**EVALUATION OF SUPERVOXEL SEGMENTATION APPROACHES ON 3D LIDAR DATASET**

**A PROJECT REPORT**

***Submitted by***

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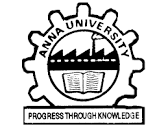
***in partial fulfillment for the award of the degree***

***of***

**BACHELOR OF ENGINEERING**

***in***

**COMPUTER SCIENCE AND ENGINEERING**



**UNIVERSITY COLLEGE OF ENGINEERING, BIT CAMPUS, TIRUCHIRAPPALLI**

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**APRIL 2019**

**ANNA UNIVERSITY : CHENNAI 600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “**EVALUATION OF SUPERVOXEL SEGMENTATION APPROACHES ON 3D LIDAR DATASET**” is the bonafide work of **Mr. SURENDAR K (810015104092)** and **Mr. SYED IMTHIYAAS S (810015104096)** who carried out Project work under my supervision.

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**DECLARATION**

We hereby declare that the work entitled **“EVALUATION OF SUPERVOXEL SEGMENTATION APPROACHES ON 3D LIDAR DATASET”** is submitted in partial fulfillment of the requirements for the award of the degree in B.E.-Computer Science and Engineering, University College of Engineering, BIT Campus, Tiruchirappalli, is a record of our own work carried out by us during the academic year 2018-2019 under the guidance of **Mrs. R.S.RAMPRIYA,** Teaching Fellow, Department of Computer Science and Engineering, University College of Engineering, BIT Campus, Tiruchirappalli. The extent and source of information are derived from the existing literature and have been indicated through the dissertation at the appropriate places. The matter embodied in this work is original and has not been submitted for the award of any other Degree, either in this or any other University.

Signature of the Project Guide

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**ACKNOWLEDGEMENT**

First and foremost of all, we would like to thank our beloved Parents and God Almighty for giving us the strength, knowledge, ability and opportunity to undertake this project study and to persevere and complete it satisfactorily.

We would like to convey our thanks to our honorable Dean **Dr.T.SENTHILKUMAR**, Associate Professor, for having provided us with all required facilities not only to complete our project without hurdles but also for the entire course of study.

We extremely indebted to our Head of the Department **Dr. D. VENKATESAN**, Assistant Professor, Department of Computer Science and Engineering, for the devoted attention shown upon us and making the project a grant success.

We whole heartedly express our gratitude to our Internal Project Guide **Mrs. R. S. RAMPRIYA**, Teaching Fellow, Department of Computer Science and Engineering for her valuable guidance and help for the successful completion of the project.

We also express our sincere thanks to our Project Coordinators **Mr.C.SURESHKUMAR** Teaching Fellow, **Mr. P. KARTHIKEYAN** Assistant Professor, **Mr. C. SANKARRAM** Assistant Professor, Department of Computer Science and Engineering, for her constant inspiration and support.

We extend our thanks to all other Teaching and Non-Teaching Staff members for their constant encouragement and moral support.

And we would like to thank all our well-wishers who have encouraged us to do this project.

**ABSTRACT**

LIDAR (or Light Detection and Ranging) has become a viable technique for the collection of a large amount of accurate 3D point data densely distributed on the scanned object surface. Accurate detection of building and non-building classes is an important challenge posed to the community dealing with LiDAR point cloud. 3D Object recognition requires accurate object identification for applications such as localization and robotic vision. The proposed novel technique generates object segmentation of dense 3D urban point cloud data. 3D segmentation is a key step to bring out the implicit geometrical information from the LiDAR point cloud. This paper proposes to use open source point cloud library (PCL) for processing 3D LiDAR point cloud data based on supervoxels and presents a novel RANSAC based methodology for 3D segmentation. The proposed methodology has been applied on airborne LiDAR datasets acquired over a part of urban region around Vaihingen, Germany and some of the features were extracted from those input point cloud data. This paper also evaluates the supervoxel segmentations such as Region Growing, Color Based Region Growing, Minimum Cut Based Segmentation, Locally Convex Connected Patches, Constrained Planar Cuts.

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**LIST OF ABBREVIATIONS**

**LIDAR** Light Detection And Ranging

**LASER** Light Amplification by Stimulated Emission of Radiation

**ALS** Airborne Laser Scanning

**PCL** Point Cloud Library

**PCD** Point Cloud Data

**DTM** Digital Terrain Model

**PMF** Progressive Morphological Filter

**SOR**  Statistical Outlier Removal

**VCCS** Voxel Cloud Connectivity Segmentation

**LCCP** Local Convex Connected Patches

**CPC** Constrained Planar Cuts

**RANSAC** RANdom Sample Consensus