IS Micro and Macro Navigation for blind

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GOAL

For successful navigation of visually impaired users, we need to scan their surroundings with proper hardware in the first place. For these purposes, we have chosen Microsoft Kinect II, because of its high precision scanning capabilities, combined with high resolution and low energy consumption.


SCANNING

Kinect is scanning its environment using Infra-Red dots by comparing distance to each other. When you know the default design of dots matrix, you can calculate the distance from the matrix source using triangulation algorithms. This way we can obtain the matrix of pixels, each one representing distance from Kinect.

PROCESSING

Finding obstacles in the matrix, where each pixel represents information about the distance from the camera, is not as easy as it should be. Therefore, we developed an algorithm which divides the whole image into sectors and then evaluates collision danger of each sector.
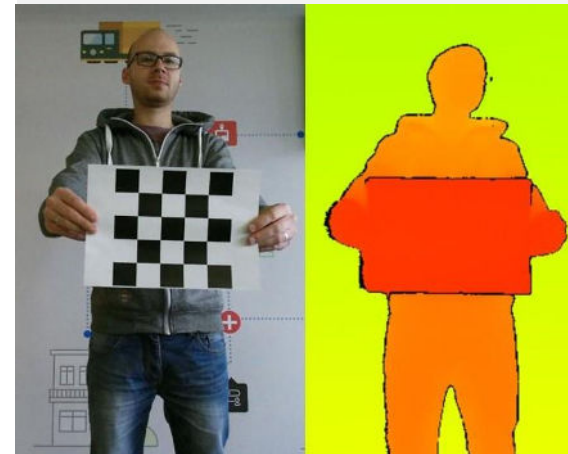
NAVIGATING

Now it's time to implement the Text-to-Speech module, to help the user avoid obstacles on the way to his destination. Real-life testing on the streets of Bratislava has proven, that Kinect in combination with Intel Atom CPU and our algorithm is more than capable to navigate visually impaired users.

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