Siemens looks into spider-bots for collaborative additive manufacturing

22 April 2016, by Nancy Owano

Credit: Siemens

Adults appear to have a difficult time figuring it out but some bees and ants find the concept quite fundamental: There is strength in numbers; if they cooperate in carrying out tasks, they can survive as a group.

Robot scientists, interested in how robots can best accomplish certain kinds of tasks, are most interested in studying and picking up patterns to emulate from nature, such as working in teams to achieve large or complex tasks.

Scientists and engineers at Siemens are among the aggressive nature watchers. The latest news on that front is that a Siemens team has worked up spider-like robots which can be equipped with 3D printing technology to work together to construct complex structures and surfaces. *3ders.org* called the devices "robo-arachnids" and said that Siemens Corporate Technology allocated time and resources toward this cluster of 3D printing spider-bots.

The team is at Siemens Corporate Technology's Princeton campus and the devices are called SiSpis.

Reports suggest SiSpis could one day be 3D printing bits of cars and airplanes. They are "the latest step in the development of autonomous mobile manufacturing techniques that Siemens' believes could ultimately play a major role in the manufacture of everything from aircraft to ships," said *The Engineer*.

Credit: Siemens

"We are looking at using multiple autonomous robots for collaborative additive manufacturing of structures, such as car bodies, the hulls of ships and airplane fuselages," said the group's Livio Dalloro in *The Engineer*. Each robot has an onboard camera and laser scanner. How it works: A spider is equipped with an extruder, which is similar to those found on traditional 3D printers. It prints a cornstarch-and-sugarcane substance, polylactic acid, added the report.

It has been designed to autonomously work out which part of an area to cover, and other robots use the same technique to cover adjacent areas. The

algorithms allow the "multi-robot" task planning.

3ders.org looked at their series of algorithms as well: For a given task, the 3D printing area can be divided up into vertical boxes, with each robot assigned its own series of boxes. This division of robotic labor enables the machines to cover even the most complex geometries."

3ders.org also provided a clear picture of how the parts and processes all fit together:

"According to the company, each robot is powered by Siemens' NX PLM software and comes equipped with a 3D printing extruder, designed to print polylactic acid, a biodegradable thermoplastic which can be derived from corn starch, sugarcane, and other natural sources. However, unlike your average 3D printer, SiSpis are fully mobile, as they sport a multitude of articulated legs. Furthermore, each bot has an onboard camera and laser scanner for interpreting its surrounding environment. These sensory capabilities enable SiSpis to know exactly where they are in relation to the 3D printing task at hand."

The impressive degree of cooperation also involves the devices being able to autonomously find their way back to a charging station when batteries are low; they can transmit a progress report to a recharged spider, which can pick up where the other device left off.

APA citation: Siemens looks into spider-bots for collaborative additive manufacturing (2016, April 22) retrieved 24 October 2020 from https://techxplore.com/news/2016-04-siemens-spider-bots-collaborative-additive.html