Robo-whiskers mimic animals exploring their surroundings

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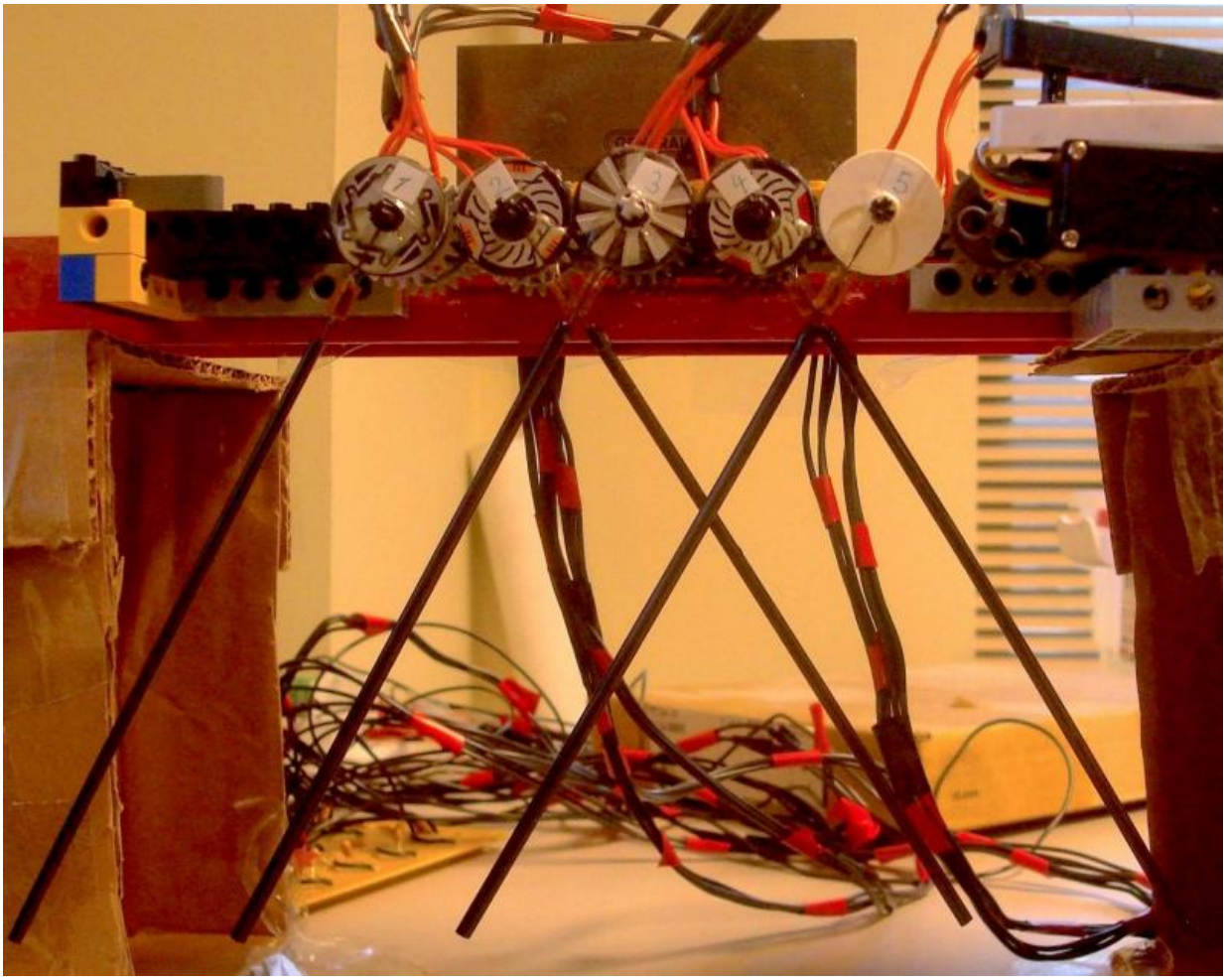

Whisker array. Credit: (c) Cagdas Tuna / University of Illinois at Urbana-Champaign'

Many mammals, including seals and rats, rely on their whiskers to sense their way through dark environments. Inspired by these animals, scientists working at the University of Illinois at Urbana-Champaign and Illinois' Advanced Digital Sciences Centre in Singapore have developed a robotic 'whisker' tactile sensor array designed to produce tomographic images by measuring fluid flow.

The results are published today in the journal *Bioinspiration and Biomimetics*.

"When it is dark, whiskers play a key role for animals in exploring, hunting or even just living underground" explains Cagdas Tuna, a lead author on the paper. "For example, seals can catch fish in the dark by following the hydrodynamic wake using their whiskers."

The whisker array is constructed of five super-elastic Nitinol wires, covered with plastic straws, resulting in each whisker being about 15 cm long and 3 mm wide. Strain gauges attached at the base measure movement in each whisker, and these signals are used to build up an image of the fluid flow past the array.

"There's no proof that animals do a similar 'tomographic reconstruction' in their brains," continues Tuna. "But this shows great potential to be a useful, if unconventional, sensing system."

The whisker array offers a strong alternative or complement to existing systems for navigating, tracking or detection in dark conditions. Future efforts to improve the imaging model to consider object content and miniaturise the system may lead to even wider uses.

"This may even find use in biomedical applications, such as cardiac surgery" concludes Tuna. "A thin-whiskered catheter tip could be used during surgery to track the relative position inside the heart, potentially

reducing the risk of injury, or atrial fibrillation."

A seal. Credit: CC0 from Pixabay

More information: "Tactile soft-sparse mean fluid-flow imaging with a robotic whisker array" *Bioinspiration Biomimetics* 10 046018. iopscience.iop.org/1748-3190/10/4/046018/article

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