

## JKU develops highly efficient Classification Sensor

The classification, i.e. the recognition of objects, patterns, or motions plays an important role in many image-processing applications.

Common image sensors capture millions of measurements per image recording. The sensed pixels are then processed algorithmically to, for instance, detect and distinguish faces, gestures, or fingerprints. However, not every pixels plays an equal role for this. Depending on the classification task, various image regions contain information that is more important for classification than others. Only those regions, so-called image features, are used for enabling a robust recognition, while all other pixels remain unused.

The method developed by the JKU Institute of Computer Graphics computes the most important image areas for a given classification task and uses them for a unique sensor design. The resulting sensors no longer record pixels of an image. They rather measure what computer tomographs capture – the so-called Radon transform of the image.

Thereby, light signals are optically coupled into a two-dimensional light guide, and are coupled out and measured at particular positions of the light guide's borders. The number and location of these positions depends on the actual classification task and is chosen in such a way that very high classification rates are achieved with a minimum of measurements.

First prototypes for motion and gesture recognition have (despite complex classification tasks) led to hit ratios of over 99% with less than 10 measurements.

Not only the high classification rates, but also the energy efficiency and better read-out speed are essential advantages of the new sensor generation. "It makes a clear differences whether millions of pixel values have to recorded and downloaded from the sensor, or only 10 measurements." states Prof. Bimber, Head of the Institute for Computer Graphics.

Details around the new classification sensor will appear in the following days in the renowned journal of the Optical Society of America (OSA), Optics Express. The project is funded by Microsoft.

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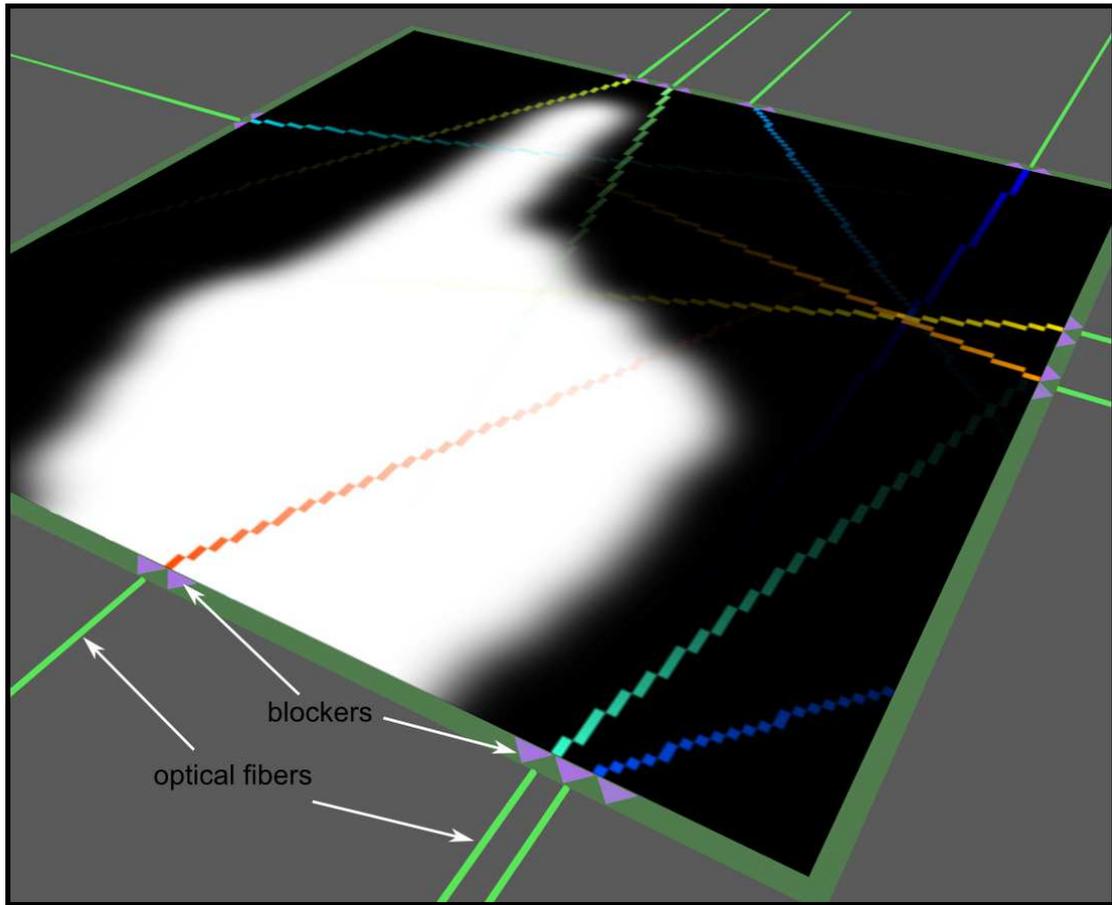
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Computed sensor design for the classification of hand gestures: 22 different gestures at 300 varying poses each are detected correctly in over 99% of all cases. For recording, only 10 photodiodes are applied that measure light integrals at particular positions along the borders of a two-dimensional light guide.