet version of the protocol to handle more than 7 modules.

Possible features:

- Realtime control

- Scripting

- Timing blocks

- At long term : sensors, servos, FPGA (wireless programming)

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Conclusion

We enjoyed...

- Working with both hardware and software concepts.

- Discovery of modular robotics and Bluetooth.

- Soldering sessions, electronic and mechanical talks

- Great atmosphere at BIRG

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Questions ?