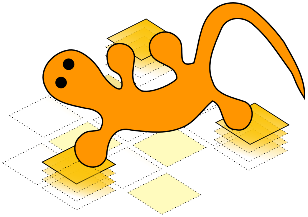


Towards an improved framework for YaMoR

Kevin Drapel - Cyril Jaquier

21 juin 2005

- The YaMoR project

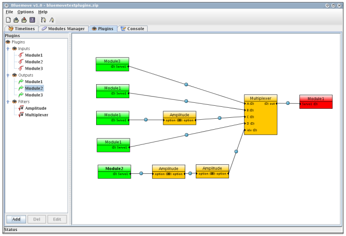
1. Bluemove
   - Real-time control
2. Simulator
   - Eve
3. Closing words
   - Future development
   - Conclusion
   - Questions

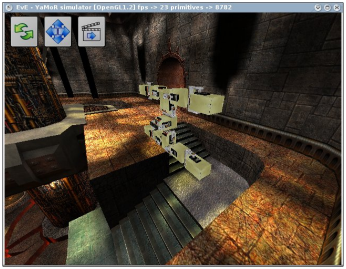
Previous work

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.

During the winter semester, we developed a Java software called Bluemove to remotely control the modules from a computer.

The YaMoR project




EvE - YaMoR simulator [OpenGL1.2] fps -> 23 primitives -> 8782

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We had to :

- Improve Bluemove and add a real-time control system with scripting
- Design a simulator receiving orders from Bluemove
- Integrate the FPGA programming project of Jérôme Maye into Bluemove

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Our real-time control uses plugins which act like generators, filters, modifiers. It behaves like an interactive signal processing box.

Main features :

- Organized in a graph with connected nodes representing the different plugins
- Each plugin can be fully configured, new options can be added
- Each plugin has its own script (BeanShell language)
- Plugins can receive keys events in real-time

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The user adds new plugins on a panel and connects the nodes together. The values are transmitted along the links and finally sent to the modules.

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- Filters : processors, modifiers, multiplexers, etc.
- Outputs : modules

Constraint : no cycles allowed in the graph !

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- Function generator in the timelines manager
  For example : $sin(t*2)+exp(t)$
- Remote programming of the FPGA via Bluetooth (Jérome Maye project)

We also fixed bugs that we discovered during the inauguration and further tests.

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A simulator that could receive the positions sent by Bluemove would be useful to test and validate different configurations.
Main features of our simulator "Eve" :

- C++ code
- Physics and collisions (ODE)
- Polyvalent and portable 3D engine (Irrlicht)
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Thanks to Irrlicht and ODE, we tried to produce something realistic.

- No more flat floors : Quake III levels
- Other objects or obstacles can be added to the scene
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- Used protocol : XML-RPC == XML files encoded and sent on HTTP
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Video

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- Security problem : serial batteries
- Hardware problem : too many wires

And of course : add sensors

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- Unreliable electronics : shortcuts, CRC errors, etc.

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