

Introduction to **SDC Hardware & Software**



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Overview

- **Hardware**
 - Hardware parts on an actual SDC
 - Programmable Components
 - Non-Programmable Components
- **Software**
 - Robot Operating System (ROS)
 - NVIDIA Jetpack
 - Arduino IDE
 - OpenCV
 - Tensorflow
 - TensorRT

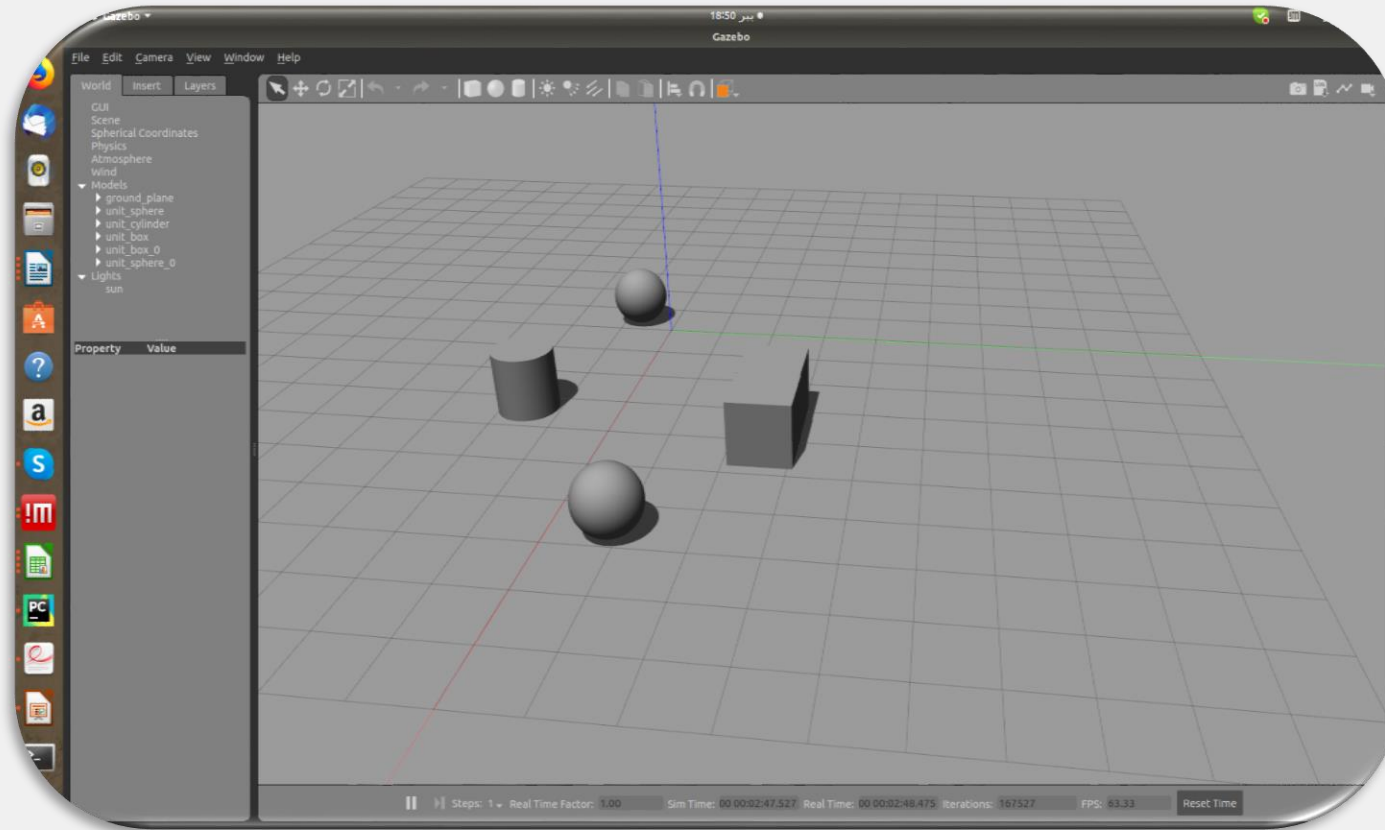
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- **Robot Operating System (ROS)**
- **Gazebo**
- **NVIDIA Jetpack**
- **Arduino IDE**
- **OpenCV**
- **Tensorflow**
- **TensorRT**

Overview

- Robot Operating System (ROS)



- A simulator for simulation of desired robot activities in a self-defined 3D space.
- Gazebo is the 3D space simulator tool.

Overview

- NVIDIA Jetpack



- Ubuntu based OS for NVIDIA Jetson Nano
- Make the Jetson Nano a micro computer to perform the major processing

Overview

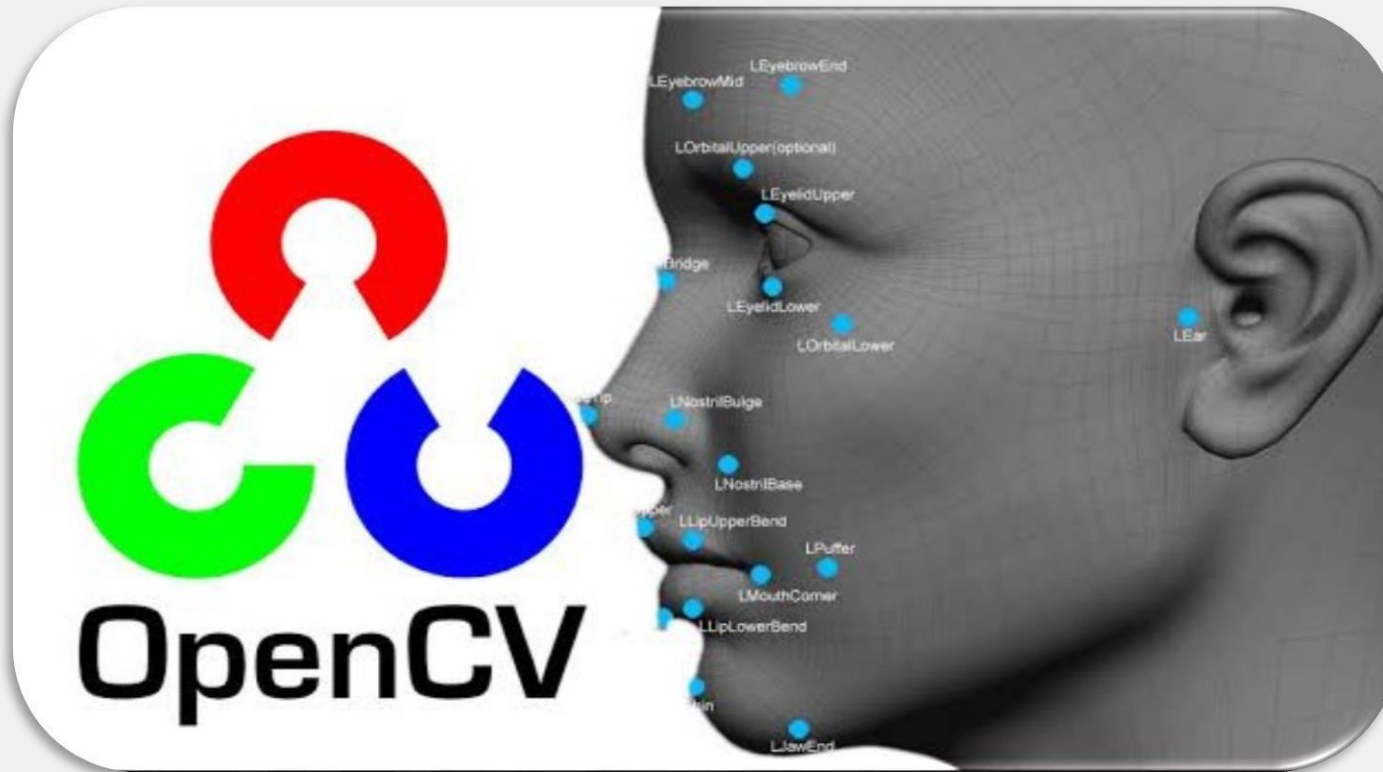
- Arduino IDE

- IDE for Arduino
- Maneuvering hardware is controlled by the instruction code using this program



Overview

- OpenCV



- Open-Source framework for image processing in python & C++.
- Can be used to perform tasks like face detection, objection tracking, landmark detection, and much more

Overview

- **Tensorflow**

```
import tensorflow_datasets as tfds

# Download the dataset and create a tf.data.Dataset
ds, info = tfds.load("mnist", split="train", with_info=True)

# Access relevant metadata with DatasetInfo
print(info.splits["train"].num_examples)
print(info.features["label"].num_classes)

# Build your input pipeline
ds = ds.batch(128).repeat(10)

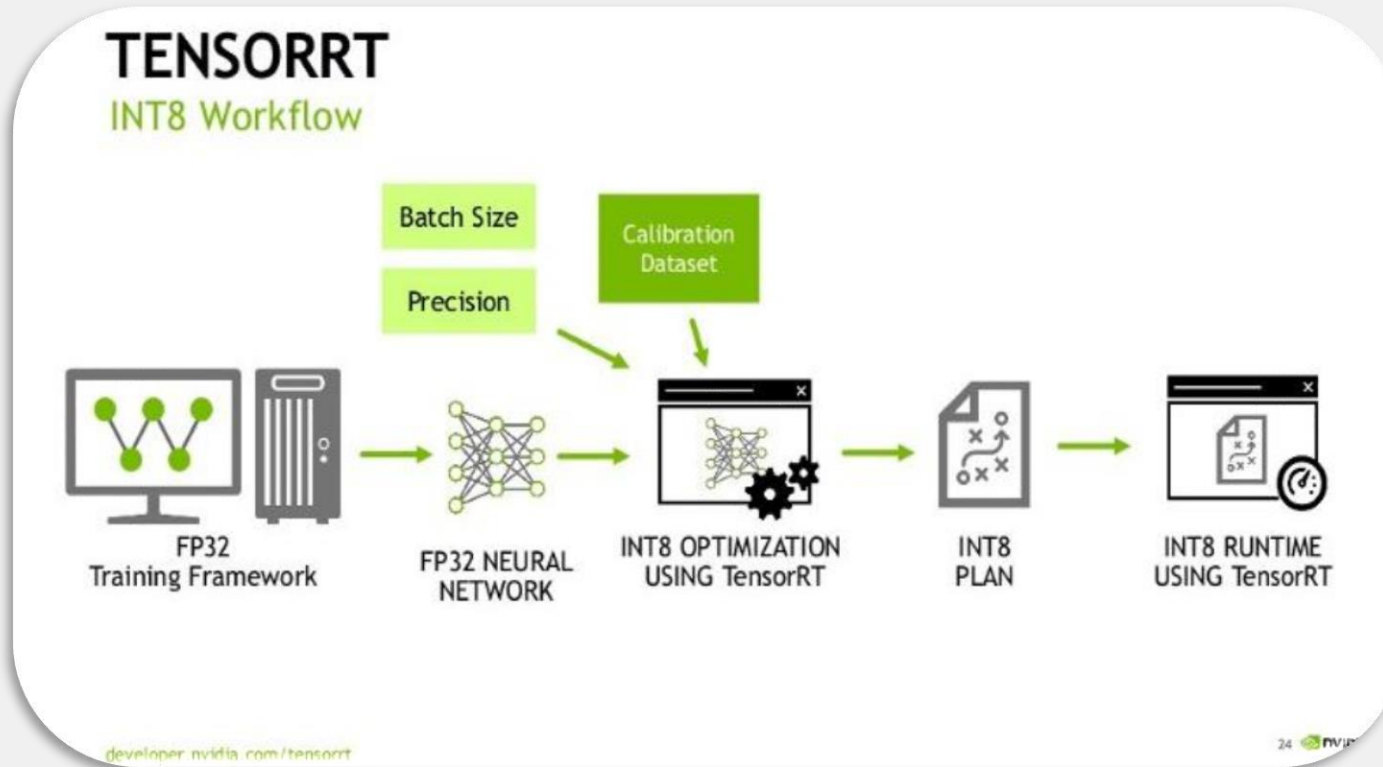
# And get NumPy arrays if you'd like
for ex in tfds.as_numpy(ds):
    np_image, np_label = ex["image"], ex["label"]
```

- It is an open-source artificial intelligence library, using data flow graphs to build models
- TensorFlow object recognition algorithms classify and identify arbitrary objects within larger images.

Overview

- **TensorRT**

- It an SDK for high-performance deep learning inference
- enables the developer to optimize inference leveraging libraries, development tools



Thank You