

**INVERTIBLE LIGHT™
TECHNOLOGY**

PyMkEViewer v1.0 User Guide

Magik Eye Inc.

COLLABORATORS

	<i>TITLE :</i> PyMkEViewer v1.0 User Guide		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
WRITTEN BY	Magik Eye Inc.	Jul 2020	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME
2007-01-EN-00	Jul 2020	Initial version	MEI

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1 Introduction

PyMkEViewer, also spelled `pymkeviewer`, is an easy to use Python3 GUI application which provides visualization of the 3D point clouds captured by Magik Eye sensors. The application includes the features to detect and connect to MKE sensors---*i.e.* it acts as an Mke API client [\[mkeapi\]](#)---and to render the data transmitted by the sensor. The application allows the user to modify the point-size of the points rendered and also to change the colormap of the rendered points.

2 Installation

The `pymkeviewer` application is distributed as a wheel file. The officially supported system for `pymkeviewer` is Ubuntu 20.04, however, it should execute on every system where `PySide2` [\[py-side2\]](#) and `vispy` [\[vispy\]](#) packages are available. The following console command will install the wheel as well as its dependencies into the system through the `pip3` utility:

```
pip3 install pymkeviewer-X.Y.Z-py3-none-any.whl
```

The `X.Y.Z` stands for the version of the wheel package. Note that the `pymkeviewer` also requires `pymkeapi`, a Python package implementing the client-side of the Mke API [\[mkeapi\]](#).

Warning



Installing `pymkeviewer` on Windows using Anaconda can result in errors if the environment variables aren't set correctly. Make sure to set the `Library\plugins` subfolder in Anaconda as an environment variable `QT_PLUGIN_PATH` under Control Panel/System/Advanced System Settings/Environment Variables

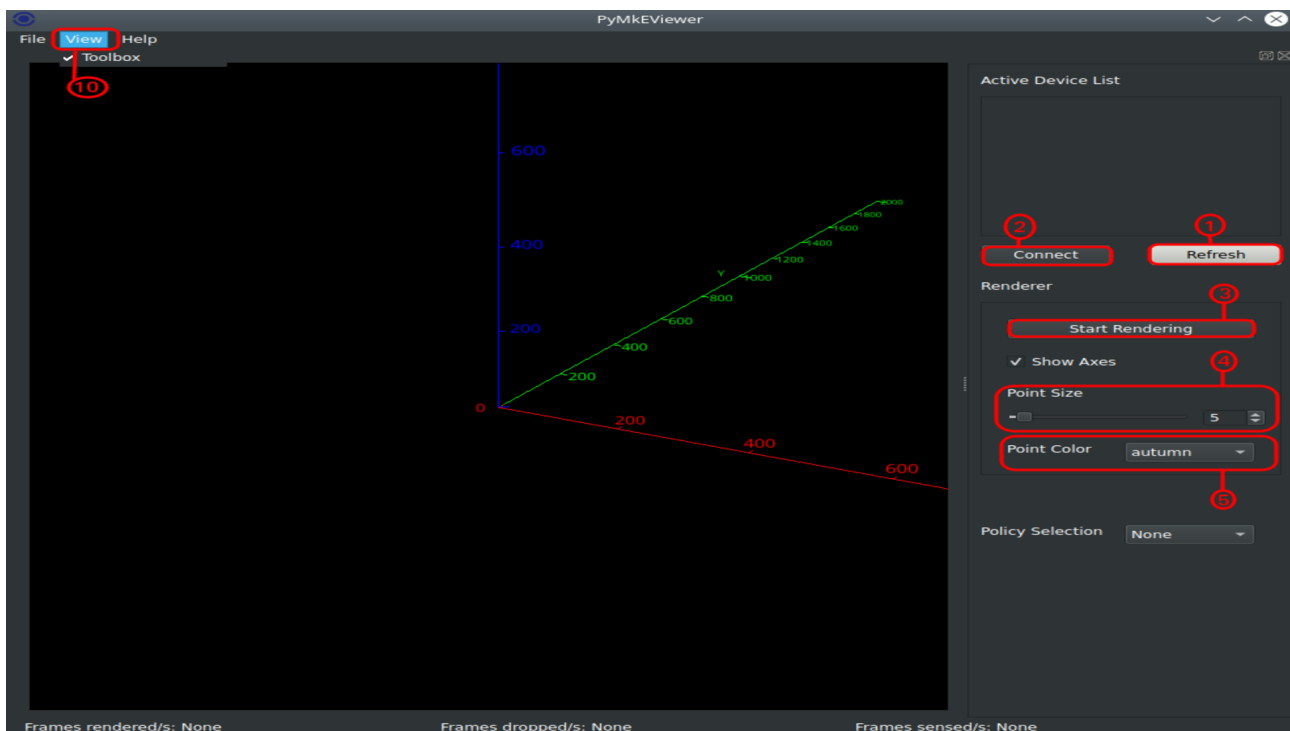


Figure 1: pymkeviewer feature diagram I

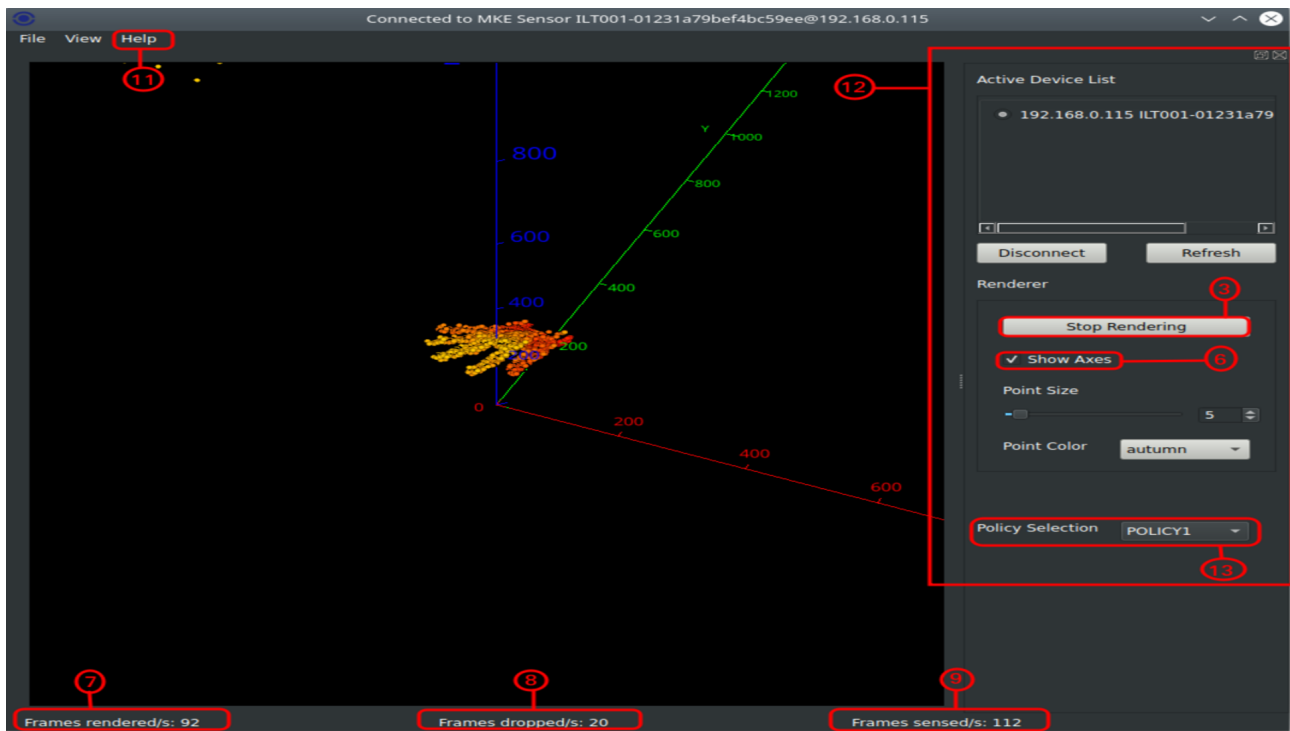


Figure 2: pymkeviewer feature diagram II

3 Application Features

The application is a simple visualization tool with the following features:

1. **Refresh** - Click on the 'Refresh' button to discover any Magik Eye sensors are available on the local network. If sensor(s) are available, they will be listed on the 'Active Devices' list.
2. **Connect/Disconnect** - In order to connect to a sensor, the sensor must be selected in the 'Active Devices' list. Next, the 'Connect' button must be selected to establish a connection. Once the connection is established, the 'Renderer' layout buttons will be accessible and the title window will show the ID of the connected sensor. To close the connection to the sensor, click on the 'Disconnect' button.
3. **Start Rendering/Stop Rendering** - Once a connection is established with the sensor, click on the 'Start Rendering' button to start receiving the 3D point cloud data from the sensor and to visualize the same on the viewer. To stop the 3D data stream and the visualization, the 'Stop Rendering' button must be clicked.
4. **Point Size** - The value set using the track bar will relate to the size of the points being visualized.
5. **Point Color** - A list of 25 colormaps are available in the drop-down list for Point Color. Each colormap will modify the color of points according to its depth.
6. **3D Axis** - When checked, the 3D axis will be displayed in the viewer. This is useful for reference purposes, the button can be unchecked to remove the axis from the viewer.
7. **Frames Rendered Per Second** - During rendering, this field will provide the FPS at which the application is currently rendering the point cloud data.

8. **Frames Dropped Per Second (DFPS)** - During rendering, this field will provide the rate of frames being dropped per second.
9. **Sensor Frames Per Second** - During rendering, this field will provide the true FPS at which the sensor is functioning.
10. **View** - The 'View' menu bar option allows opening of and gives the option to show the dockable window.
11. **Help** - The 'Help' menu bar option provides the licencing information and a brief summary of the application.
12. **Dockable window** - The dockable window holds all the interactive features of the application. This window can be undocked, moved, and closed for improving the viewer space during rendering. The window can be reopened by selecting the 'Toolbox' option in the 'View' menu bar option.
13. **Policy Selection** - All available Policies of the sensor connected will be listed in the drop-down list for Policy Selection. Selected policy will be applied to the connected sensor.

The viewer allows for a free rotation and translation. By clicking the left mouse button and by dragging its pointer, the view can be rotated along any axis. Performing the same with the shift key being pressed will allow translation along two axis. The scroll button of the mouse can be used to perform the zoom-in and zoom-out actions.

4 Bibliography

- [] *MagikEye API v1.0*, 2020, Magik Eye Inc.
- [] *Qt for Python*, https://wiki.qt.io/Qt_for_Python
- [] *Vispy*, a high-performance interactive 2D/3D data visualization library, <https://vispy.org>