3D Camera to Give Robots Better View

The EU Project TACO will develop a new type of 3D camera that will give robots a more "human view of the world".

The project will provide current and future robots with a significantly better overview and understanding of their surroundings. This will open up opportunities for the application of robots to a much greater extent – robots may interact with humans on a daily basis and perform a wide range of different tasks such as cleaning, construction, maintenance, security or personal support.

Emulating the Human Eye

Today, the sight of most robots is not good enough for the robot to be able to understand its surroundings, which also results from the inability to control the collection of data about the environment. The information about the robot's surroundings is infrequent and of insufficient quality.

The human visual system is oriented differently since the eye's vision is always attracted most by elements of our environment that we find interesting and/or important. This might be a ball that we see rolling down the road while we are driving, or the cup of coffee we are about to grab with our hands. In both cases, our eye moves to get a visual impression of the important object or element in our surrounding in the best quality possible.

The camera developed during the TACO project aims at imitating the human eye, in particular the process of constantly searching for those elements of the environment that are considered important or interesting and then reproducing the area of interest with significantly higher quality than the less interesting areas. This process is being displayed in the illustration on the right.

By applying principles of human vision, the camera can produce better quality data, without increasing the total amount of data the robot needs to process. The camera will even provide something that the human view fails to provide – accurate information about the distance to every point in the image. This helps robots to deal with our unstructured world. A robot will be more likely to grab a cup of which it knows that it is 52 cm away, then a cup of which it knows that it is "slightly to the right hand side of the observation area".
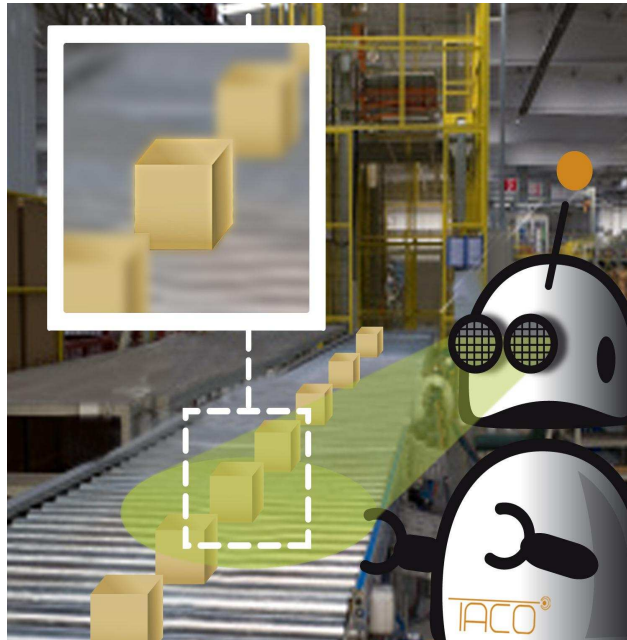
The TACO camera will be realized through two main technologies: flexible, low-cost and robust hardware based on laser scanning technology on the one hand, and software for rapid object detection and environmental understanding on the other

hand. The research and development is carried out in a consortium that consists of research institutions as well as robotic companies from Austria, Germany, United Kingdom and Norway. The expertise of the consortium members is widespread and ranges from the development of the required hardware and software components over the provision of the test environment to the experience of international project coordination.

About TACO

TACO (Three-dimensional Adaptive Camera with Object detection and foveation) is a small or medium-scale focused research project co-financed by the European Commission under the 7th Framework Programme. The project started in February 2010 and will last for 36 months. TACO's consortium is composed of four research institutes, two industrial companies and one university, which are all seated in Europe (Austria, UK, Germany and Norway).

Project Partners: Technikon Forschungs- und Planungsgesellschaft mbH (AT), Shadow Robot Company Limited (UK), Oxford Technologies LTD (UK), TU Vienna (A), Fraunhofer Germany (DE), Stiftelsen SINTEF (N), Carinthian Tech Research AG (AT).

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