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AERIAL OBSTACLE DETECTION SOFTWARE FOR THE VISUALLY IMPAIRED

TECHNOLOGY DESCRIPTION

Blindness is considered the major sensory disability, which determines to a large extent the life of a person, being the autonomous movement one of the major challeges to faced by.

The Mobile Vision Research Lab of the University of Alicante has developed an application that integrated in a mobile phone (Smartphone) acts as a complement for walking stick or guide dog solving the main problem of these systems, that is, the inability to detect aerial obstacles.

These aerial obstacles are characterized by not having projection on the ground like tree branches, awnings, etc …

To make possible the obstacles detection, the application is able to take measures of the environment in a radius of several meters. For this purpose, the device must incorporate hardware that allows obtaining the scene in stereo. Within these devices, we find the “3D phones” that are endowed with a double front camera, and every smartphone equipped with a catadioptric system that allow us to obtain two shifted observations of the environment.

In addition to the observation of the stereo pair of images, the application uses data from different sensors, such as magnetometers and accelerometers. These sensors provide the global orientation of the device, to detect the direction in which the user is walking.

The obstacle detection is performed up to four meters forward, within the space corresponding to the user torso (a volume of 0.5 x 0.5 x 4.0 meters is estimated). The system incorporates an algorithm to correct the swing movement produced when the user walks. This correction makes the system to search the obstacles in the walking direction, instead of the direction the camera is pointing.

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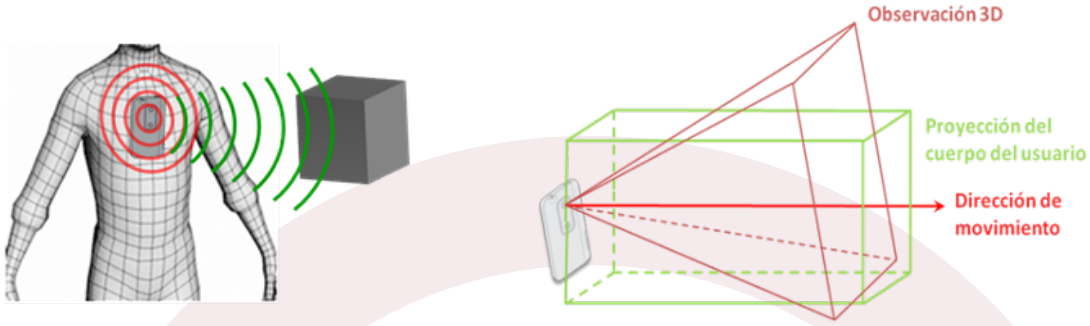

To detect obstacles technology calculates the moving direction of the user, which is not coincident with that of the camera device.

It is worth to highlight that this technology is new for this kind of devices. Until now, smartphones were not able to extract real measures from the environment. This application extracts about 30.000 measures per frame, with a frame rate of 9 fps.

APPLICATION SECTORS

- Companies developing software for mobile devices and smartphones. Especially vision applications on mobile devices, embedded or autonomous.
- Companies specialized in products for the visually impaired.
- Organizations for the visually impaired support (foundations, associations, national and regional public authorities, etc ....)
- Other companies or entities interested in new developments in robotics, and computer vision systems.

TECHNICAL ADVANTAGES AND INNOVATION

- The technology offers the following advantages and benefits:
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- It is integrated in a smart phone, being comfortable and discreet to the user facilitating their social integration.
- Ease of use via touch interface specially designed for the blind. Items and options are vocalized.
- The system does not require previous calibration to start the obstacles detection.
- Also, the system warns the obstacles via acoustic signals or vibrations without depriving the user from the sense of hearing.

CURRENT STATE OF THE TECHNOLOGY

The technology has been successfully tested in 3D mobile featuring a prototype developed for the Android platform. This prototype is being tested by blind people within limited fields.

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INTELLECTUAL PROPERTY RIGHTS

The technology is protected by the following patent application
Title: "Aerial obstacles detection system for the visually impaired".
Application number: 201201247.
Date of application: 19/12/2012.

COLLABORATION SOUGHT

We are looking for companies interested in:

- Software License Agreement, know-how and / or patent to exploit the technology by third parties.
- R & D cooperation projects for development or adaptation of technology to other applications or sectors.
- Outsourcing Agreement for advisory activities, technical assistance, development of turnkey software, training, etc...

CONTACT

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More information about technology: http://sgitt-otri.ua.es/en/empresa/offers-techonology.html