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3D surface reconstruction of underwater object

MNVSS Kumar
AITAM, India

Underwater navigation robots like AUV's (Autonomous Underwater Vehicle) are used for navigation and surveying purposes. Crucial equipment that provides navigational and surveillance capability to the Autonomous Underwater Vehicle (AUV) is the sonar. With the advancement of technology, there are Imaging sonars which scan areas unto a range of 100 to 300 meters in front of the AUV and provide images as output. Sonar information collected while searching for, or identifying, underwater mines is often presented to the operator in the form of a two dimensional image. This 2D information provides only range and bearing but not depth of the target. It is necessary to convert this two dimensional data to three dimensional object so as to distinguish the object from sea floor. This 2D data is considered as a finite sampling of a surface. To construct the 3D model three algorithms Slice centroid algorithm, ball pivoting algorithm and Quick Hull and Triangulation algorithm are implemented. Among all three methods Quick Hull and Triangulation algorithm performs well in constructing the 3D surface with good resolution. In Slice centroid algorithm the shape of the 3D object is obtained but with this we cannot construct the surface. In ball pivoting algorithm the surface can be constructed but the resolution is very less. In Quick Hull and Triangulation algorithm the finite sampling S is referred to as point cloud i.e., a group of points. The finite sampling S is obtained from the underwater sonar scans. The obtained sampling is converted to a surface by triangulating the 2D data.

muvvala_sai@yahoo.co.in

Virtual Reality as a means for storytelling in animation and its practical uses in therapeutic medicine

Marlene Palafox Bello and **Rodrigo Omar Torres Rubio**
Monterrey Institute of Technology and Higher Education, México

This project seeks to design an interdependent relationship between virtual reality and storytelling by telling immersive and interactive animated stories that benefit the health sector. With the use of a CAVE and the Unity multiplatform game engine, we'll propose a story in which virtual reality would be a medium to tell the story, and not just a projection system, that is to say that without virtual reality, the story would be impossible to understand. In addition, we look to generate a completely immersive experience where spectators need to fully interact with the narrative through the RV. This story will be oriented to youths and kids, from 10 to 18 years old. Activities to be made during the development of the story will be directed to cognitive and psychomotor abilities rehabilitation. The results will be measured by the analysis of the user's performance, before, during and after the activities. With this project, we are looking to compare the results between a conventional therapy and the ones with virtual reality one; furthermore, we look to take animated stories into a new level of visualization and experience.

loqueseagenial@gmail.com