Celtic-Plus
Smart Connected World

EUREKA

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Scene Interpretation For Blind And Visually Impaired People

ProVisual

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GeoSim

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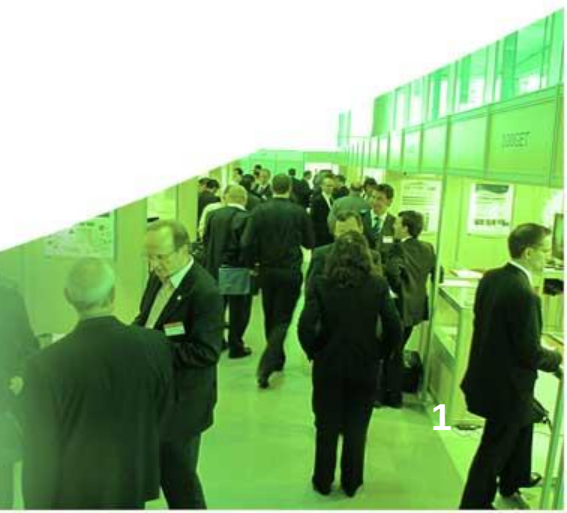

Teaser

Objectives

- To revolutionize quality of life and significantly enhancing the **mobility and independence** of the blind and visually impaired people.
- Enabling the blind to **detect**, **identify** and **avoid obstacles** on its way and assist in finding the way to a specific target or object.

It is based on "Data Fusion" of multi sensors enabling the creation of an overall mental picture of the surrounding physical environment in front of the blind person ,

Organisation Profile

GeoSim

GeoSim is a private company incorporated in Israel in 2001.

*GeoSim builds high definition **3D-city maps** and turns them into multi-purpose application platforms whose key parameters are:*

- *Spatial accuracy of 10 cm with 1 cm/pixel textures.*
- *Complete street-level details, including seamless extension into indoor spaces (with 5cm spatial accuracy and 0.5 cm/pixel textures).*
- *Built-in 'intelligence' based on highly parametric structure and the ability to integrate all city-related data (zoning, utilities, traffic, retail, real-estate, etc.).*
- *Real-time data streaming supporting continuous 3D-navigation/visualization.*

Proposal Introduction (1)

Vision

- ProVisual aims to **support independent active living** of the blind and visually impaired people and enhance their quality of life and integration within the society. .
- ProVisual will enable the blind to **detect**, identify and avoid obstacles on his way and assist in finding his way to a specific target or object

Motivation

- We have identified the relevant research topics for the ProVisual project will go beyond the State of the Art in several areas- **3D compact imaging sensors based on MEMS** technology, fusion of data, high level vision algorithms allowing capturing **3D models of rapid dynamic scenes.**

Content

- **Implementation of wearable prototype** consisting of the **multi-sensors** unit, the data processor and the Gigabit communication link.
- Implementation of Simulator emulating 3D imaging sensor emitting cloud of voxels representing 3D physical surrounding.
- Implementation of **algorithms** for **sensing the environment** and analysis of 3D and 2D data for **building World Model** information describing the **semantic properties of the environment**

Proposal Introduction (2)

Expected outcome

- Implementation of **wearable compact multi-sensors unit**, including **3D imaging sensor** and high resolution CCD cameras, linked by **Gigabit communication link** to **parallel processing unit** enabling **image understanding**, scene description, obstacles detection and objects recognition in a dynamic environment.

Impact

- ProVisual results will have a profound **societal impact** through improvement of the **quality of life of blind** and visually impaired people**,** enabling **freedom of physical movement** in **out-door** environment.
- **Europe** statistics show about **1.25 m blind people above 18 years old**, while **visually impaired people reach 21m**. About 50% belong to medium-socio economic class. **World wide** Statistics indicate existence of over **340m** visually impaired people and 18m blind people.
- Technologies developed will have impact on Robotic area engaged in the development of assistant Robot for handicapped and elderly people

Schedule

- Project duration will extend over **36 months**

Partners

Setup of the ProVisual consortium is still in its **initial phase**, so far **Finland**, **Israel** and **Spain** have interest to join.

Partners` areas of expertise needed for the proposed research and development of the ProVisual project:

1. Low level vision algorithms to **identify** regular **surfaces in 3D** space.
2. The ability to **track camera orientation** and surfaces seen through the camera through **sequence of frames** during relative movement of the observer as immersed in the target scene.
3. **3D sensor technologies** adapted to different environments (indoors, outdoors) and ranges
4. **HW design**. Different potential applications of the suggested technology may require alternative configurations of the integrated system to suit the variable processing power and/or storage and physical dimensions as may be required for each deployment environment..

Partners

5. **Voice understanding** -expertise in speech understanding and **dialogue management** are needed as speech is the most likely modality of interaction between the scene-interpreter and the blind person
6. **High speed processing** capability based on **multi-core parallel processor** responsible for processing 3D pixels, high level image processing functions and relative velocity computation.
7. A **new architecture** for **high speed processor** and **Giga bit communication** link.
8. Adding **range information in synchronization with video** information. **Stereoscopy vs. 3D imaging**
9. The ability to continuously add objects and generalizations to the system knowledge base of the surrounding scene.

Contact Info

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