

Konrad Vowinckel

Indoor Location Retrieval with Depth Images using 3D Shape Features

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Technische Universität München
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Abstract

Content-based image retrieval (CBIR) for location recognition allows more precise indoor navigation than state-of-the-art methods. Using range images and matching a query image to a dataset of geo-tagged images is current research. This thesis investigates the prospects of applying 3D Shape feature detectors and descriptors to a point cloud projection of the range image. Therefor at first the keypoint detection methods Normal Aligned Radial Feature (NARF), Intrinsic Shape Signatures (ISS) and HARRIS3D detector are described, followed by the shape feature descriptors Spin Images, Signatures of Histograms of Orientations (SHOT) and Unique Shape Context (USC). Special attention is paid to the parameters. Varying radii, border estimation methods, preset filters and computing times are analysed in order to determine, how to set those parameters to obtain good results. The results exhibit the shortcomings of the state-of-the-art 3D feature algorithms, in application of indoor navigation. Finally suggestions for improvement are made.