UNIVERSITÉ DE BOURGOGNE

Master IN COMPUTER VISION AND ROBOTICS

PROJECT REPORT-COMPUTER SCIENCE

PROJECT TITLE: "3D Scanner "

Group NAME
Group 2

CO-ORDINATOR
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Summary

The report includes brief and key information about the task which we have been able to complete successfully in addition to the task on which we are currently working on and what are our future plans.

As in our previous report we have explained how our groups and tasks are divided and which are the important techniques that are needed in order to proceed towards the final goal, In result of the work assigned last week to all the group members we are able to install PCL library in systems of all members by solving all errors and now all members are able to run sample examples from PCL library and debug them. In addition to that we are able to apply mesh on Point Cloud data which we got from sample examples online in order to apply meshes till we get our turn for the Kinect. We have installed Microsoft Windows SDK for installing Kinect libraries which will be used to stream raw data from Kinect, we have been able to stream Kinect on windows as we got Kinect few hours before, we are working on applying some different Meshes, ICP, Kinect Interfacing with QT and so on, We have also studied how we can remove the depth pixels using threshold, and how the pixels are stored in one dimensional array and how we can get our required object out of image by using depth pixels. As soon as we are able to interface Kinect with QT which we are working on we will be able to apply the same mesh which we already have applied through sample point cloud. As we have one Kinect and our group just got it tonight so we will be trying our best to figure it out soon and for that we have assigned few group members who are working on interfacing Kinect with QT. rest of the group members are working on Marching Triangles, Marching cubes, Triangulation algorithm,

Our future plan is as soon as we are able to get the raw data one of the sub-group will start working on designing the GUI and rest of the group will be working on dynamic Fusion

1. Task Achieved

a. PCL Working:

As mentioned above we have been able to run few sample examples of PCL in Qt such as we have a point cloud of an object and a translational matrix which will transform that object Point cloud object to a distance depending on the parameters of the matrix below here is the results we got.

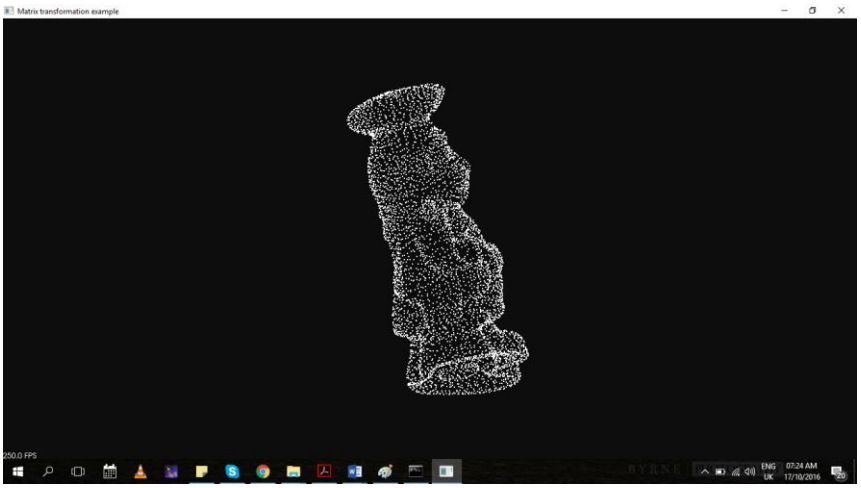

Figure : 1 (PCD of an Object)

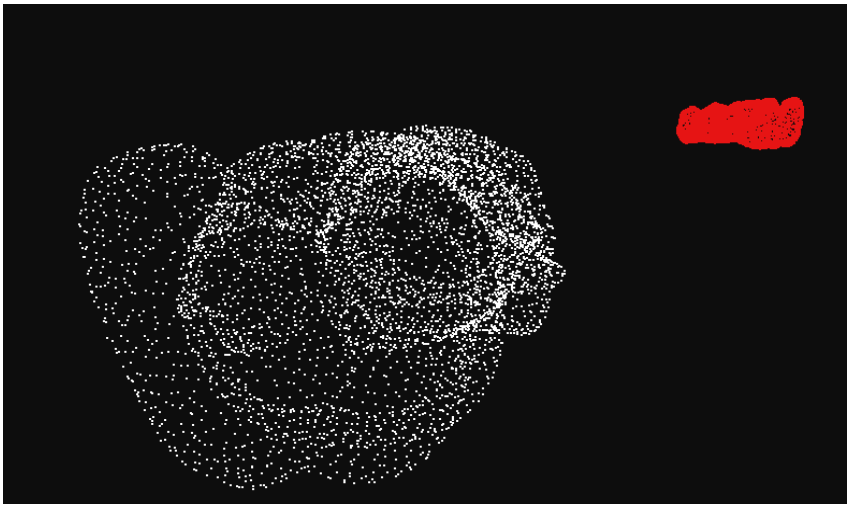

Figure : 1a (PCD of transformed Object)

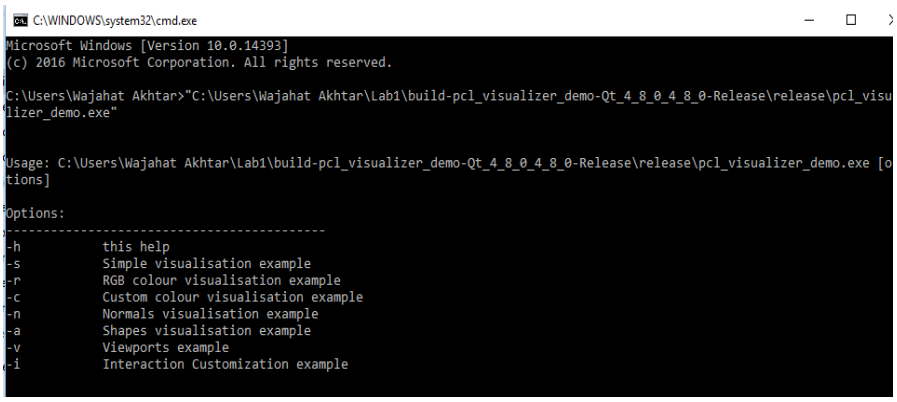

Figure : 2 (PCL Visualizer options)

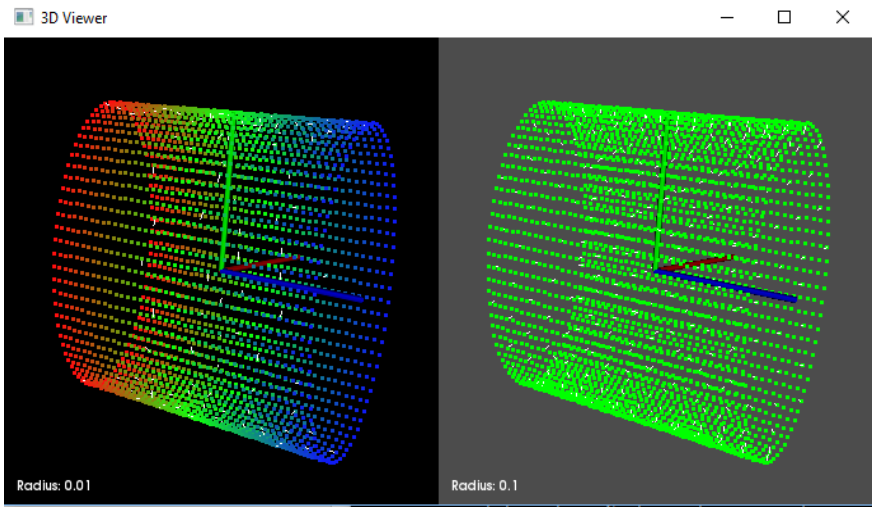

Figure : 2a (PCL Visualizer Output)

b. We are also able to store Point cloud data to .pcd files

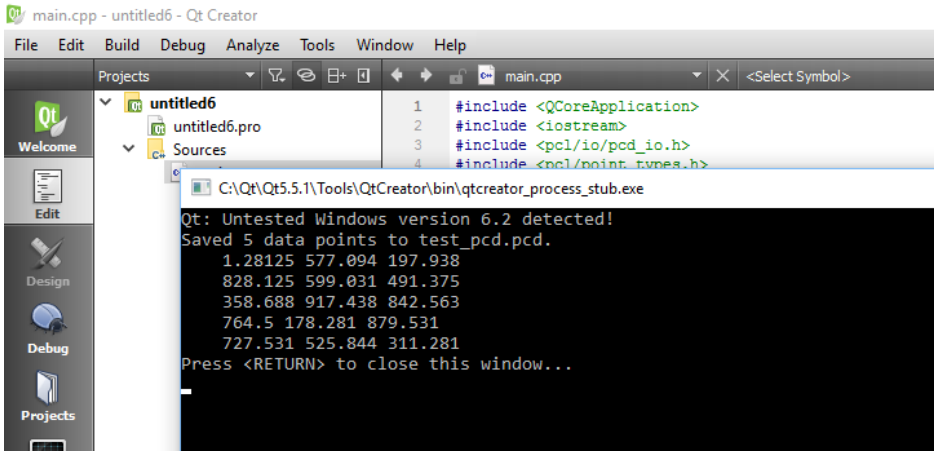

Figure : 3(Point Cloud Stored Data)

c. Below here is an example of PCL_Viewer

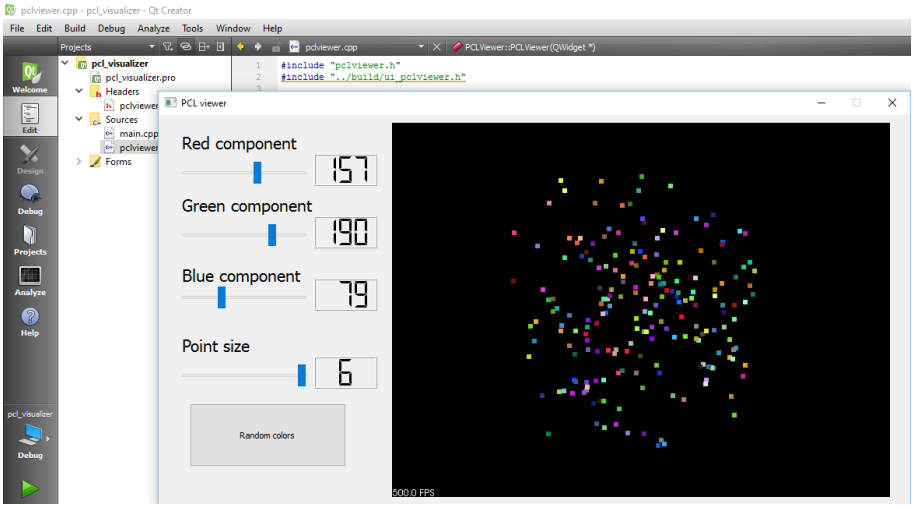

Figure : 4 (PCL_Viewer)

d. Mesh Applied to PCD

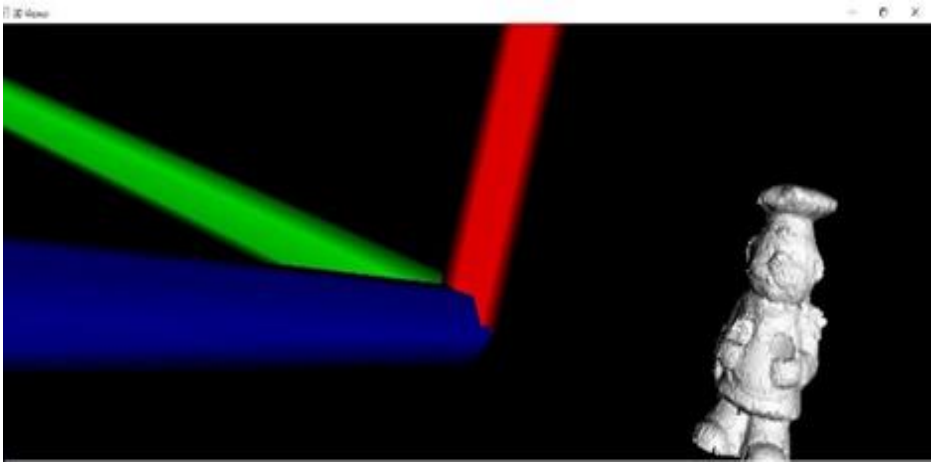

Figure : 5 (3D Viewer with mesh)

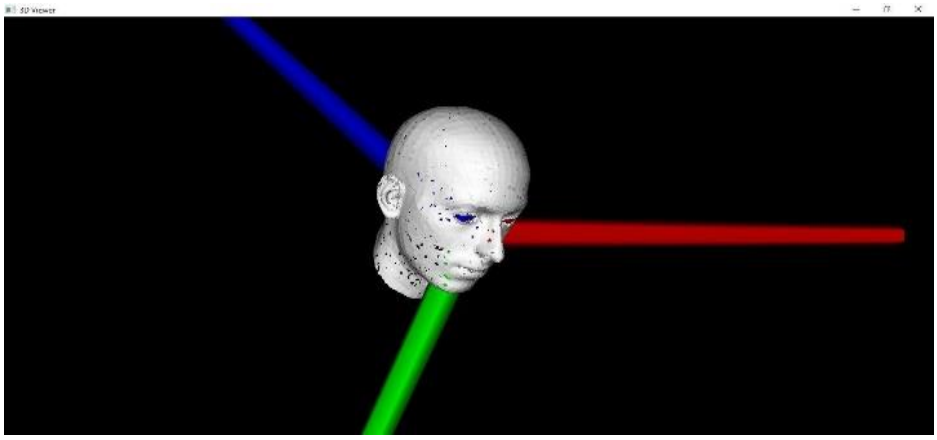

Figure : 6 (3D Viewer with mesh)

e. Streamed Image from Kinect after Installing Windows SDK installed

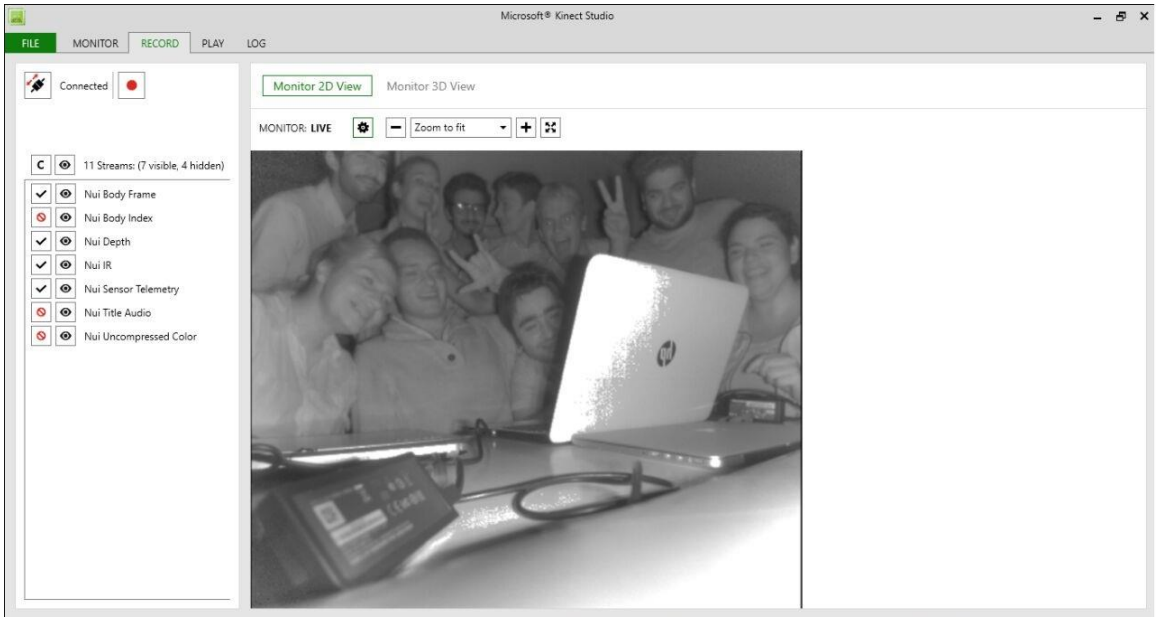

Figure : 7 (Kinect Output)

2. Task Assigned for Next Week:

As now it is more clear which are our tasks so we have assigned them accordingly:

1. Filtering by depth using Kinect or Pcd.
2. Recording the data with depth info of a 3D object and storing it in .pcd format.
3. Creating a module, which can create a 3d mesh from a point cloud from built in functions in PCL, Choosing one of the given algorithms (Poisson sampling, marching cubes, marching triangles). Try them and figure out which one is best for us.
4. Figure out the algorithm for automatic planar removal (when we will get data from Kinect of a body, we will certainly have a planar table that the body is standing with and we need to remove it. we think we can find a nice automatic algorithm for this).
5. We need to create a module which accepts a set of pcd images as input, performs ICP algorithm (stitching them together), and outputs a complete point cloud, that we can later use for Task3, Task4.
6. Study and implement the algorithms for compression of RAW data from Kinect. This must increase the processing speed, lower the amount of used memory etc. There is a paper on this subject in the group. The algorithm accepts a set of pcd images as input, and minimizes the number of points without losing a lot of quality. (Down sampling, Outlier filter, etc.)

3. Future Work:

As we have mentioned in our previous report that The Project will be done after going through different steps firstly by basic handling ,Designing the interface and lastly adding additional features in the software to make it more user friendly but for now we considering that as soon as we are able to finish interfacing Kinect with QT and able to stream depth pixels and RGB image one of the sub-group will be working on designing the GUI and the functionalities that a normal 3D scanner has which will make our work faster in order to get desired 3D scanner.