User guide for Graphical User Interface

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1 GUI

GUI is basically a graphic window where we can set the parameters, modify the parameters before we process to start the scan. Whenever we build any software it is mandatory to prepare a user guide which gives the set of instructions to follow from the first page to the end of result. The instructions should be simple so that it should be understandable by layman person.

For our project, we have designed GUI which is divided into two independent windows for better simplicity and precision of the results. The two windows used are named as *Edit Window* and *Scan Window*, as shown on the figure 1.1 and 1.2.

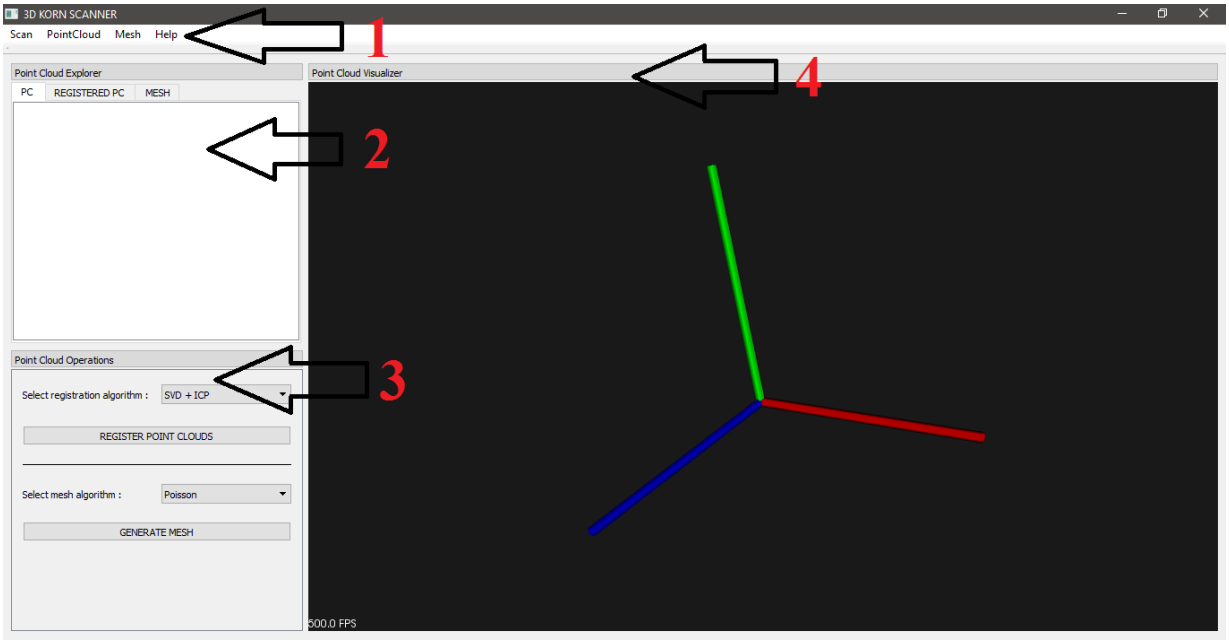

Figure 1.1: *Preview of the Edit Window*

1.1 Edit Window

The *Edit Window* is shown in figure 1.1. We can even call this window as main window as when we run our code, this is the window which pops up first. This window is divided in four sub windows, they are labelled with numbers. The detailed explanation about the windows is explained in the GUI chapter.
1 - Menu Bar
2 - Point Cloud Explorer
3 - Point Cloud Operations
4 - Point Cloud Visualizer

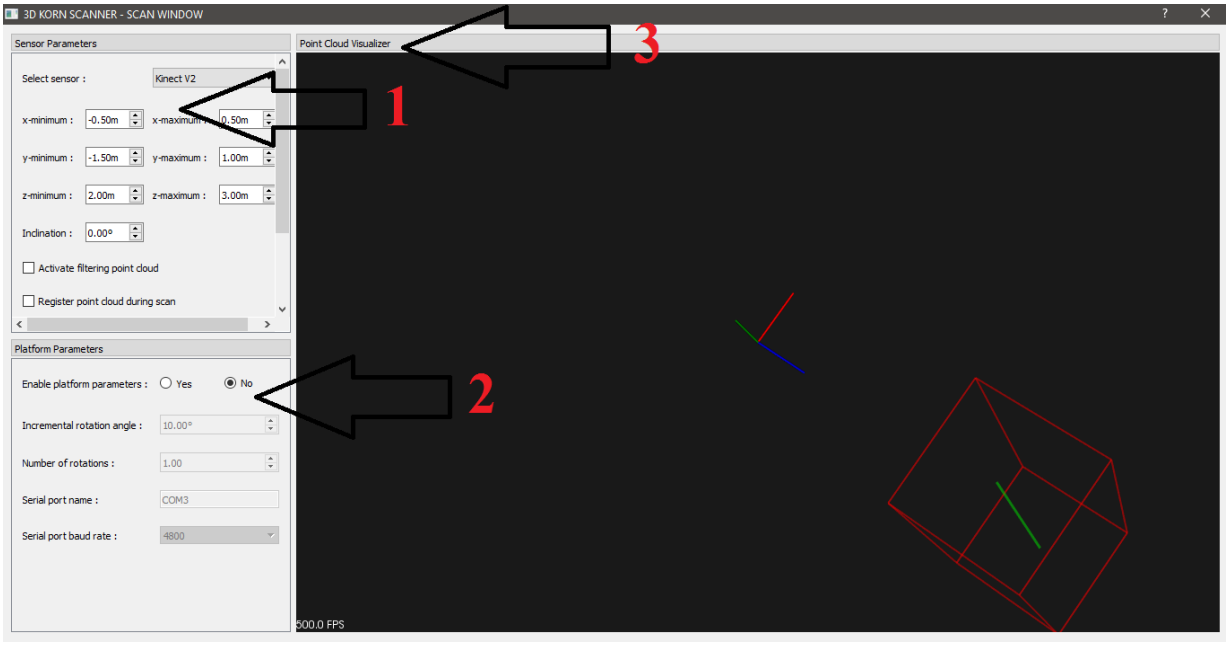

Figure 1.2: *Preview of the Scan Window*

1.2 Scan Window

The *Scan Window* is shown in figure 1.2. From this window we will be able to maintain many operations with point cloud, sensors, generating mesh and many other. This window is differentiated into three sub windows, they are labelled with numbers.
1 - Sensor Parameters
2 - Platform Parameters
3 - Point Cloud Visualizer

2 Scanning

Before we start to run the scan the following instructions and precautions should be taken care of:

2.1 Precautions

- Kinect sensor should be connected with laptop
- Turn table should be calibrated and powered
- Electronic components like motor and controller should be connected to the table in safe environment and powered
- Person should stand on the turn table
- There should be no physical movement of the person while scanning
- Movement subjects should be avoided while scanning
- Brighter light conditions for precise results

2.2 Calibrate scan workspace

Once we take care of every precautions mentioned about we are ready to scan the person. To calibrate the scanning workspace we should follow:

- Go to *Edit Window*
- Click on *Scan* $\rightarrow$ *New Scan*

Now scan window pops up showing the sensor parameters on the left top of the screen and point cloud visualizer window in the middle and Platform parameters below sensor parameters.

2.2.1 Sensor Parameters

Sensor parameters section consists of x, y, z and inclination variables for the workspace. x, y and z has maximum and minimum values to set the distance. These total seven variables are used to set length, breadth, depth and inclination of the workspace box from the visualizer. This parameters depend on the distance of the kinect sensor setup from the turn table. From this window we have to select the sensor which we are using.The sensor parameters are shown in figure 2.1.
The other two variables we are using here are: Activate filtering point cloud and register point cloud during scan. Activate filtering is used to capture the point clouds when we are scanning the person, it should be selected before scan. Registering is used to register all the point clouds while scanning. If we select this the registering of point clouds continues in the background simultaneously with capturing point cloud but the results

are not very precise.We can register the point clouds after total scan also.Start scan and stop scan are used to start and stop the scanning process respectively. Number of point clouds captured shows the captured point clouds with respect to the rotations.The window follows as:
1 - Selecting sensor
2 - X axis maximum and minimum
3 - Y axis maximum and minimum
4 - Z axis maximum and minimum
5 - Inclination Angle
6 - Point cloud filtering
7 - Point cloud registration
8 - Start Scan
9 - Stop Scan
10 - Number of point clouds captured

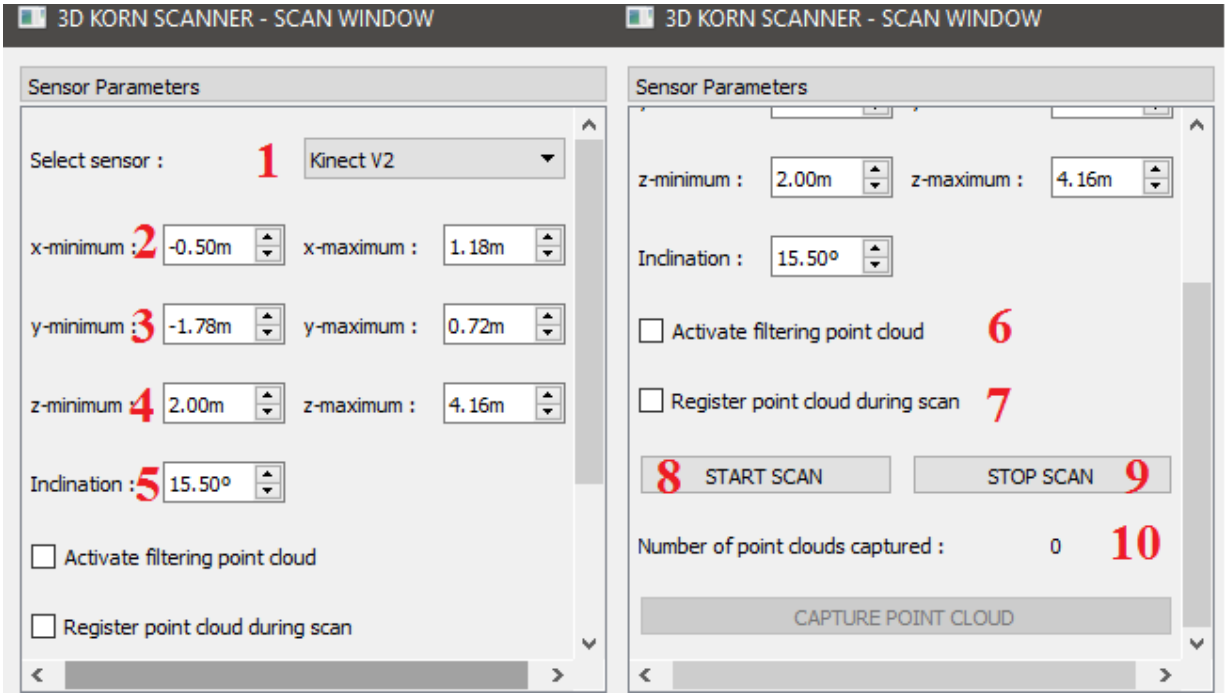

Figure 2.1: *Sensor parameters*

2.2.2 Platform Parameters

This window suggests various parameters to be stabilized before scanning. By enable platform parameters we will be able to set the rotation angle from 5 degree to 360 degree. It described we can take point cloud for every 5 degree to 360 degree of turn table rotation. For precise result we have set to 15 degree, which means for every 15 degree of turn table rotation we will take point clouds.We can even set the number of rotations to

be made by the turn table. Serial port parameter to check the connection with sensor and baud rate.The platform parameters are shown in figure 2.2. The window follows as:
1 - Enable platform parameters
2 - Rotation angle
3 - Number of rotations
4 - Serial port connection
5 - Baud rate

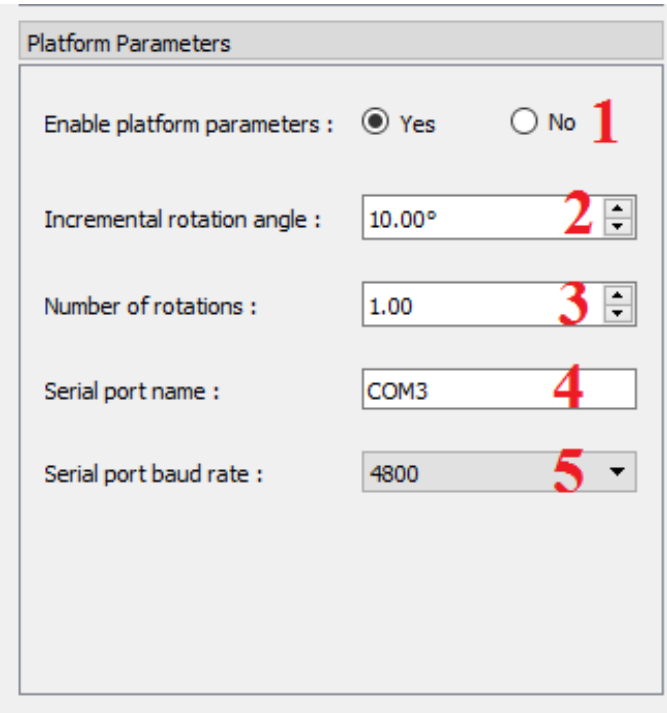

Figure 2.2: *Platform parameters*

2.2.3 Point Cloud Visualizer

This window suggest all the set parameters from sensor and platform parameters windows.The visualizer workspace is shown in figure 2.3. It represents a box (work space) with green vertical axis inside, which represents the inclination. Once the setup is calibrated we are ready to scan the person.

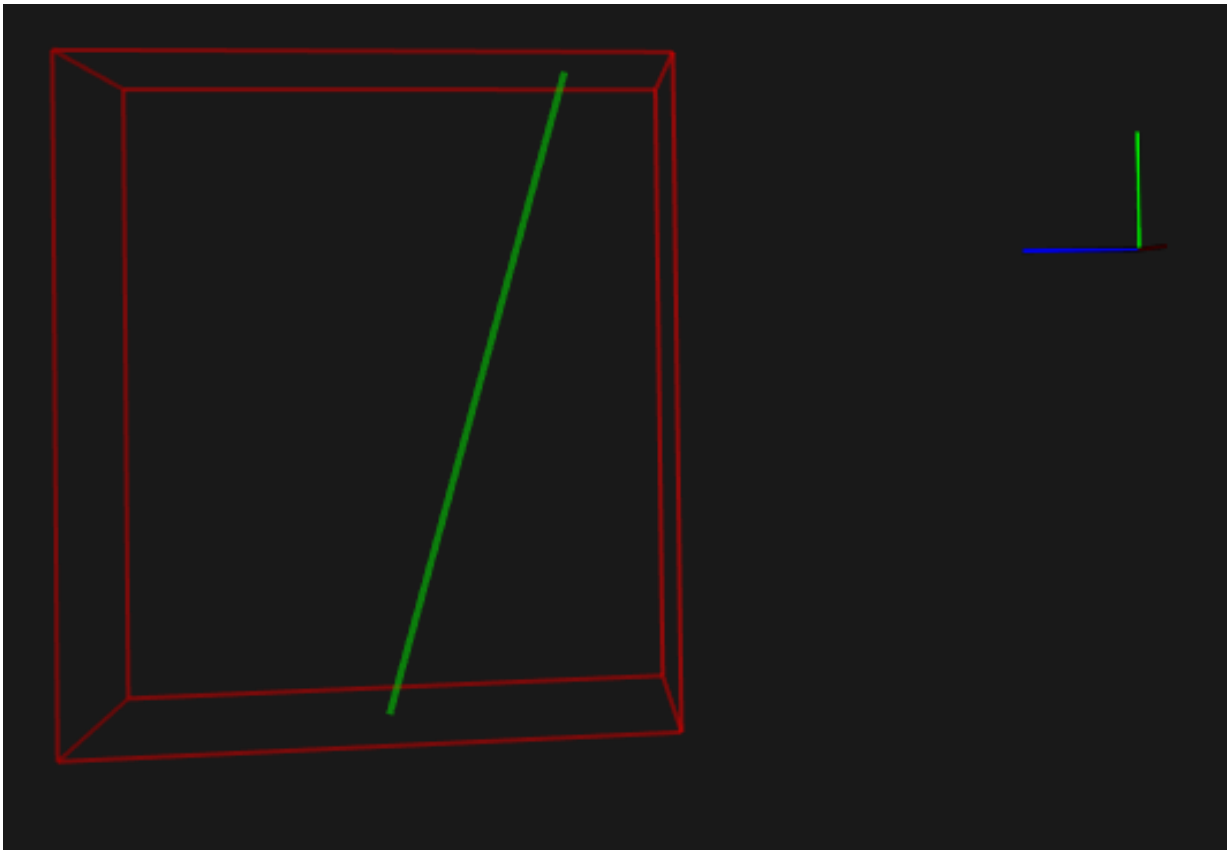

Figure 2.3: *Visualizer*

2.3 Steps for scan

- Click start scan from the scan window after calibration
- Wait until all the point clouds are captured
- All the captured point clouds are displayed on point cloud explorer widget from edit window
- We can select every point cloud captured to check
- Once all the point clouds are of good quality register the point clouds from point cloud operations widget
- Registering will take some time
- Once registering of all the point clods is obtained press generate mesh
- The generated mesh is displayed on the visualizer
- This scanned data can be export from menu bar of edit window

2.4 Import Point cloud

- Open *Edit window*
- Go to *Menu Bar*
- Click on *Point Cloud* $\rightarrow$ *Import*
- Browse *.PCD* or *.PLY* files
- Press *Open*
- Selected point clouds are imported

2.5 Export Point cloud

- Open *Edit window*
- Go to *Menu Bar*
- Click on *Point Cloud*
- Export into *.PCD* or *.PLY* files
- Browse the folder to save
- Press *Save*
- Selected point clouds are saved

2.6 Import Mesh

- Open *Edit window*
- Go to *Menu Bar*
- Click on *Mesh* $\rightarrow$ *Import*
- Browse *.STL* or *.VTK* files
- Press *Open*
- Selected mesh is imported

2.7 Export Mesh

- Open *Edit window*
- Go to *Menu Bar*
- Click on *Mesh*
- Export into *.STL* or *.VTK* files
- Browse the folder to save
- Press *Save*
- Selected mesh is saved