Robotic System Design for Automated Outdoor Data Analysis

Robotics has observed an ultimate growth in the past decade. One sub area of robotics is its application in outdoor & unstructured environment. Technology is working out for a robotic system that can build models of natural unstructured environments. The talk addressed the robotics in natural unstructured environments. Let us consider marine environment, there is no working GPS underwater after a certain extent, no possible radio communication from the system which led to minimal existing mapping.

The speaker introduces a hexapod robot that can walk and swim in the water. The current robotic system is a portable, highly manoeuvrable with good localisation capabilities. The robot has to learn itself and identify the terrain it is walking on. It should be able to analyse and make itself comfortable to move on the terrain. We have to maintain temporal coherence like the terrain it is walking on. Sensor data is to be collected for one leg cycle comprising to 23 samples. For this kind of robotic system, we need legs of the robot to be robust. We can control movements that are generated by modifying pitch, roll and yaw. Learning motor control for under water robots is crucial. Probabilistic inference for learning and control is an approach which in turn leads minimization of loss over episodes and useful for changing the roll of the robot to desired direction of motor.

Efficient learning is done in the field for periodic leg commands. Parallelised gait learning fragment. There arises a common secretary problem metaphor in this case as well and the regular strategy would generally help.

Applications:

Finding interesting images is one of the tedious task. Every time the robot sees a new environment around it records specifically on graph and the rest is ignored. The correlation with the secretary problem is like: Secretaries = images

Good Secretary = Interactive images

Secretary Score = Instinctiveness of each image

Content of image is important and selection of images that are useful for further research is one area that the study has to improve.