

Animal-inspired whiskers key to new navigation technology

April 18 2016



Seals can judge water current conditions by how water flows through their whiskers. Credit: Kjersti Jorgensen

Researchers have developed artificial whiskers that allow robots to "see" the surroundings in dark and murky places by analysing the way the



whiskers respond to water and air flow.

Many animals rely on their whiskers to paint a picture of their surrounding environment when vision or hearing is limited. For example, rats get a sense of their surrounding environment by brushing their whiskers against surfaces. Seals can judge water current conditions by how water flows through their whiskers.

In a recently published study in the IOP Publishing journal *Bioinspiration and Biomimetics*, researchers from Singapore and the U.S. describe a whisker array they developed using five super-elastic metal alloy wires covered in plastic straws. A strain gauge located at the bottom of the array records any movement the whiskers make. These signals are accumulated to create an image of the gas or fluid brushing past it.

Making artificial whiskers that interpret delicate movements, called vibrissal sensing, has only become possible in the last 15 years, following advances in understanding the brain's neural processing of vibrissal signals.

Lead author Cagdas Tuna of the University of Illinois' Advanced Digital Sciences Center in Singapore believes artificial whiskers might eventually be used in robotics as an alternative to conventional vision, radar or sonar systems. His team is currently working on improving its image model so it can keep up with interpreting quick changes in flow patterns or moving objects.

"I believe if we can mimic some of the active strategies animals use to survive in their environment, we can actually further increase the sensing capabilities of the whisker system," he says.

Currently, the whiskers developed in this study can only form twodimensional images. Creating three-dimensional images would require a



more sophisticated mathematical model to interpret the signals coming in, as well as improving the whisker sensors, making them smaller and more flexible. Not only this, but because humans have only begun to understand how animals in the wild use their whiskers to read their environment, it is important to continue research to find out how animals such as seals actively process vibrissal signals in their brains in different situations, and to understand how their <u>whiskers</u> are designed to do so.

Provided by Institute of Physics

Citation: Animal-inspired whiskers key to new navigation technology (2016, April 18) retrieved 1 May 2024 from <u>https://phys.org/news/2016-04-animal-inspired-whiskers-key-technology.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.