

# HESAI Pandar XT32 Point Cloud Data Acquirement

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Github: [Link](#)

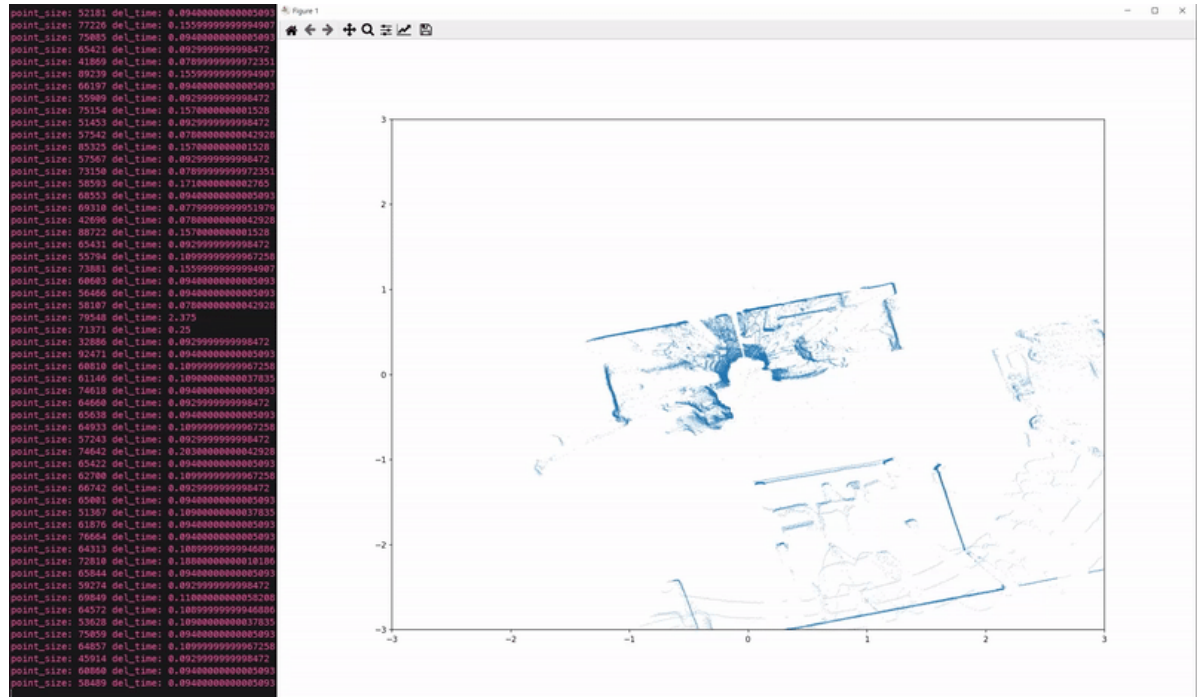
Tutorial Video: [Link](#)

## I. Introduction

**Goal: HESAI Pandar XT32 LiDAR Acquirement Point Cloud Data using Windows 10 Python**

LiDAR provided by [HESAI SDK](#) that acquire data can be obtained from Ubuntu in a C++ environment. Therefore, it is difficult to obtain point cloud data in Windows and python environments. This code can obtain point cloud data for HESAI XT-32 LiDAR in Windows 10, Python environment. The goal is to unpack and visualization data using python's multiprocessing module to maintain the sensor's data acquisition rate of 10Hz.

### Demo



## II. Requirement

# Hardware

- HESAI Pandar XT32

# Software

- Windows 10
- Python 3.8.16
- Numpy 1.23.5
- Matplotlib 3.6.2

## III. Installation

### 1. Install Anaconda

**Anaconda** : Python and libraries package installer.

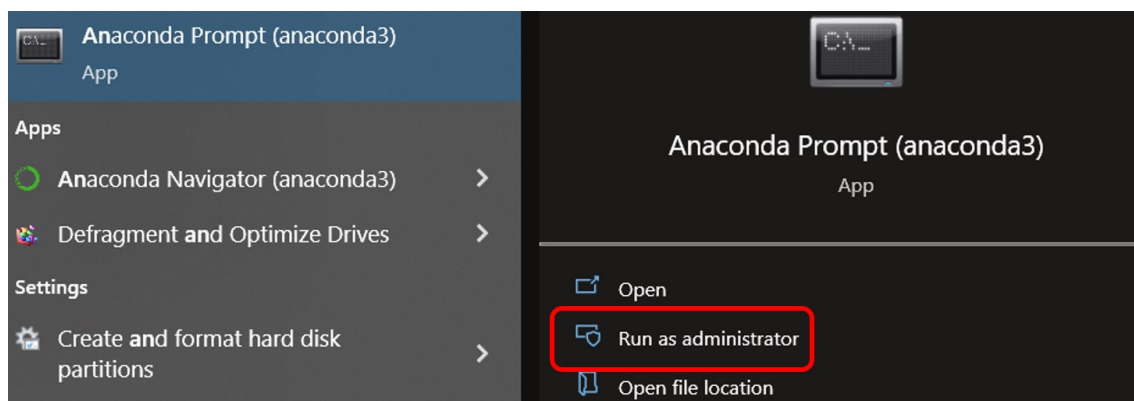
Follow: [How to install Anaconda](#)

### 2. Install Python

Python 3.8

Python is already installed by installing Anaconda. But, we will make a virtual environment for a specific Python versionn.

- Open Anaconda Prompt(admin mode)



- First, update conda

```
conda update -n base -c defaults conda
```

```
(base) C:\WINDOWS\system32>conda update -n base -c defaults conda
Collecting package metadata (current_repodata.json): done
Solving environment: done

# All requested packages already installed.

(base) C:\WINDOWS\system32>
```

- Then, Create virtual environment for Python 3.8. Name the \$ENV as `XT32_py38`. If you are in base, enter `conda activate XT32_py38`

```
conda create -n XT32_py38 python=3.8.16
```

```
D:\MIP\github\Software\mmdetection3d_purelidar_totutorial>conda create -n XT32_py38 python=3.8
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: C:\Users\AnChangMin\anaconda3\envs\XT32_py38

added / updated specs:
- python=3.8

The following packages will be downloaded:
```

package	build	
libffi-3.4.2	hd77b12b_6	109 KB
python-3.8.16	h6244533_3	18.9 MB
wheel-0.38.4	py38haa95532_0	83 KB
Total:		19.1 MB

```

The following NEW packages will be INSTALLED:

ca-certificates      pkgs/main/win-64::ca-certificates-2023.01.10-haa95532_0
certifi              pkgs/main/win-64::certifi-2022.12.7-py38haa95532_0
libffi               pkgs/main/win-64::libffi-3.4.2-hd77b12b_6
openssl              pkgs/main/win-64::openssl-1.1.1t-h2bbff1b_0
pip                  pkgs/main/win-64::pip-22.3.1-py38haa95532_0
python               pkgs/main/win-64::python-3.8.16-h6244533_3
setuptools           pkgs/main/win-64::setuptools-65.6.3-py38haa95532_0
sqlite               pkgs/main/win-64::sqlite-3.40.1-h2bbff1b_0
vc                   pkgs/main/win-64::vc-14.2-h21ff451_1
vs2015_runtime       pkgs/main/win-64::vs2015_runtime-14.27.29016-h5e58377_2
wheel                pkgs/main/win-64::wheel-0.38.4-py38haa95532_0
wincertstore         pkgs/main/win-64::wincertstore-0.2-py38haa95532_2

Proceed ([y]/n)? y

Downloading and Extracting Packages

Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
#   $ conda activate XT32_py38
#
# To deactivate an active environment, use
#
#   $ conda deactivate

```

- After installation, activate the newly created environment

```
conda activate XT32_py38
```

```
D:\MIP\github\Software\mmdetection3d_purelidar_totutorial>conda activate XT32_py38  
(XT32_py38) D:\MIP\github\Software\mmdetection3d_purelidar_totutorial>
```

### 3. Install Libs

Install Numpy, OpenCV, Matplot, Jupyter

```
conda activate XT32_py38  
conda install -c anaconda seaborn jupyter  
python -m pip install --upgrade pip  
pip install opencv-python
```

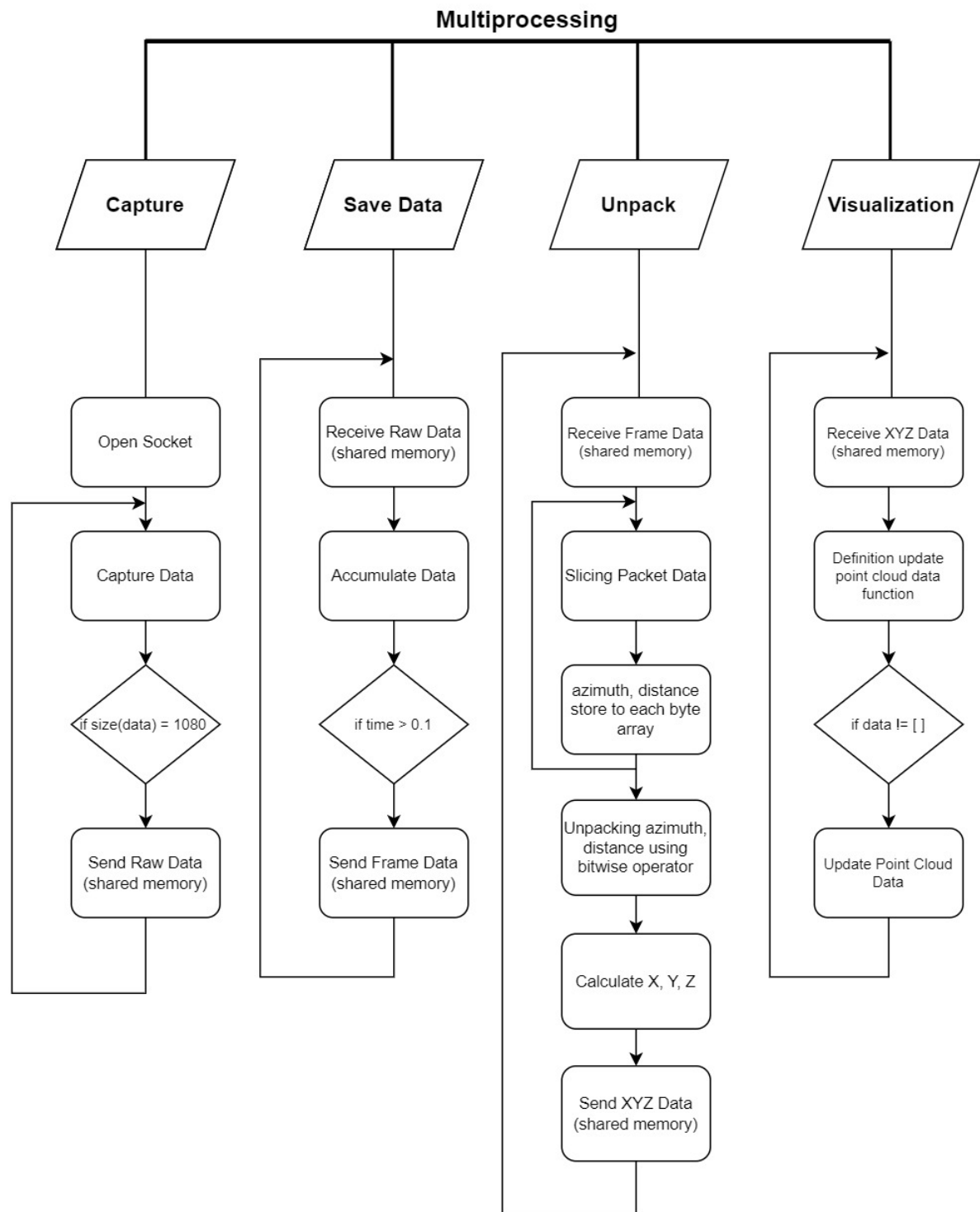
### 4. Install Visual Studio Code

Follow: [How to Install VS Code](#)

Also, read about [How to program Python in VS Code](#)

## IV. Flow Chart

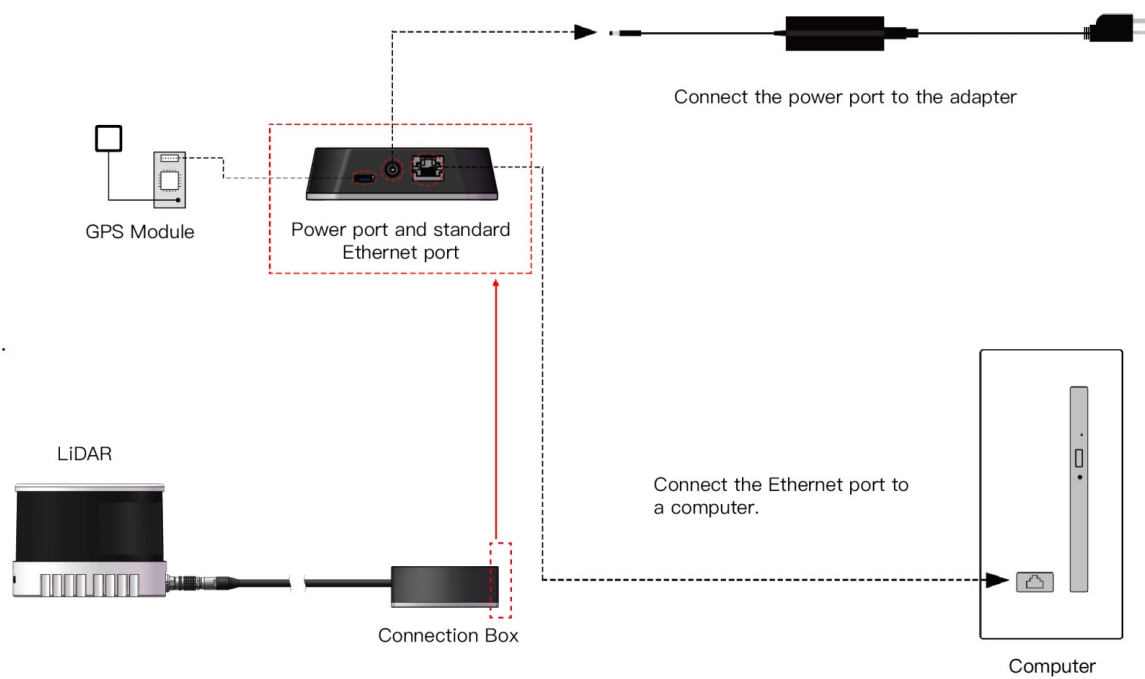
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## V. Procedure

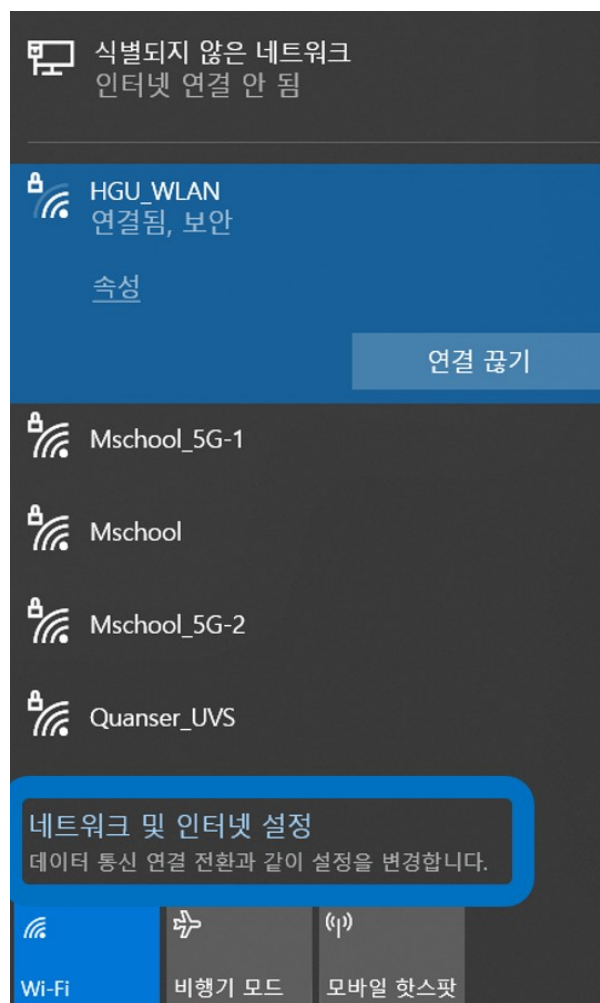
### 1. Connect Sensor

#### 1-1. Connect LiDAR sensor through Ethernet cable





## 1-2. Ethernet Configuration


### 1-2-1. Open the Network Sharing Center, click on "Ethernet"



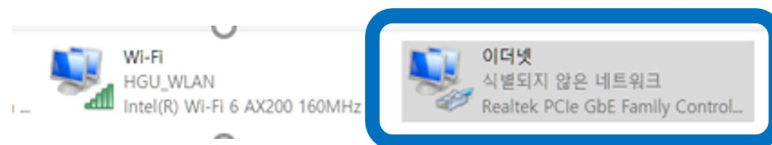
## Advanced network settings

 **Change adapter options**  
View network adapters and change connection settings.

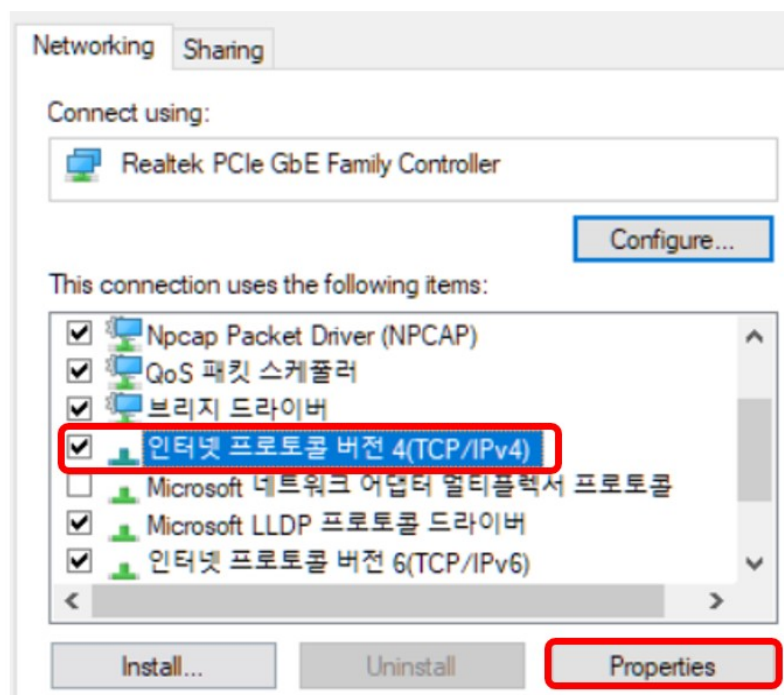
 **Network and Sharing Center**  
For the networks you connect to, decide what you want to share.

 **Network troubleshooter**  
Diagnose and fix network problems.

### 1-2-2. In the "Ethernet Status" box, click on "Properties"



### 1-2-3. Double-click on "Internet Protocol Version 4 (TCP/IPv4)"



### 1-2-4. Configure the IP address to 192.168.1.100 and subnet mask to 255.255.255.0

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address:

Subnet mask:

Default gateway:

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server:

Alternate DNS server:

☐ Validate settings upon exit

Advanced...

OK Cancel

#### 1-2-5. Check that LiDAR is connected (Search 192.168.1.201 in search bar)



Status	
Spin Rate	600 rpm
GPS	Unlock
NMEA (GPRMC/GPGGA)	Unlock
PTP	Free Run

## 2. Download code

```
git clone https://github.com/ckdals915/HESAI_Pandar_XT32_Interface.git
cd HESAI_Pandar_XT32_Interface
```

## 3. Drive LiDAR

```
conda activate XT32_py38
python HESAI_Pandar_XT32_Interface.py
```

# VII. Appendix



