OCEANONE

Underwater Robotics For Research & Engineering

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Abstract—The Stanford Universities robotics groups was connected and contributed to the research related to properties of the manipulation of artificial intelligence and controls. The main aim, focus is to create robots that are human friendly and successfully able to interact with humans. In inclusion they executed an intense research based on human motion and develop , create prototypes that are able to briefly capture human motion and engineer, manipulate skills based on the tasks need to be executed. Which allows them to control the robots based on the specification of the situations. Oussama Khatib is the director of the computer science department, head of the robotics lab. Mr. Oussama made fundamental contribution to development in the field of artificial intelligence and has deeply studied on human motion analysis. His wide ranged work includes the development of field for control. Operational space control framework, full body multi-contact control with priority null spaces, body dynamic simulation, haptic rendering and human motion based biomechanics analysis. Oussama Khatib is a highly credited person he has successfully completed a PhD from Sup-Aero, France (1980). He has also been honoured by the IEEE Fellow. He is affiliated with two major projects The Stanford SystemX Alliance and the Symbolic Systems Program

Index Terms - Oceanone, Stanford, Artificial Intelegence, ROV, Humanoid, Oussama Khatib, Aquatic Research.

1 INTRODUCTION

Artificial intelligence is an arm of computer science which has a wide range it mainly related to building mechanisms which are able to accomplish tasks that need to be carried out specifically by humans, requires proper human understanding and analysis. Artificial intelligence is related to multiple branches of science, research and machine learning. The OceanOne is a underwater ROV (remotely operated vehicle) The OceanOne is a robot that is energised by artificial intelligence. The OceanOne was created to execute aquatic assignments instead of a human diver with equivalent abilities under water. The humanoid was mainly designed and fabricated to attain and fulfil tasks familiar to human divers as well as able to assemble structures, deal with fragile and irregular structures, while maintaining the structural integrity of the engineered structures. The blueprint of the Oceanone tackles challenges by merging location guidance with stereo-vision camera visual abilities. The haptic feedback sanctioning humans controlling the ROV to feel and experience contact forces what the humanoid is feeling. The Ocean One is also equipped with cameras which provide visual imaging and graphics of what is visible to the humanoid.

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2 TECHNICAL SPECIFICATIONS & DESCRIPTION

Remotely Operated Vehicles (ROVs) have been advanced and developed majorly since the past years. Most advancements have taken place in the fields of navigation and sensing. OceanOne is non identical and better thane traditional remotely operated vehicles for numerous reasons. One of them are that the dimensions, as an average most ROVs are around 12 ft long where as the OceanOne is 5 ft long and easy to transport for task and is able to get into water caves for research purposes as its dimension are a all most equivalent to a human diver and is able to reach deeper than a human diver. Instead of trying to induce water resistance to protect the electronics in the OcenOne all the electronic parts and circuits are dipped in oil because oil and water are insoluble liquids the oil creates a layer around the electronics. The layer created is thick and doesn't compress much giving the robot a max depth of two thousand meters. The OceanOne was developed to move with preciseness in small spaces utilizing eight thrusters. The OceanOne can independently stabilize itself during currents or surges. The ROVs most important attribute is its pair of its elastic arms. The wrists have involve force sensors. OceanOne is proportioned a lot like a human with arms , legs, and a head filled with sensors, which is one of the reasons it's so innovative over existing ROVs.

3 EXPIDITION TO THE LUNE

On the 6th of April 2016 The OceanOne was transported from the Stanford university premises to France for it first voyage visiting the lune (lune is French for moon). The lune was a fifty four gun vessel and it was one of the best vessel of the French royal navy. This vessel was used in

most of the naval missions. The Lune offers a number of objects including her arms, weapons, and crew and passenger personal belongings, and is considered one of the greatest collections of maritime, political , social, and material history of the seventeenth century anywhere. At "just" 91 feet, it provides access for a robotic test dive thus providing a glimpse of working conditions in far

deeper water.

1. Host Ship: There are as many as two hundred thousand archeological sites located off France's Mediterranean and Atlantic coasts, and an estimated three million around the world; the rest are inaccessible to human divers at depths. To

explore and preserve these artifacts, DRASSM commissioned the Andre ' Malraux, a ship with state-of-the-art underwater archaeology equipment including a remote controlled robotic vehicle. Started with the goal of providing scientists above water with remote exploration and maintenance capabilities, several on-site evaluation and interaction capabilities, including 3D mapping visualizations, were developed.

2. OceanOne Field: When underwater, three support ROVs accompanied Ocean One: the Perseo mid-size working class – fitted with a 5kW LED illumination system, a Sony HD professional video camera, and a Nikon D810 for stills; the Leonard observation platform constructed by LIRMM on a 3- meter tether above OceanOne and a downward-looking tracking device; and the Achille for additional photography. The operators of ROVs worked in the control room to maintain isolation and account for tether stresses and currents.

3. Mission at 15m Depth: On April 11, Ocean One was lowered off the coast of Marseilles in the Mediterranean for its first depth task. Only 15 m of floor, with sand and sea life, this allowed the system to be tested with divers under field conditions. A piece of rope and a plastic crate were manipulated with both hands by the robot; he also grasped and used a trowel. Divers interacted with the robot in order to test its capacity for cooperative manipulation. Interestingly, Ocean One and divers could communicate, as often do human divers, through hand gestures.

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