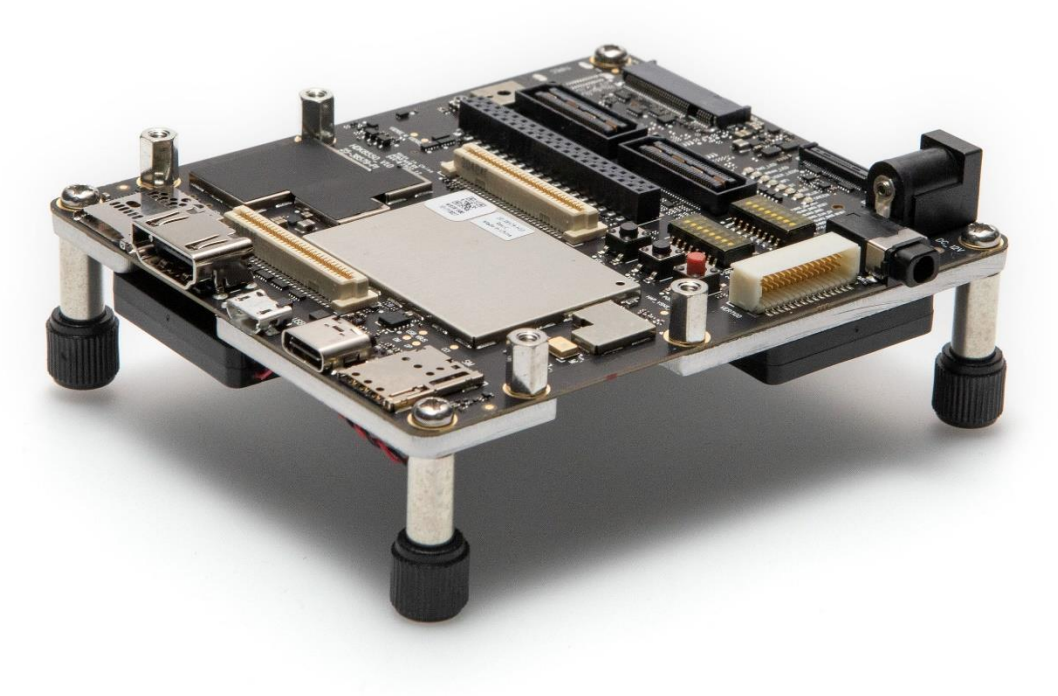
# IIIT Megathon

## QIDK Kit:

The Qualcomm Innovators Development Kit (QIDK) aims to enable developers to with Snapdragon® mobile platforms. The kit offers hardware and software components, along with customer support. Students, academic researchers and developers can now purchase a hardware platform from Qualcomm Technologies Inc. to build prototypes for a variety of applications ranging from on-device AI to writing device drivers to learning about the internals of modern mobile processors that drive the flagship smartphones.



1. QIDK kits HW Capability:
    a. Snapdragon 8 Gen 3 kit: This hardware has the same capability as S24 device.
    b. Snapdragon 8 Gen 2 kit: This hardware has the same capability as S23 device.
2. QIDK kit HW resources:
    a. NPU, GPU, CPU
    b. Camera Module to capture real-world information.
    c. USB C-type Serial port to connect Laptop/PC to install any applications. This port helps to capture the logcat debug data.
3. QIDK contains **Android Operating System**.

## SNPE:

Qualcomm Neural Processing Engine (also known as Snapdragon Neural Processing Engine or SNPE) is an all-in-one SDK to port ML models to run on Qualcomm hardware accelerators. SNPE offers tools to convert and quantize models trained in PyTorch and TensorFlow and offers a runtime to execute these models on CPU, GPU, and HTP.

Following the below link for quick setup of SNPE environment:
**https://docs.qualcomm.com/bundle/publicresource/topics/80-63442-2/setup.html?product=1601111740010412**

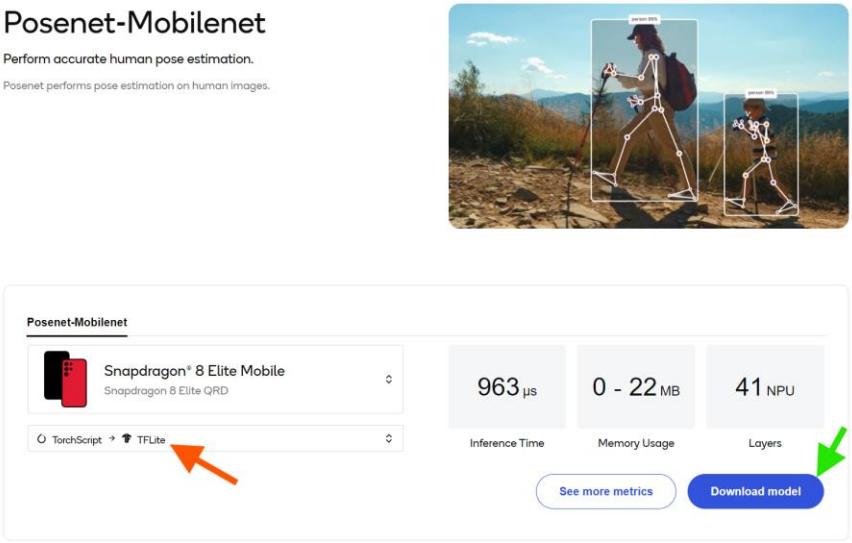
You can also use docker setup from QIDK GitHub:
https://github.com/quic/qidk/tree/master/Tools/snpe_qnn_docker

## AI-Hub Details:

Qualcomm® AI Hub simplifies deploying AI models for vision, audio, and speech applications to edge devices. You can optimize, validate, and deploy your own AI models on hosted Qualcomm platform devices within minutes.

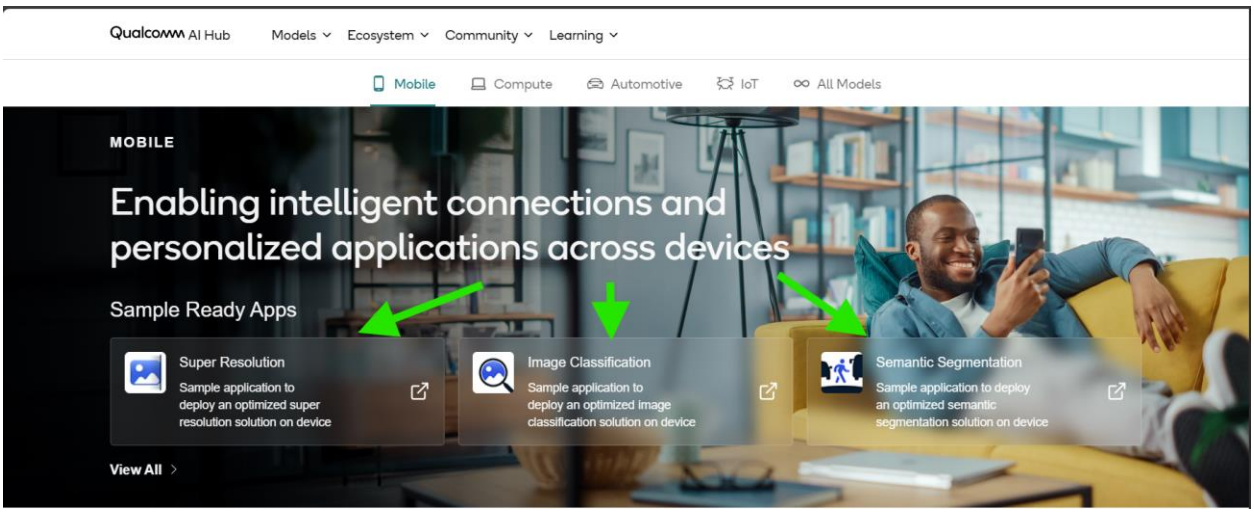
Download model link: AI-Hub Pose Estimation Model Link

From this Link you can directly download TFlite/ONNX model.




1. If you download **TFLite** model you can directly run this TFLite model on Snapdragon NPU processor,Please follow this link for more info **accelerating-tensorflow-lite-on-qualcomm link**.

Please refer to these sample applications for how to run the TFLite model on NPU processor, Sample Application Link.



2. **If you've downloaded the ONNX model**, you can convert the model to DLC format and then Quantize the model on FP16 or INT 8 based on the model's performance.

Please refer to these links for more information on how to convert any ONNX model to DLC format and then quantize the model. Sample Android application accelarating dlc-model inference on NPU link .

You can check multiple android applications like Object detection, Pose Estimation, Automatic Speech Recognition etc where you can convert the ONNX model to multiple precisions DLC format and then doing inference on NPU from the above link.

You can refer to this ONNX model conversion and quantization link using SNPE to have a better understanding of model conversion using SNPE.

## Android Studio:

Official Integrated Development Environment (IDE) for Android app development.

Download link: https://developer.android.com/studio/archive

You can use your own Android Studio Version. We recommended using Android Studio Dolphin | 2021.3.1. In case you are using QIDK GitHub solutions.

## Resources Links:

**QIDK Kit details:** https://www.qualcomm.com/developer/hardware/qualcomm-innovators-development-kit#tutorials

**AI HUB link:**
https://aihub.qualcomm.com/mobile/models?domain=Computer+Vision&useCase=Pose+Estimation

**QIDK GitHub:** https://github.com/quic/qidk

**QIDK GitHub Solutions**: https://github.com/quic/qidk/tree/master/Solutions

**Qualcomm Neural Processing Engine (SNPE) SDK:**
https://softwarecenter.qualcomm.com/api/download/software/qualcomm_neural_processing_sdk/v2.25.0.240728.zip

**AI Developer Workflow document (SNPE):**
https://docs.qualcomm.com/bundle/publicresource/topics/80-70014-15B/snpe.html

**Android Debug Bridge (ADB):** https://developer.android.com/tools/releases/platform-tools