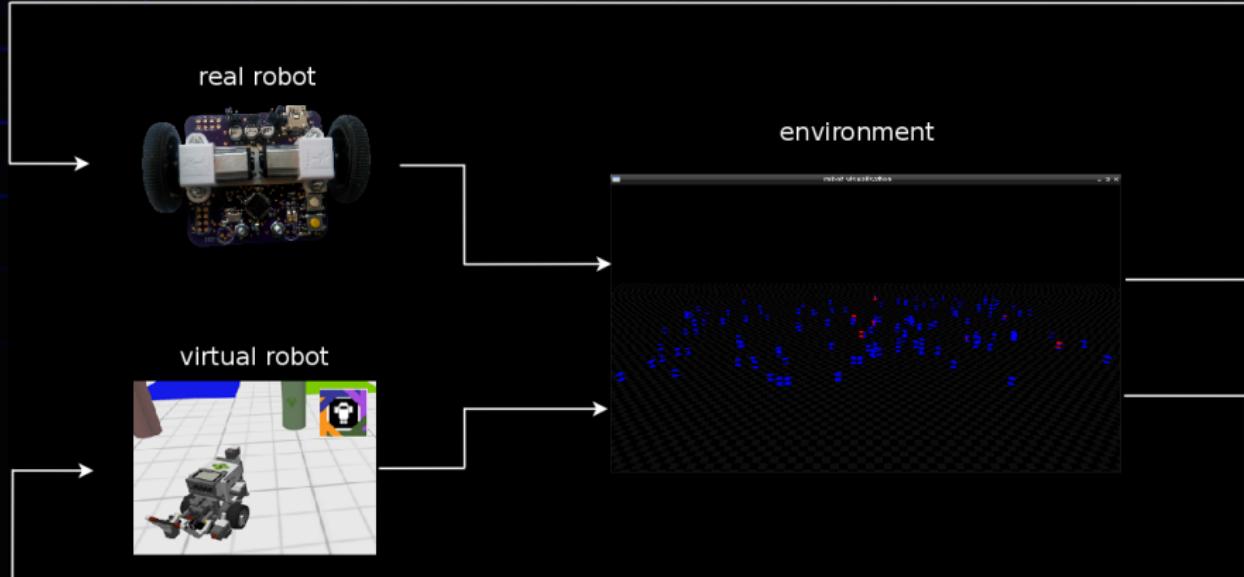


Aeris - Hybrid multirobotics system

Michal CHOVANEC et. al

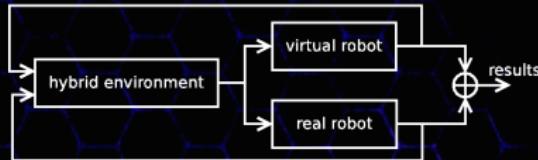
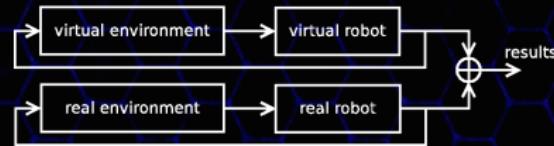
April 2016

Combine virtual reality with real robots



- Real robot, based on ARM Cortex M4F
- Virtual robot, running on Linux PC
- Virtual environment, running on Linux PC

Comparsion with common solution

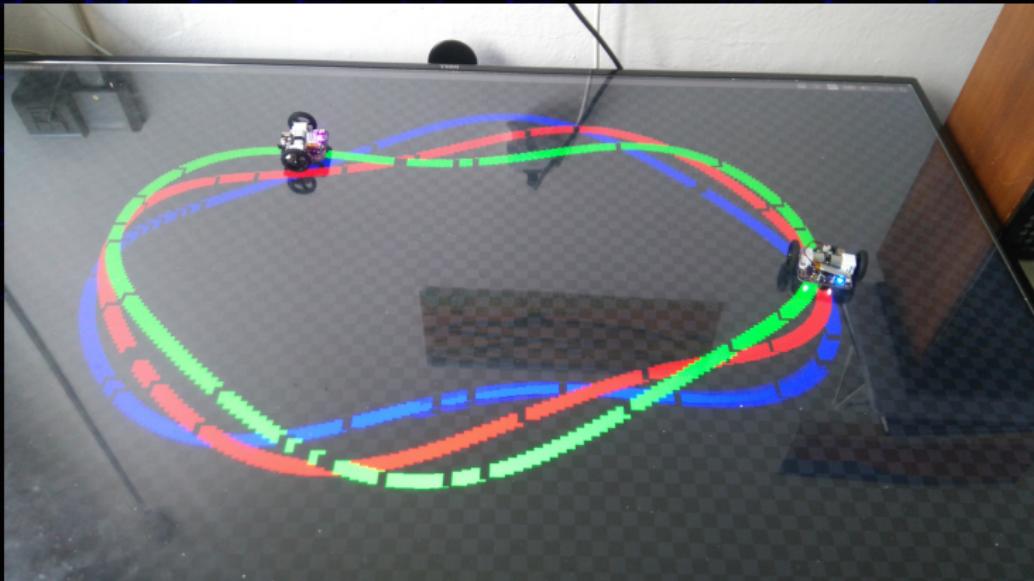


- Separated model and reality
- Different inputs for virtual and real robot
- Difficult to compare

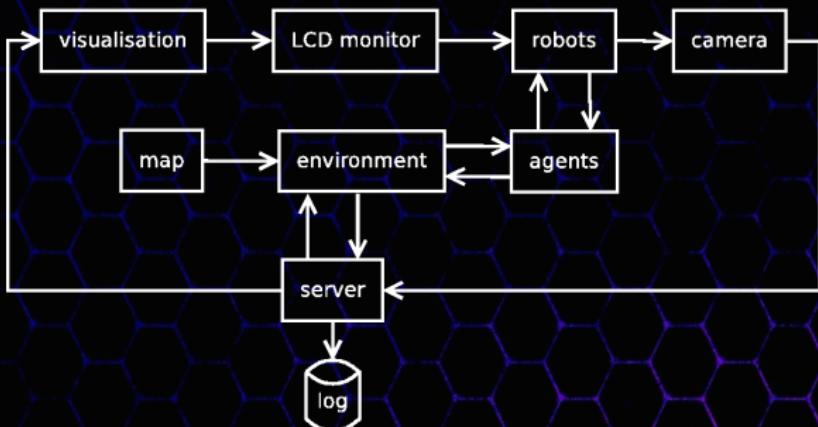
- Single environment
- Same inputs for virtual and real robot
- Easy comparable

Aeris system photo

Linefollower on dynamic changing line



Software architecture

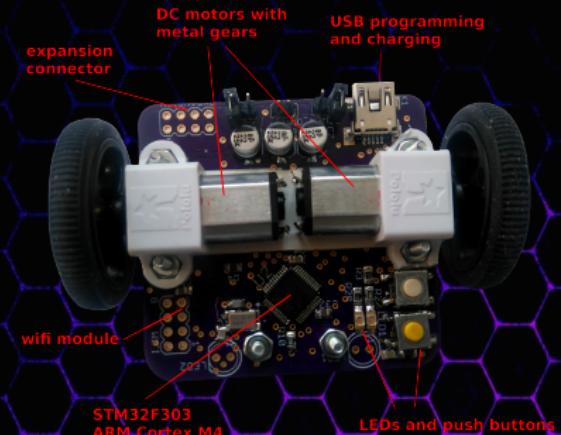


- C++ 11, GNU Linux
- client-server
- OpenGL

- Server, Visualisation, Robots
- each on own computer
- multiple visualisations
- html5 visualisation

Robot hardware

- 72MHz ARM Cortex M4 with FPU
- IMU : gyroscope, compass, accelerometer
- 4x RGB surface sensors
- USB programming and charging
- WiFi and I2C expansion connectors
- 2x DC motors



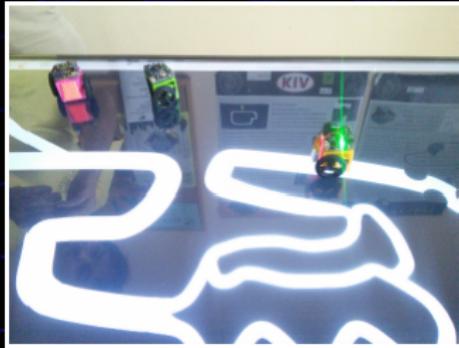
Robot hardware

- 72MHz ARM Cortex M4 with FPU
- IMU : gyroscope, compass, accelerometer
- 4x RGB surface sensors
- USB programming and charging
- WiFi and I2C expansion connectors
- 2x DC motors



Experiments

- Ant colony - pheromone footprint
- Virtual maze solving
- Line follower
- Self organizing systems
- Any problem asking for changing environment in time
 - minisumo
 - robotic football
 - capture-the-flag game
 - ...



Thanks you for your attention

- web <http://www.fribot.sk>
- sources <https://github.com/michalnand/aeris>

Authors : Michal Chovanec, Lukas Cechovic, Lukas Mandak