Choose the Right Hardware

Proposal Template

Scenario 1: Manufacturing

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)
FPGA

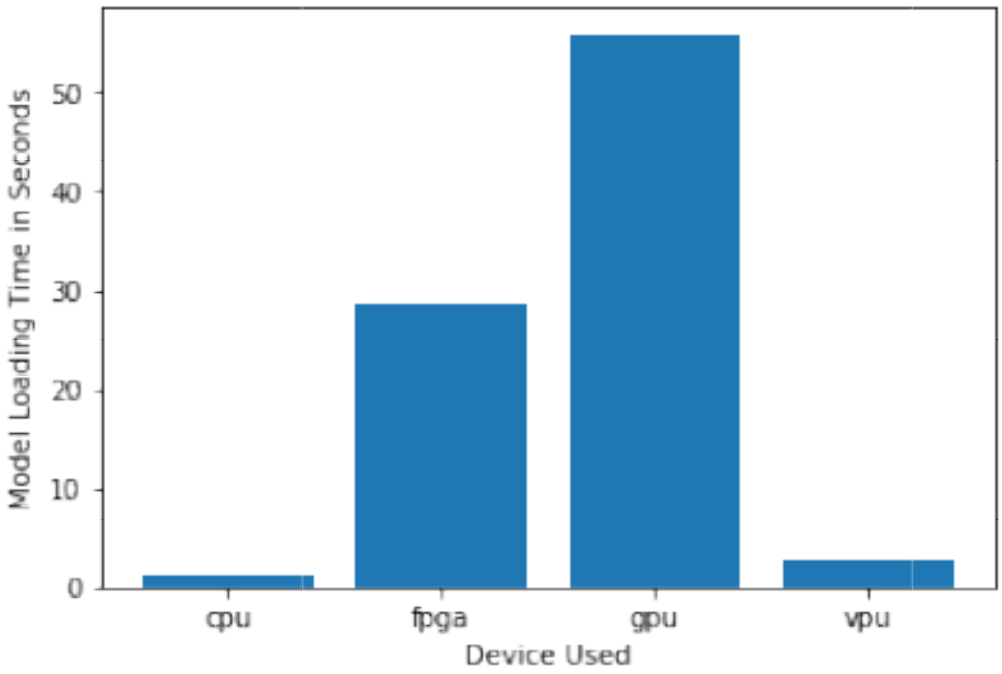
Requirement Observed (Include at least two.)	**How does the chosen hardware meet this requirement?**
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client requires a system to monitor the number of people in the factory line installed in their vision cameras at every belt-recording video at 30-35 FPS and image processing done at 5 times per second	*FPGAs have a plug and play interface, so it is easy to add to an existing system. They can execute high performance with low latency.*
The client requires the system to be reprogrammable to detect flaws in their semi conductor chips with multiple designs.	*FPGAs can be reprogrammed to adapt to new chip designs.*
The client requires the system to last for at least 5 – 10 years	*FPGAs have a guaranteed life span of 10 years from the start of production.*

Queue Monitoring Requirements

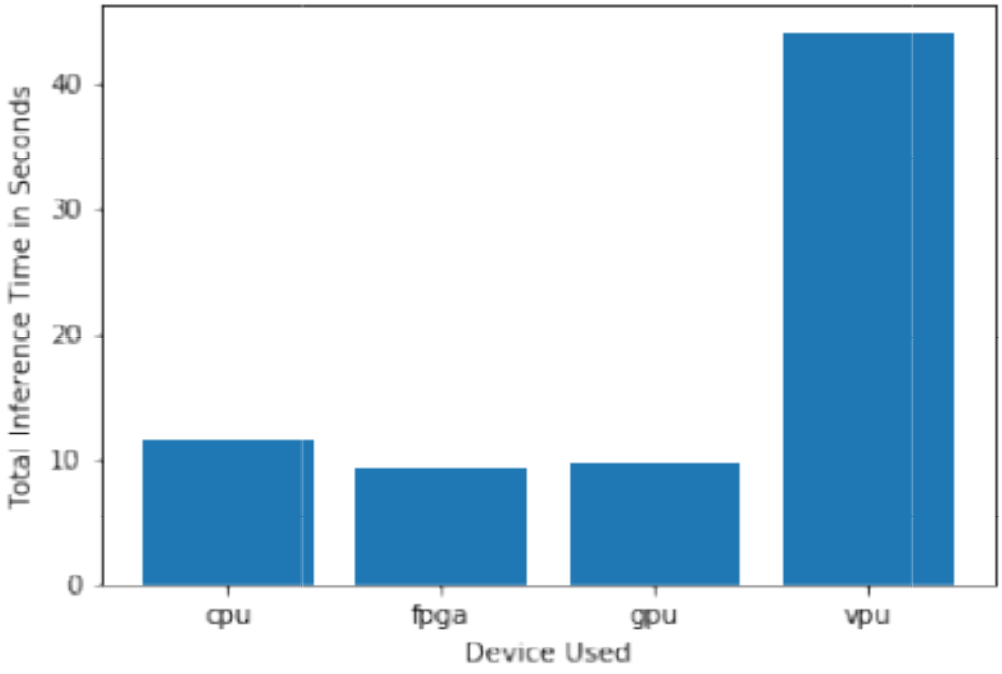
Maximum number of people in the queue	*5*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

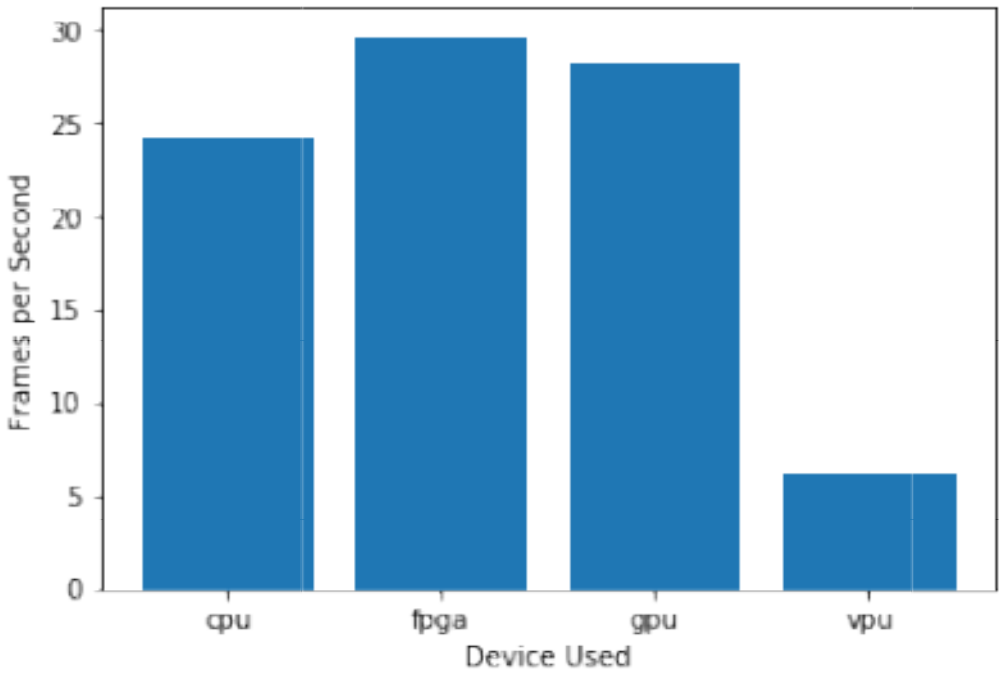
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



FPS

Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation
As seen from the above statistics, FPGA works best in the given Manufacturing scenario as video is captured with high FPS and with least inference time it processes images quickly, as FPGAs are reprogrammable even if there is any change in chip design it can handle the situation. Finally, FPGAs have a guaranteed lifespan of 10 years which also meets the client's requirement.

Scenario 2: Retail

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)

IGPU

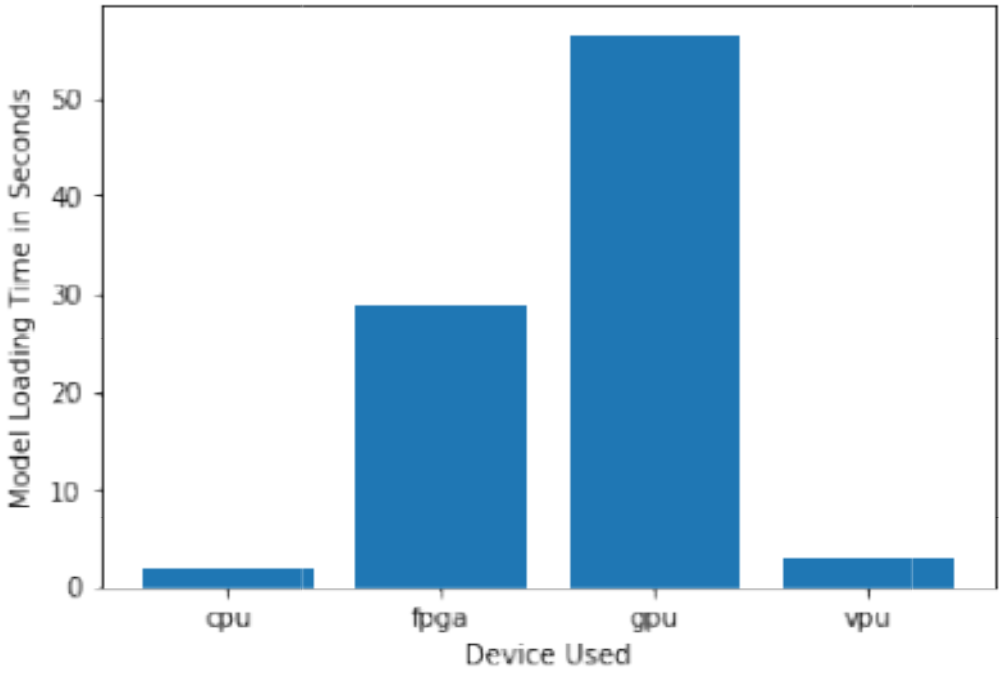
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client wants to install a system that will be used to direct people to less-congested queues – and they don't have much money to invest on additional hardware.	*As the client's store checkout counters already have a modern computer with an Intel i7 Core processor and they are being used to carry out some minimal tasks that are not computationally expensive, existing IGPUs can be used.*
The client wants to save as much as possible on his electric bill.	The unused sections in an IGPU can be powered down to reduce power consumption.
[TODO: Type your answer here]	*[TODO: Type your answer here]*

Queue Monitoring Requirements

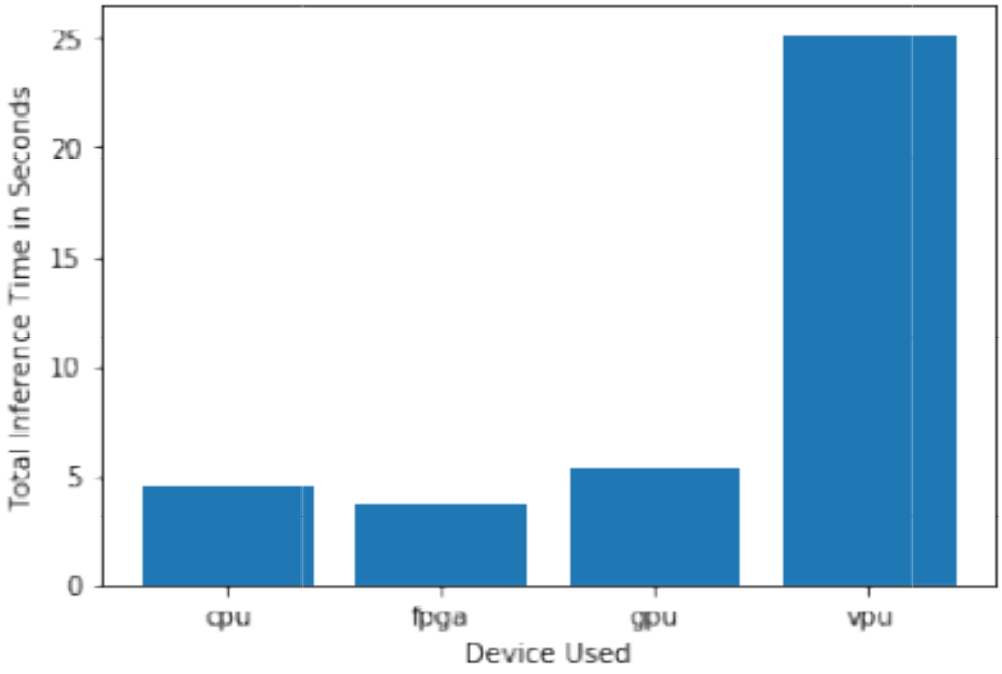
Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP32*

Test Results

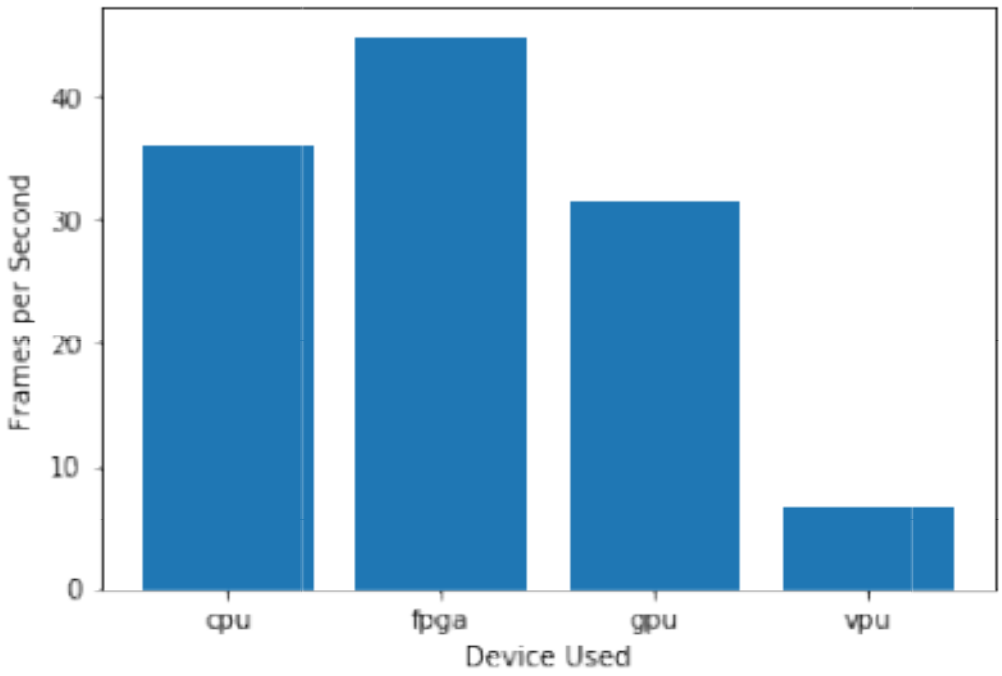
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



FPS

Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation
From the statistics obtain we can conclude that CPU will work best for the Retail scenario. However, using CPU alone in this case will consume more power and will not meet clients low power requirement. Hence, in order to consume less power during peak hours the CPU can take the help of an IGPU and also as the client has no additional budget for hardware choosing a CPU with an IGPU will meet the client budget as well as low electric bill requirement. Therefore, IGPU suits best for the clients scenario.

Scenario 3: Transportation

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)

VPU

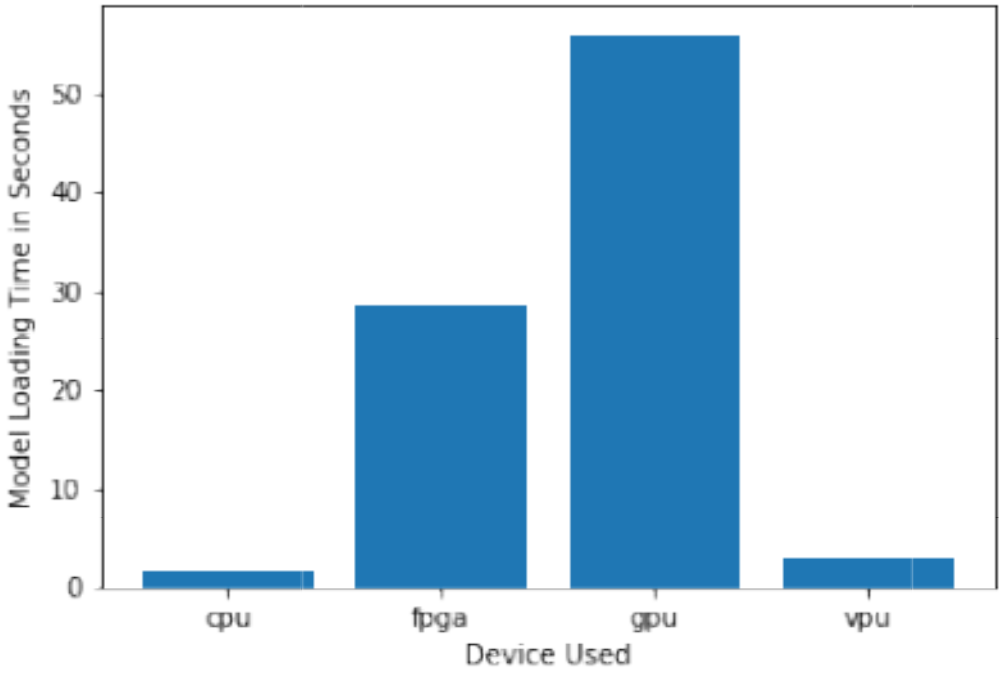
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client requires an edge AI system to monitor and quickly direct passengers to less congested areas of platform – and their budget is only about $300 per machine.	VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client wants to save as much as possible both on hardware and future power requirements.	*VPU* or NCS2 has a very low power consumption of only 1-2 watts.
[TODO: Type your answer here]	*[TODO: Type your answer here]*

Queue Monitoring Requirements

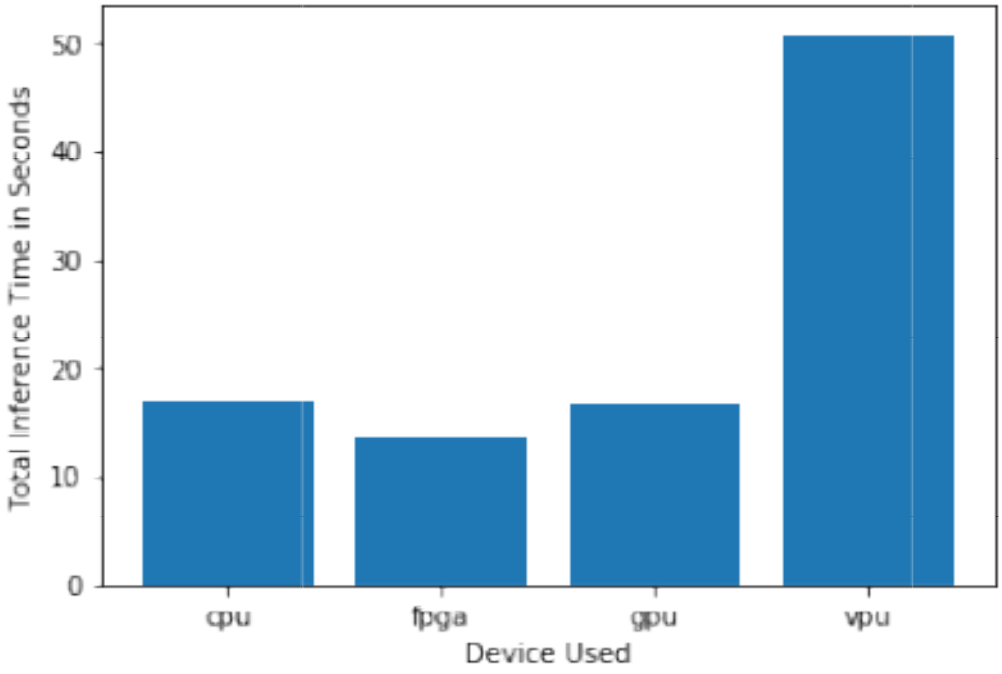
Maximum number of people in the queue	*7*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

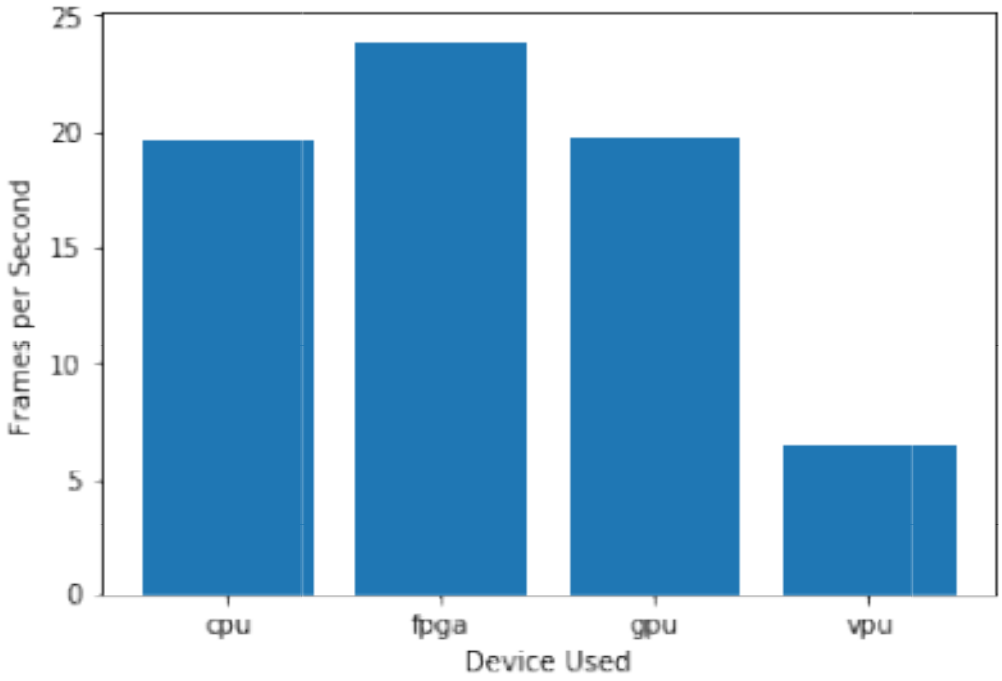
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



FPS

Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation
From the above statistics we can observe that CPU alone performs better in Transportation scenario. However, using CPU alone may result in high power consumption which does not meet the low future power requirement. So using a Intel Neural Compute stick 2(VPU) with the CPU will match the clients requirement of low power consumption and the price is with of a VPU is just around $70 to $100and way below the clients budget. Hence adding a VPU with the CPU will work best for the clients need.