This document provides an overview of the code and instructions for its usage. The code is designed for single-tree segmentation based on point clouds. It includes two main processes: **Oriednted Search and Clustering** and **Validity Checking and Points Updating**. Below are the detailed descriptions and guidelines for running the code.

# 1. Dependencies

The following software libraries are required to run the code:

* PCL (Point Cloud Library): Version 1.11, for point cloud data processing.
* OpenCV: Version 4.2, for visualization and related operations.

Ensure these libraries are properly installed and configured on your system before running the code.

# 2. Code Structure

The code folder contains the following files:

* Code.cpp: The main source file containing the implementation of the algorithm.
* CMakeLists.txt: A configuration file for building the project using CMake.

Key configurable parameters in the source code:

* Line 558: Set the input folder path for point cloud files (format: .pcd).
* Line 606: Define the search radius (Radius) for clustering operations.

# 3. Generated Output Files

For each input point cloud, the program generates five output files, which are divided into two main stages:

## Stage 1: Oriednted Search and Clustering

\_cha: Contains the XYZ coordinates and classification of each point.

\_cha\_point: Includes XYZ coordinates, classification, and RGB color of each point. Points belonging to the same tree share the same color.

\_cha\_lei: Contains the XYZ coordinates of the top point (tree apex) for each tree.

## Stage 2: Validity Checking and Points Updating

\_cha\_ge\_point: Similar to \_cha\_point, it includes the updated XYZ coordinates, classification, and RGB color of each point after validity checks. Points in the same tree retain the same color.

\_cha\_ge\_lei: Contains the XYZ coordinates of the updated tree apex positions.

# 4. Contact Information

For questions or issues regarding this code, please contact:

dingwh5@tongji.edu.cn