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24 February 2014
by Alexander Hellemans

Jørgen Christian Larsen - Learning from animals to build walking robots

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Newly developed robotic kits with legs, inspired from animal movement, constitute off-the-shelf solutions for scientist who need to model movement

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Robots are usually thought off as devices to alleviate the burden of certain repetitive or difficult tasks. Robots welding car bodies and painting them is a classic example. But the idea that robots can be used as a research tool is relatively new. And what can be a better way of improving the walk of robots than by looking at how animals move. **Jørgen Christian Larsen**, a researcher at the **University of Southern Denmark** in Odense tells youris.com how robots can make such study possible, following the development of a robotic kit with EU funding.

Why are the kits you have developed different?
There are a lot of construction kits for building robots. However, our robotic kit, **LocoKit**, is specifically aimed at building legged robots, with the ability to walk, run, and

jump. It was designed as was part of the EU-funded **Locomorph** project, which ended in March 2013. The main goal was to build a robot for the general study of motion.

We wanted to have a platform that would enable researchers from fields that normally do not build their own robots to use them as a tool in their daily scientific work. We have developed a standard interface, which allows users to enter parameters. This way, researchers can make the robot walk without having to programme everything from scratch. For example, these kits are used in Denmark for studying embodied artificial intelligence. Students have to think about how to design the robot body to make it walk. This is an area in which we are using it right now.

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parameters, such as positions of legs and the physics of the motion of the system, we could compare it to an animal's walk. And by comparing the foot fall patterns and the ground reaction between the robot and similar measurements taken on a dog, we could see that there are similarities between the robot's and the dog's movements.

Why is it interesting to compare the walk of a robot with that of a dog?

If we look at robots, we see that they do not walk as naturally and elegantly as animals do. So something is still missing. The question is: how do we get robots to walk as animals? One way to find out is to study animals and derive some general principles. We do not want to copy nature, we cannot copy the complexity of an animal's body, but we can mimic nature.

What are the current limitations of your robot kit?

The current limitation is that the robot just does doing what it is taught. It is just pre-programmed to walk, no matter what the environment looks like. We would like the robot to learn how to walk by itself, using sensory information to adapt to its environment. For example, we would get feedback from the environment with footfall sensors. This would provide knowledge on how the leg is working. This is our next step. We plan to add incrementally sensors for the external world, such as cameras and touch-down sensors.

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