**Robotic Scene Understanding and Mapping using SLAM**

***Abstract –*** This paper looks at …

Introduction –

A brief history -

In most recent years, SLAM is fundamental in many areas of where there is applied robotic intelligence. According to H.D Whyte, the research on this topic dates back to 1986. The ideas that were postulated was to use estimation-theoretic methods for robot localization. This was first discussed in the IEE Robotics and Automation Conference, which was held in San Francisco. It was only until 1995 that the International Symposium on Robotics Research formulated the structure of the SLAM problem; the convergence result and the birth of the acronym were formally presented. Earlier SLAM works relied mainly upon odometry and laser / ultrasonic sensors as the perception input and came the release of the Bayesian filtering approach as well. At this point robot vision was growing and in this period, very important topics were created; two of these being visual odometry and structure from motion. Visual odometry is the process of estimating the ego-motion of a robot using only the input of a single or multiple cameras attached to it. SFM, investigating the problem of recovering relative camera poses and 3-D structure from a set of calibrated or un-calibrated camera images. Both techniques are imbedded in multi view geometry and are early forms of visual SLAM.

As we know from the previous paragraph, SLAM is still in its infancy stage, commercially speaking. It has enormous potential in a wide range of sectors particularly, robotics. The applications extends into all parts of the physical world. Examples of this would be in commercial products such as the autonomous Dyson hoover. Underwater for reef monitoring. Surveillance with unmanned air vehicles. There would be application in terrain investigation, such as mine exploration and using it for space rover applications. In fact, that is what the MARS rover system used. This is my inspiration for the project. It is to be deeply involved with this upcoming area to research and develop a different approach that can implemented into this field.

My project will be taking this idea of using multi view geometry and develop and deploy machine learning and image-processing tools to analyse video sequences captured using stereo cameras mounted on small moving robots. The outcome of the project is to create a robot that can autonomously navigate and can perform a series of tasks such as object detection, recognition, and route mapping. My research would influence this field because, of the large growing amount of tasks that are becoming dependant on SLAM. By incorporating the machine learning aspect into solving this problem, I can aid in providing another of the many solutions to tackle the upcoming tasks as efficiently as possible.