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

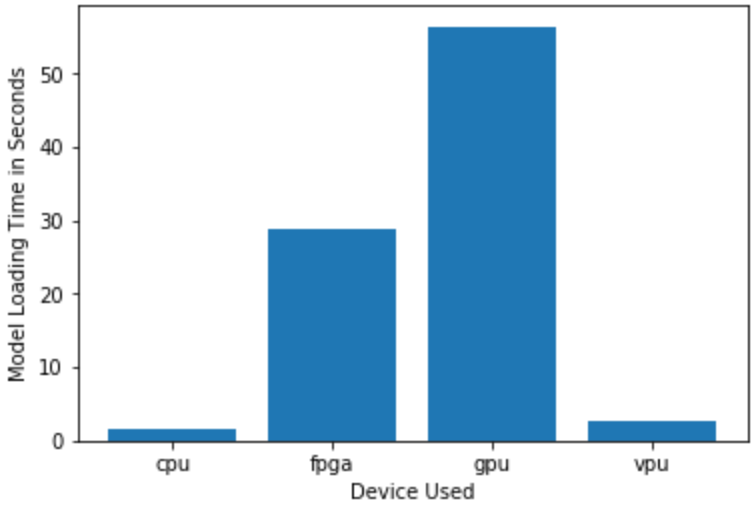
Requirement Observed (Include at least two.)	**How does the chosen hardware meet this requirement?**
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client's production floor runs 24 hours a day and packaging continues non stop.	*FPGA is a robust hardware with a 100% on-time performance meaning it can run continuously 24/7*
The client would like a solution that can be repurposed so as to solve two problems	*FPGA is configurable even after deployment on site i.e. logic is programmable. It can be reprogrammed to optimize its performance for different functions as needed.*
The client would like the system to last 5 to 10 years after installation	*FPGAs that use devices from Intel's Internet of Things Group have a guaranteed availability of 10 years, from start of production.*

Queue Monitoring Requirements

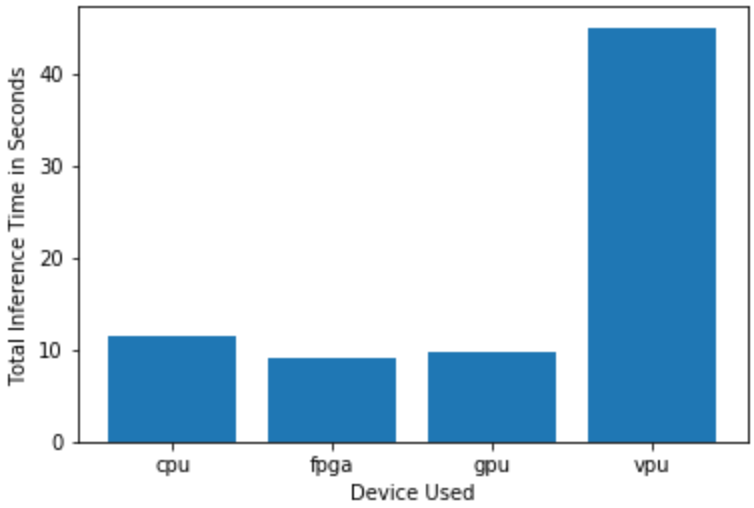
Maximum number of people in the queue	*5*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

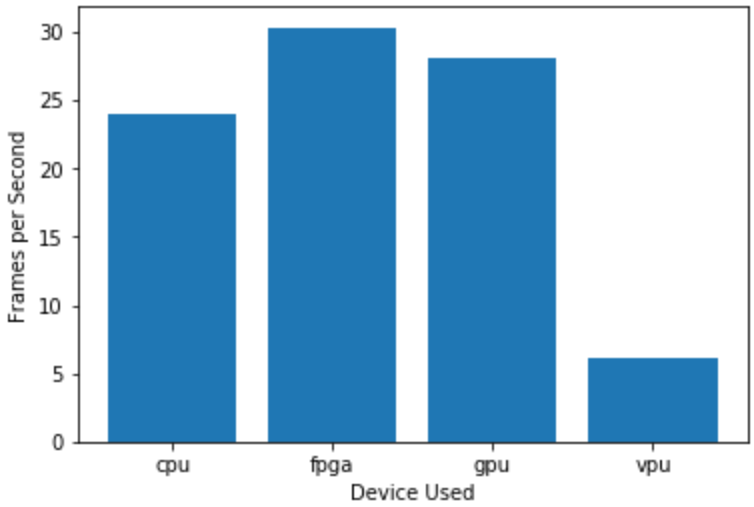
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



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
Recommendation: FPGA *Mr. Vishwas requirements included* 1. *The client's production floor runs 24 hours a day and packaging continues non stop.* 2. *The client would like a solution that can be repurposed so as to solve two problems* 3. *The client would like the system to last 5 to 10 years after installation* *and since the company has plenty of revenue to install a quality system we matched up the requirements with the best device to serve them. An FPGA.* *After running tests on the various intel device offerings the following results have been obtained;* 1. *Model load time (seconds): the FPGA device came in a distant third (approx 30 seconds in model load time)after VPU (approx 3 seconds) and CPU (approx 2 seconds).* 2. *Total Inference time (seconds): the FPGA device took the least amount of time to perform inference among all the tested devices.* 3. *Frames Per Second (fps): the FPGA device had a higher count of frames per second (approx 30 fps) than any other device tested.* *Whereas the CPU & VPU outdid the FPGA in model load time, they did not test as efficient in the rest of the metrics. Also, CPU and VPU cannot be repurposed, and are not as robust and flexible as FPGA.* *Overall, the FPGA proves to be the best device in the test. Out of the 3 metrics it was consistent in two, and also meets the client's requirements and budget.*

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)
CPU

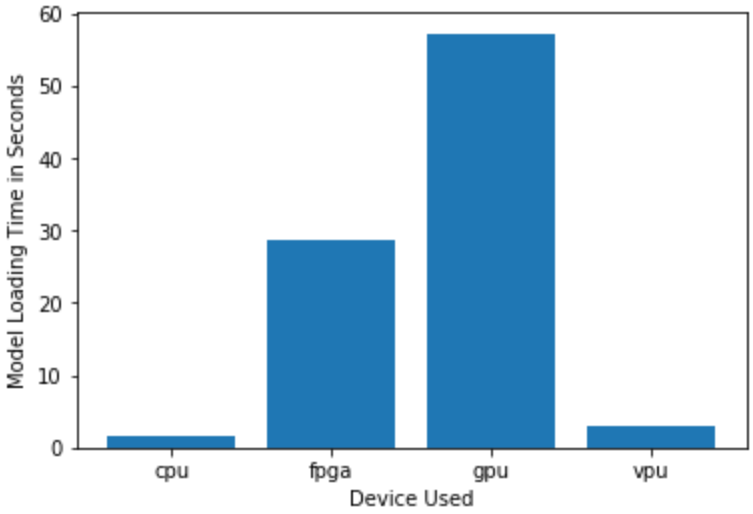
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client does not have much money to invest in additional hardware therefore use of preexisting hardware (intel i7 core).	*CPU comes with the computers the client has. The available intel i7 CPU would be enough.*
The client wants to save on electric bill	*CPUs have the following power consumption relationship, Higher Performance=More Power=Higher Cost.*
[TODO: Type your answer here]	*[TODO: Type your answer here]*

Queue Monitoring Requirements

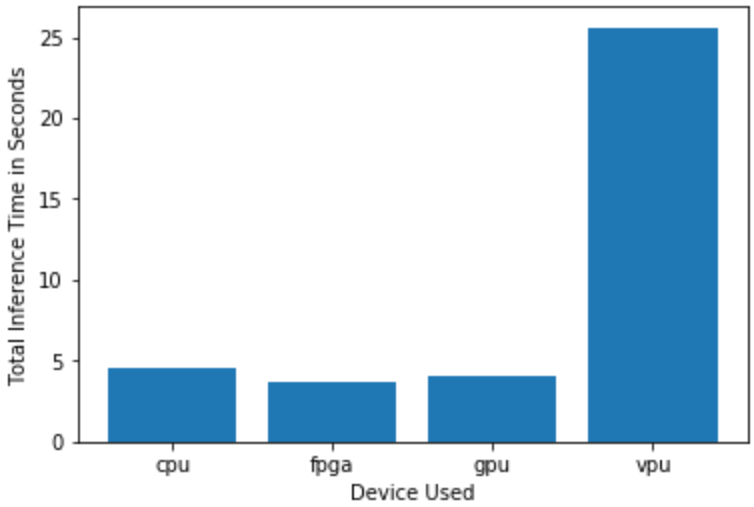
Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

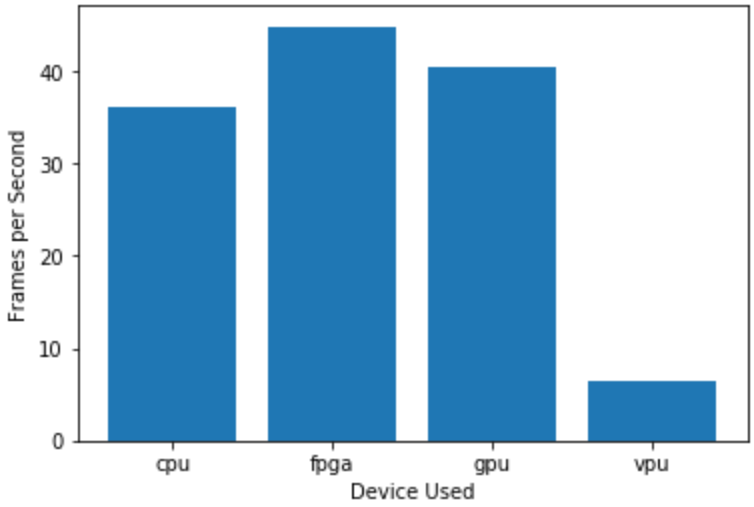
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



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
Recommendation: CPU and IGPU *Mr. Lin requirements included;* 1. *The client does not have much money to invest in additional hardware therefore use of preexisting hardware (intel i7 core).* 2. *The client wants to save on electric bill* *This meant we had to work with pre-existing hardware especially, since the client did not have the budget to invest on additional hardware. The first proposal was an Intel CPU Device and has been tested as follows:* 1. *Model load time (seconds): the Intel CPU device (approx 2 seconds of load time) ranks the best in the evaluation of this metric..* 2. *Total Inference time (seconds): the Intel FPGA device took the least amount of time to perform inference among all the tested devices, followed by the Intel GPU device. The Intel CPU device was third among the four Intel device offerings.* 3. *Frames Per Second (fps): the FPGA device had a higher count of frames per second (approx 30 fps) than any other device tested, followed closely by both the Intel GPU device and the Intel CPU devices.* *Whereas the CPU outdid the rest of the devices in model load time, it still did not test as efficient in the rest of the metrics. The CPU best fits into the client's requirements and budget, however, to make good use of the preexisting Intel core i7 computers we will have to make use of the IGPU to improve the efficiency of the Edge AI.* *As we have seen from the metrics test, the Intel GPU device is consistently second best.*

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

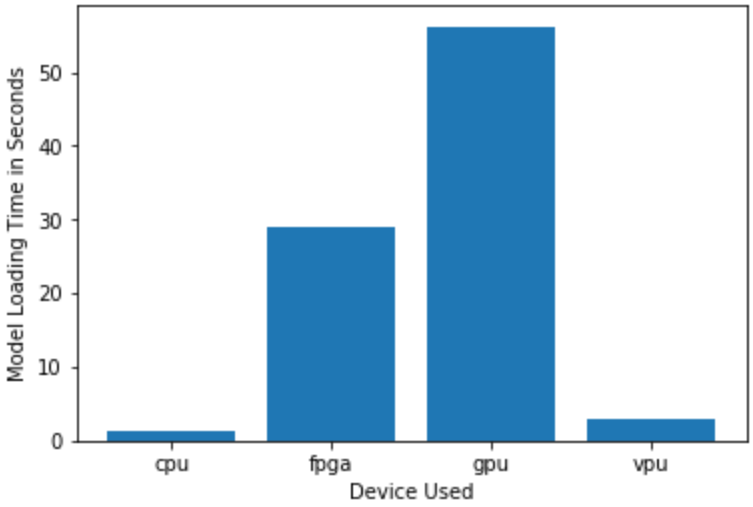
Requirement Observed (Include at least two.)	**How does the chosen hardware meet this requirement?**
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client is using CPUs to process footage, and no significant processing power is available to run inference. The system in use needs an upgrade	*VPU is an accelerator, meaning it accelerates the performance of the pre-existing CPU. An NCS2 would be interfaced with a CPU to perform inference.*
The client has a budget of $300/machine and would like to save on hardware requirements.	*VPU is a cost-efficient way to add performance to a pre-existing system, costing around $70 to $100, well within the budget.*
The client would like to save on future power requirements	*VPU is a low-power device and would not consume much power.*

Queue Monitoring Requirements

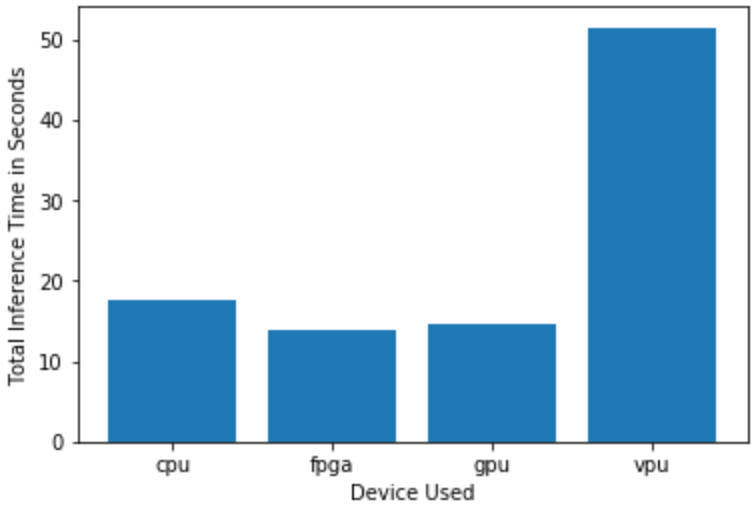
Maximum number of people in the queue	*4*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

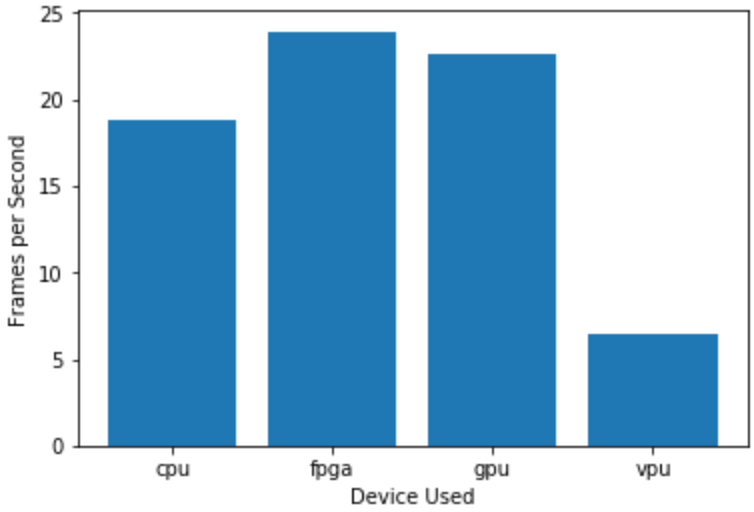
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



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
Recommendation: CPU, IGPU and VPU *Ms. Leah requirements included;* 1. *The client is using CPUs to process footage, and no significant processing power is available to run inference. The system in use needs an upgrade* 2. *The client has a budget of $300/machine and would like to save on hardware requirements.* 3. *The client would like to save on future power requirements* *This meant that the pre-existing hardware needed an upgrade but within the budget of $300/machine. The first proposal was an Intel VPU Device and has been tested as follows:* 4. *Model load time (seconds): the Intel VPU device (approx 3 seconds of load time) ranks the second best in the evaluation of this metric..* 5. *Total Inference time (seconds): the Intel FPGA device took the least amount of time to perform inference among all the tested devices, followed by the Intel GPU device. The Intel VPU device was a distant among the four Intel device offerings taking the longest to perform inference.* 6. *Frames Per Second (fps): the FPGA device had a higher count of frames per second (approx 30 fps) than any other device tested, followed closely by both the Intel GPU device and the Intel CPU devices. The Intel VPU device was a distant last having the least FPS.* *The Intel VPU device is not the best recommendation for the transportation scenario as seen by the test results. However, combining it with Intel CPU and Intel GPU devices makes the Intel VPU a more worthy choice* *As we have seen from the metrics test, the Intel GPU device is consistently second best.*