

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

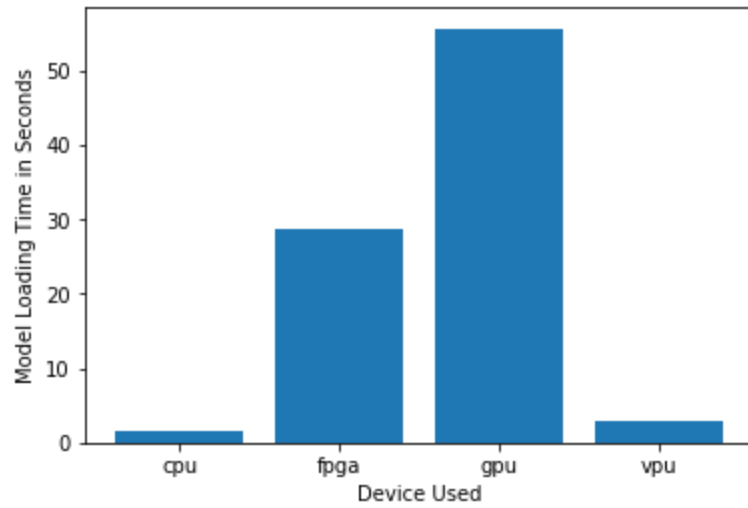
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.	<i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
<i>Last for at least 5-10 years</i>	<i>FPGAs that use devices from Intel's Internet of Things Group have a guaranteed availability of 10 years, from start of production</i>
<i>Able to repurpose the system</i>	<i>FPGAs are field-programmable; they can be reprogrammed to adapt to new, evolving, and custom networks</i>
<i>Run inference very quickly</i>	<i>FPGAs can execute neural networks with high performance and very little latency</i>

Queue Monitoring Requirements

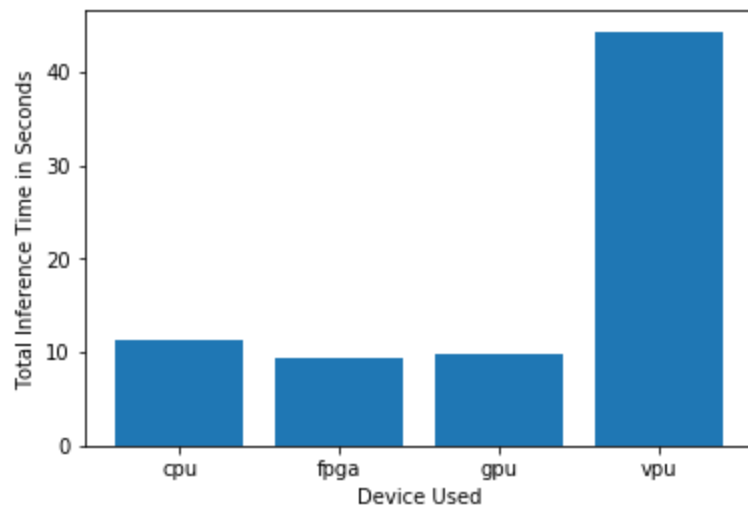
Maximum number of people in the queue	2
Model precision chosen (FP32, FP16, or Int8)	FP16

Test Results

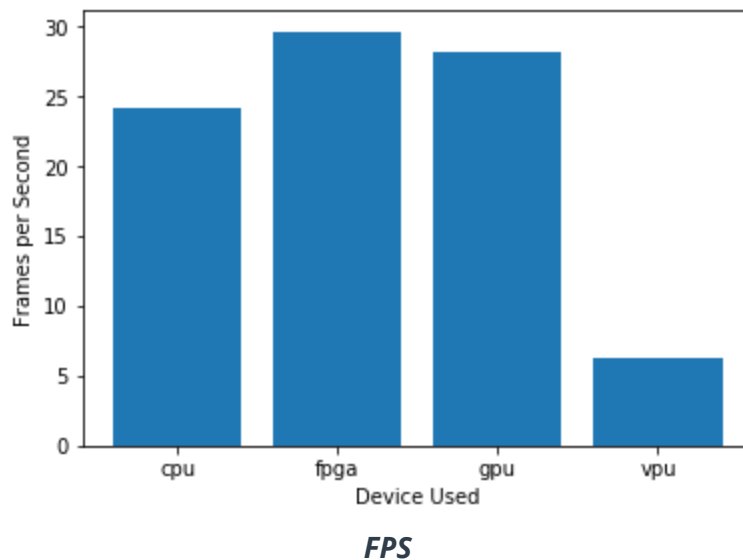
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



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

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?
<p><i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.</p>	<p><i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.</p>

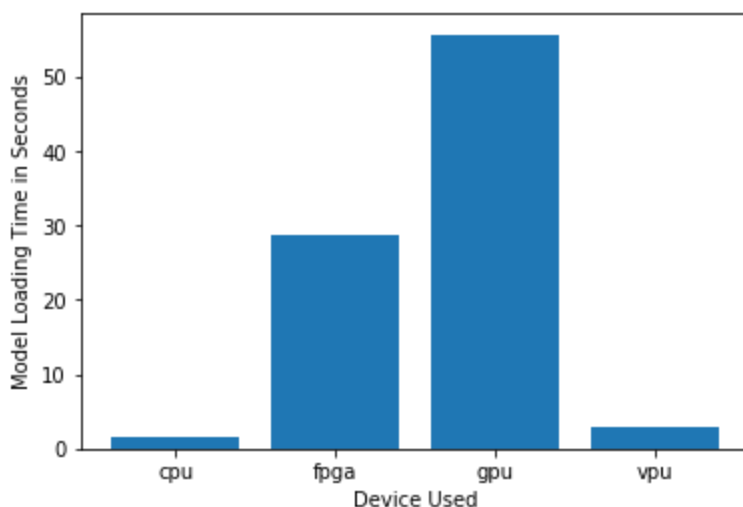
<i>Do not have much money to invest in additional hardware</i>	<i>IGPU is a GPU that is located on a processor alongside the CPU cores and shares memory with them.</i>
<i>Want to save as much as possible on his electric bill</i>	<i>Unused sections in a GPU can be powered down to reduce power consumption</i>
<i>[TODO: Type your answer here]</i>	<i>[TODO: Type your answer here]</i>

Queue Monitoring Requirements

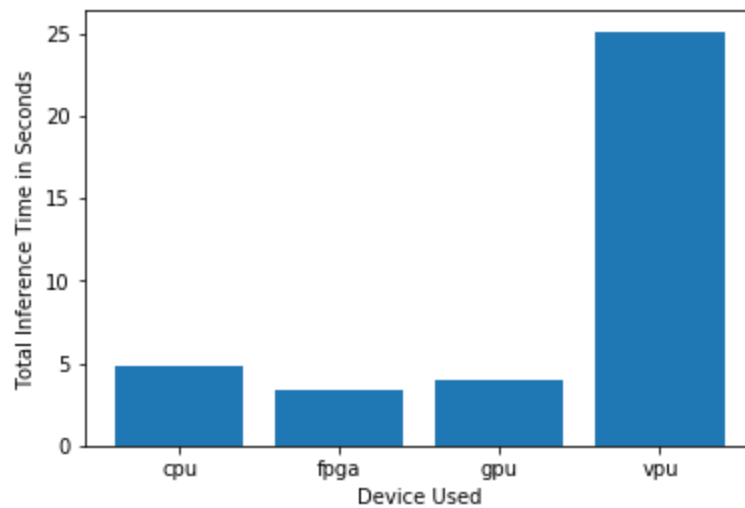
Maximum number of people in the queue	5
Model precision chosen (FP32, FP16, or Int8)	FP16

Test Results

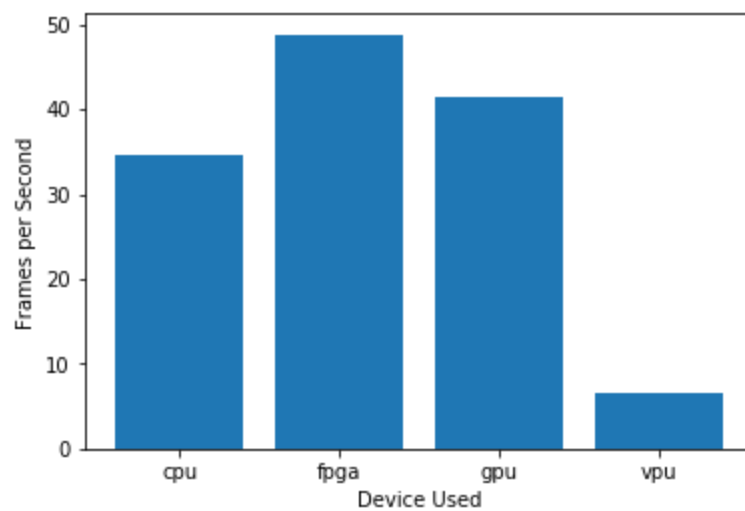
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Model Load Time



Inference Time



FPS

Final Hardware Recommendation

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Write-up: Final Hardware Recommendation

As the client does not want to invest in additional hardware, and also save as much as possible on the electric bill, IGPU is the best option. The reason is that it is already included in the Intel i7 core processor and the unused sections in a GPU can be powered down to reduce power consumption.

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

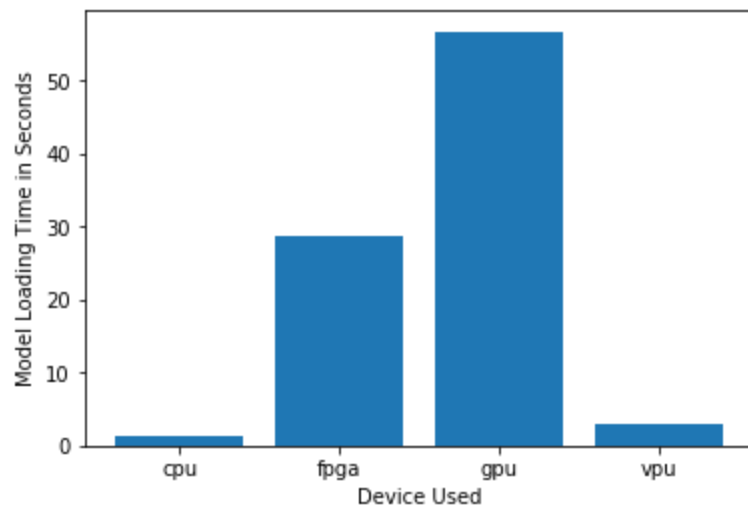
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.	<i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
<i>Current CPUs have no significant additional processing power is available to run inference</i>	<i>The NCS2 is a USB3.1 plug and play removable VPU for AI inferencing. It is a dedicated hardware accelerator optimized for running deep learning neural networks at low power without any loss in accuracy.</i>
<i>Budget allows for a maximum of \$300 per machine</i>	<i>Compared to other AI accelerators, VPU is an inexpensive option. For example, the NCS2 is typically costing around \$70 to \$100.</i>
<i>Save as much as possible both on hardware and future power requirements</i>	<i>The processor, for example Myriad X, has a very low power consumption of only 1-2 watts</i>

Queue Monitoring Requirements

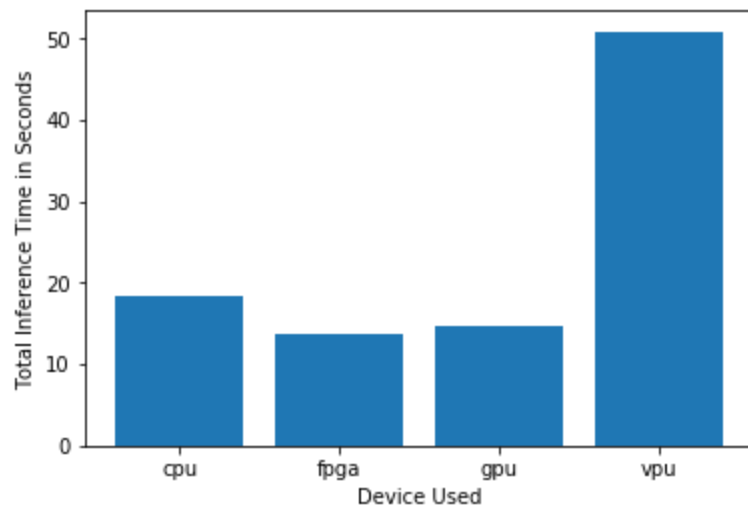
Maximum number of people in the queue	7
Model precision chosen (FP32, FP16, or Int8)	FP16

Test Results

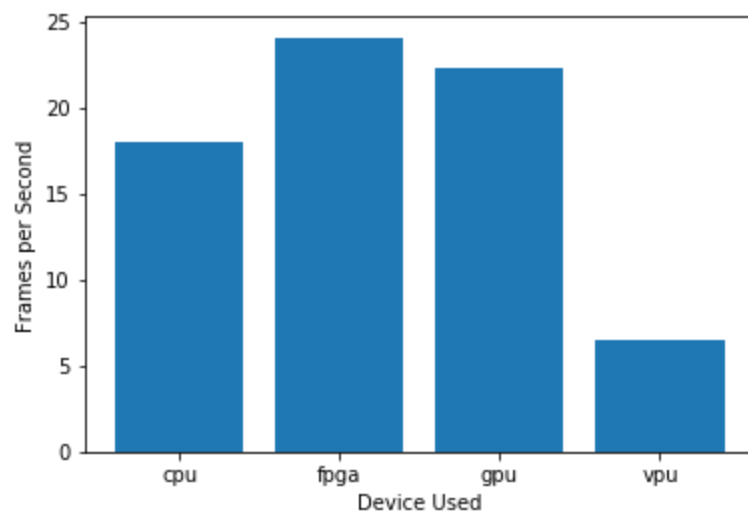
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Model Load Time



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

The client's current PCs are being used to process and view CCTV footage for security purposes and no significant additional processing power is available to run inference. Therefore, we need to add additional hardware to run inference. VPU is the only option that also fulfills low cost and low power consumption.