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Real Time Signal Processing: Texture Recognition using a novel Fiber Sensor

Partners:

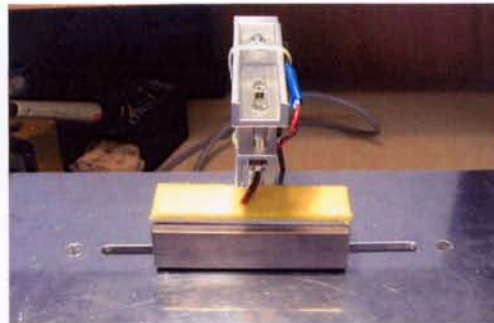
Baumer electric **Neuronics**

KTI/CTI

CTI project 6520.1 NMS-NM

IMES	Institute for Microelectronics and Embedded Systems
ICOM	Institute for Communication Systems
ITA	Institute for Internet Technologies and Applications
IFS	Institute for Software
IET	Institute for Energy Engineering
IMA	Institute for Mechatronics and Automation Engineering
IPEK	Institute for Product Design, Development and Engineering
IWK	Institute for Material Technologies and Plastics Processing
SITEC	Institute for Plant and Safety Engineering
SPF	Institute for Solar Technologies
UMTEC	Institute for Environmental and Process Engineering
IBU	Institute for Civil and Environmental Engineering
FLE	Center for Landscape Development
FTL	Research Center for Leisure, Tourism and Landscape
GTLA	Institute for the History and Theory of Landscape Architecture
IRAP	Institute for Spatial Development, Applied Research and Planning Support

A fiber sensor is a new kind of a sensor which uses fibers that are attached to a membrane to sense its environment. One of the great advantages of such sensors is that they are relatively cheap. In this project, carried out together with the HSR Institut für Mechatronik und Automatisierungstechnik, several such sensors were manufactured and tested on different tasks. For each task, a custom real time signal processing software was developed



The recognition of different textures, shown in the figure to the left, was one such task. With the proper real time signal processing it was possible to reliably distinguish between different surface textures. For example, this fiber sensor was able to distinguish different rubbers, which appear all identical to a camera system, but

result in different drag on the fibers which can be detected by the real time signal processing software.

In another task, several fiber sensors were attached to a small Katana robot from Neuronics, in an attempt to enable the robot to sense the different surface textures of two different objects.

This situation is shown in the figure to the right. The two objects are a white mechanical pencil (on top) and a black pen (on the bottom). Again, the real time signal processing software was able to reliably recognize the particular object based on the fiber sensor signal alone.



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