

<u>Name</u>	<u>Organisation</u>	<u>Project title</u>	<u>Decision No.</u>	<u>Decision date</u>	<u>Funding period</u>	<u>Funding</u>
Pietikäinen, Matti	OY	Texture-based computer vision: methods and applications	120988	17.09.2007	01.01.2008 - 31.12.2011	368 000

Project description

Vision is a key component for building artificial systems that can perceive and understand their environment. With computer vision it is possible to provide machines with an ability to understand their surroundings, control the quality of products in industrial processes, help diagnose diseases in medicine, recognize humans and their actions, and search for information from databases using image or video content. Texture is a fundamental property of surfaces. It can be seen almost anywhere. Texture could play a key role in a wide variety of applications of computer vision, but the progress in understanding how to describe and recognize textures effectively has been very slow. We have made recently great progress. We have developed a novel methodology based on Local Binary Patterns (LBP), which has evolved to present a major breakthrough in texture analysis. Our recent results in adopting the methodology to facial image analysis and to modeling the background and detecting moving objects suggest that the approach could offer significant potential for many important tasks in computer vision which have not been earlier regarded as texture problems. A general objective of the planned research is to develop novel generic methods and solutions which allow us to utilize texture information effectively in such problems as object recognition and tracking, face recognition, recognition of facial expressions and speech, and analysis of motion and actions. Results of the research are planned to be evaluated and demonstrated in a smart environment containing a network of cameras and intelligent mobile robots communicating with humans. The research is divided into four tasks: 1) Development of generic methodology, 2) Face analysis (including recognition of faces, facial expressions and speech), 3) Analysis of motion and actions, and 4) Human-machine interaction in a smart environment. In this research area we have established active collaboration with some of the world's leading groups and top scientists. Among the most important partners are the University of Maryland, USA (Larry S. Davis, Rama Chellappa), INRIA Rhone-Alpes, France (Cordelia Schmid), and the Chinese Academy of Sciences, China (Stan Z. Li). By its nature our research also includes interdisciplinary collaboration with experts from different fields.