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

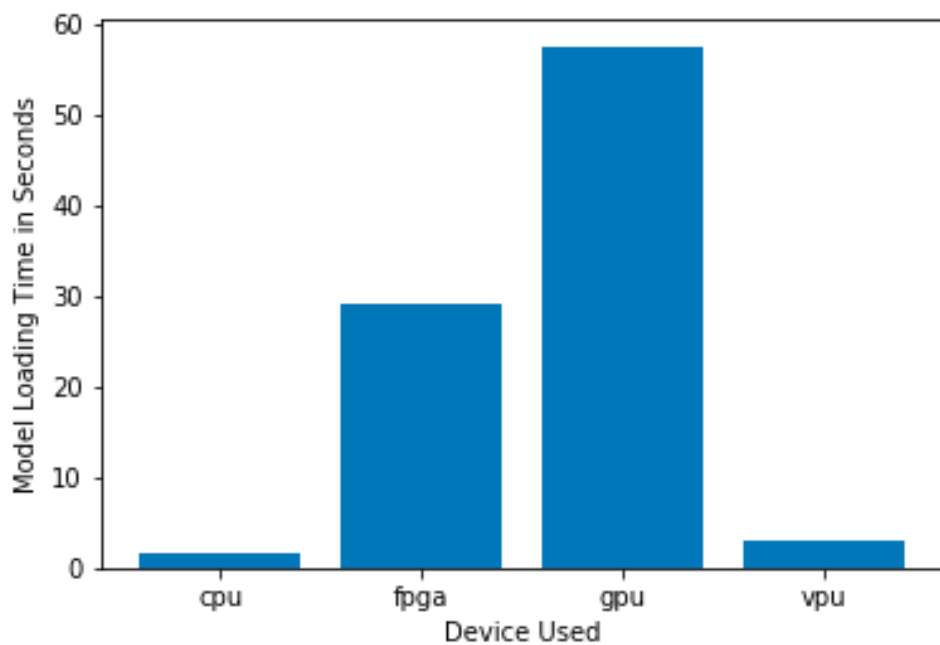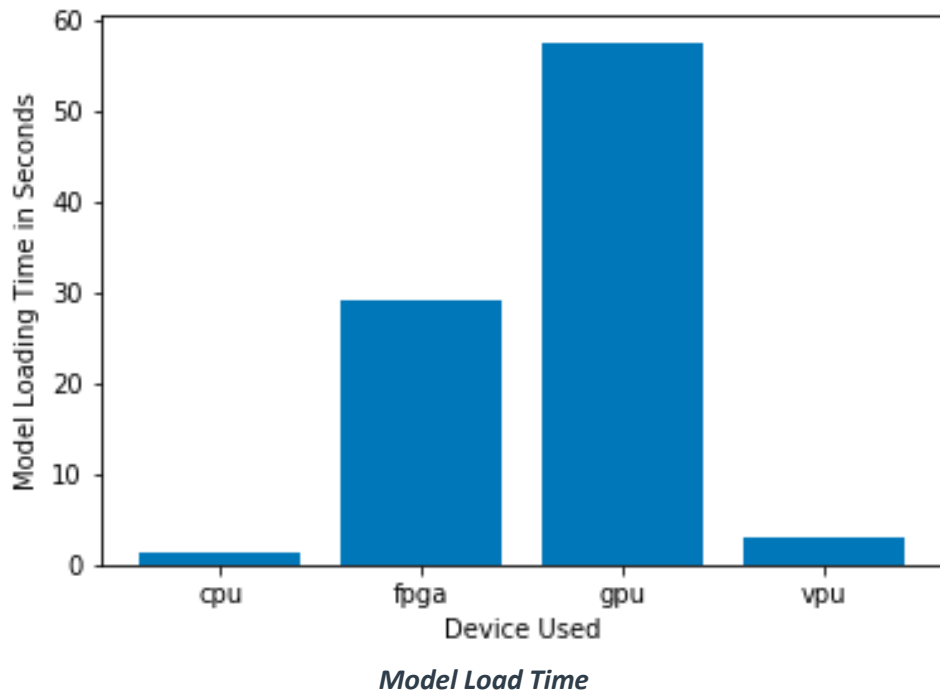| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client wants the image processing task to be completed five times per second.	FPGA is very fast and should be fast enough.
The client wants the system repurposed later for another project. The system would need to be flexible so that it can be reprogrammed and optimized to quickly detect flaws in different chip designs.	The flexibility of the FGPA reprogramming and repurposing should meet the future project requirements.
The system would ideally like it to last for at least 5-10 years.	FPGAs have a long lifespan. For example, 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

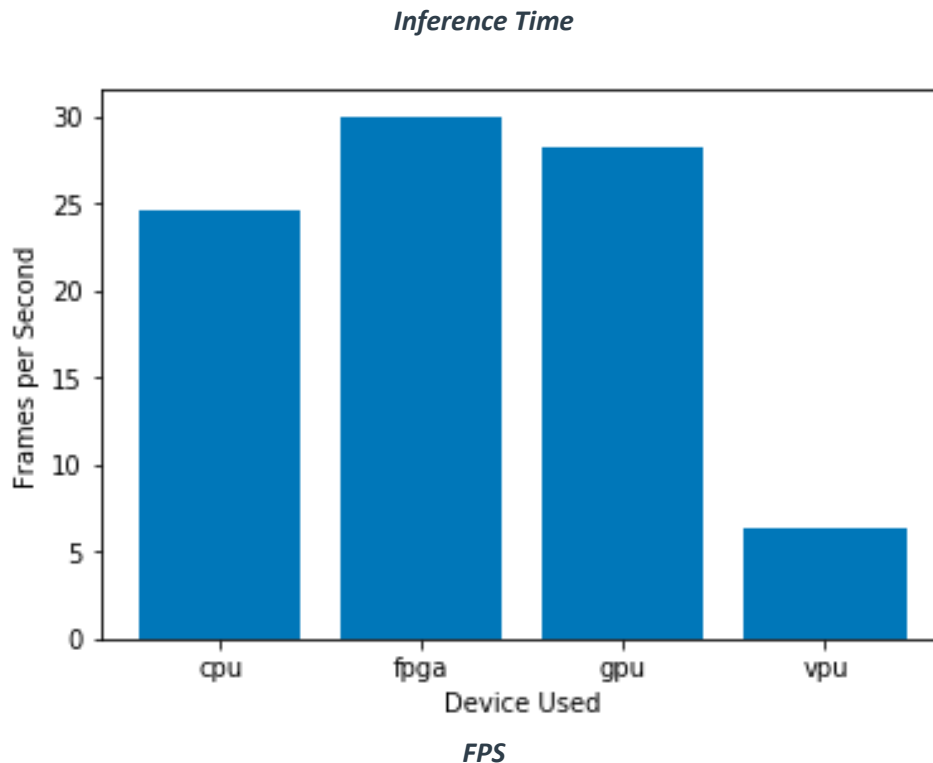| Maximum number of people in the queue	2

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

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 can be verified by the graphs, the FPGA could be the best solution. It provides a solid FPS of near 30fps more than enough of the 5fps requirement and the model loading time is not important for this application. This all could be done with the CPU and GPU environments, but the necessity of a hardware that is very fast, have a long lifespan and can be repurposed to the next phase of chip flaws detection is very compelling. As they do not have budget restrictions for the initial phase this is indeed the best choice.

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.

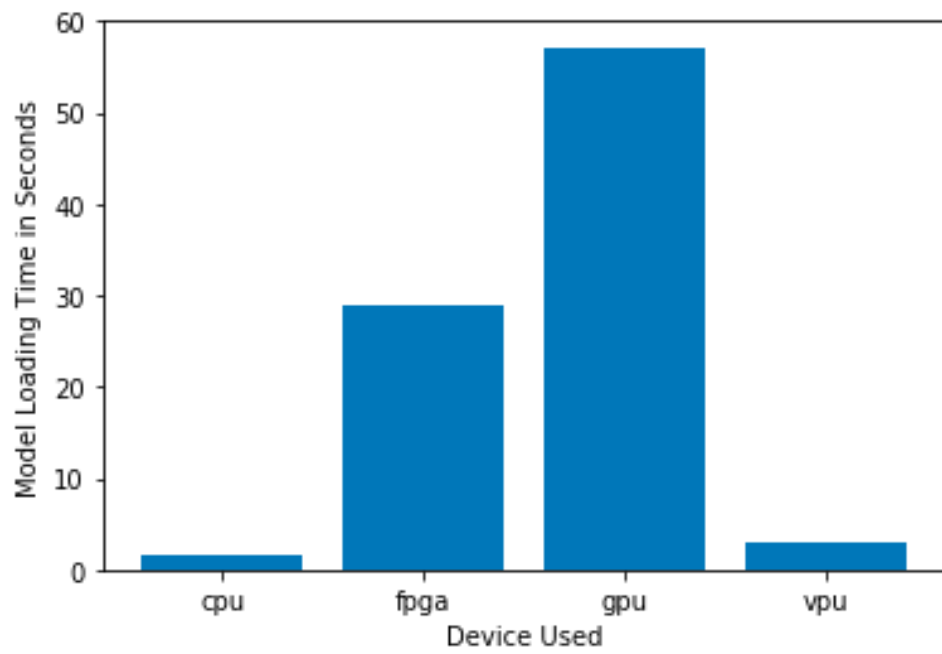| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
| --- |
| CPU |

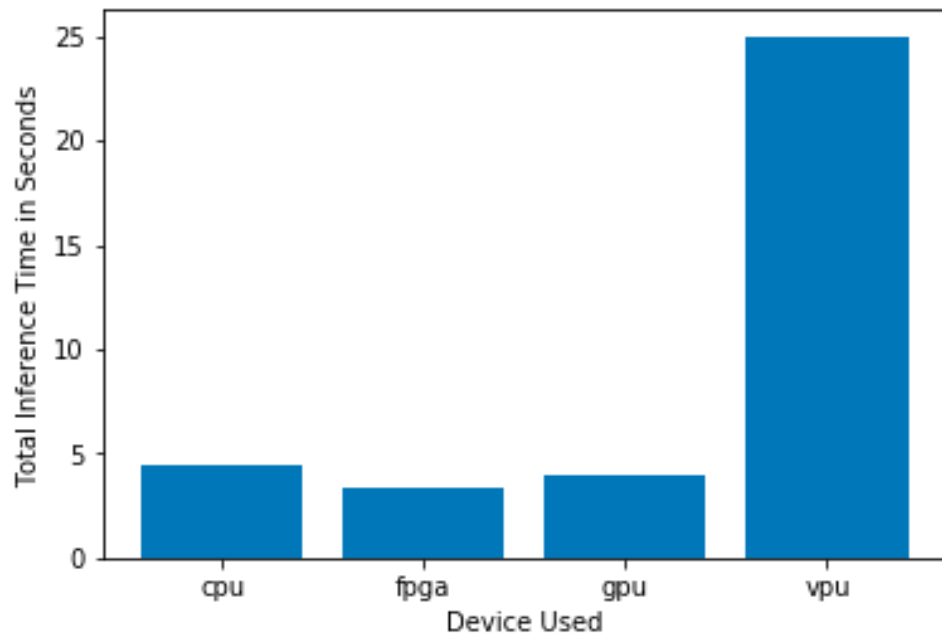| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client has checkout counters with i7 processor with minimal use	I5 processor is already enough for a 30fps queue analysis. As this is not very time sensitive, the framerate could be lowered to 10fps to give room for the normal processing of the CPU.
Client wants to save as much money as possible	The CPU is already there and there is not extra computing power costs.
Client wants to save with the electrical bill	The CPU is already there and On. We could have a small increase on the Watt usage but with a lower fps this could be reduced.

Queue Monitoring Requirements

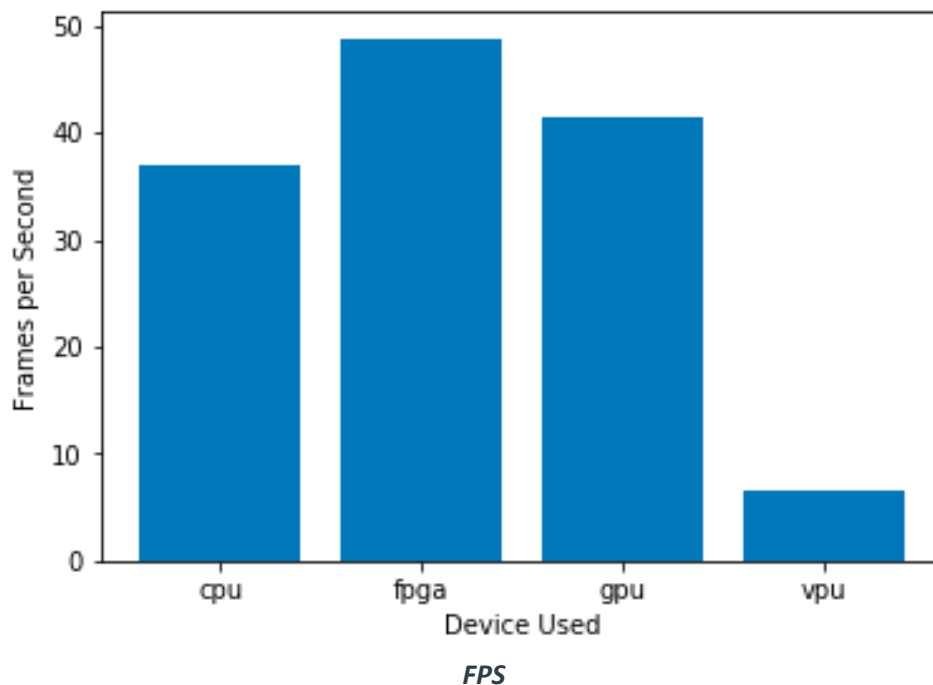| Maximum number of people in the queue	2
Model precision chosen (FP32, FP16, or Int8)	FP16 (for less consumption)

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 CPU system is a good choice for this project as it meets the low cost (the CPU is already there) and energy consumption (if it is used a low fps). As Mr. Lin does not have future plans in sight for AI (just this one), the longevity of the system will be attached to the longevity of the checkout counters itself.

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.

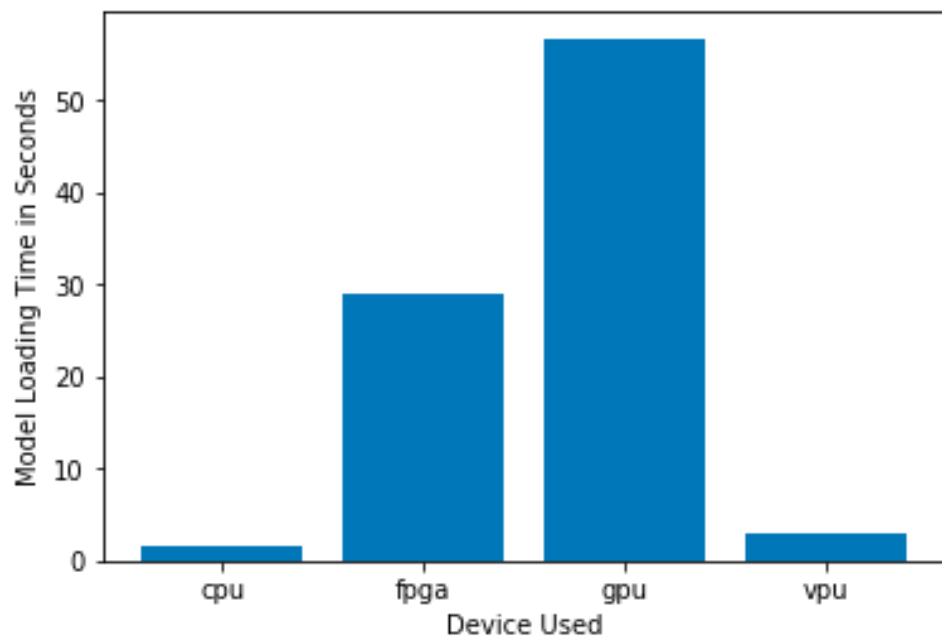| Which hardware might be most appropriate for this scenario?
(CPU / IGPU / VPU / FPGA) |
|---|

UDACITY

VPU

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Want to use All-in-one PCs nearby security booth	Using Myriad-X USB stick could do the required processing and there is only the option of USB as the All-In-one PCs do not have PCI interfaces
7 Cameras	Using 2 Myriad-X USB sticks can process a workload of 8 simultaneous inferences
Budget of $300 max per machine	Each Myriad-X USB stick cost less than $100
Monitoring platform	Do not need a high framerate, Myriad-X could do it

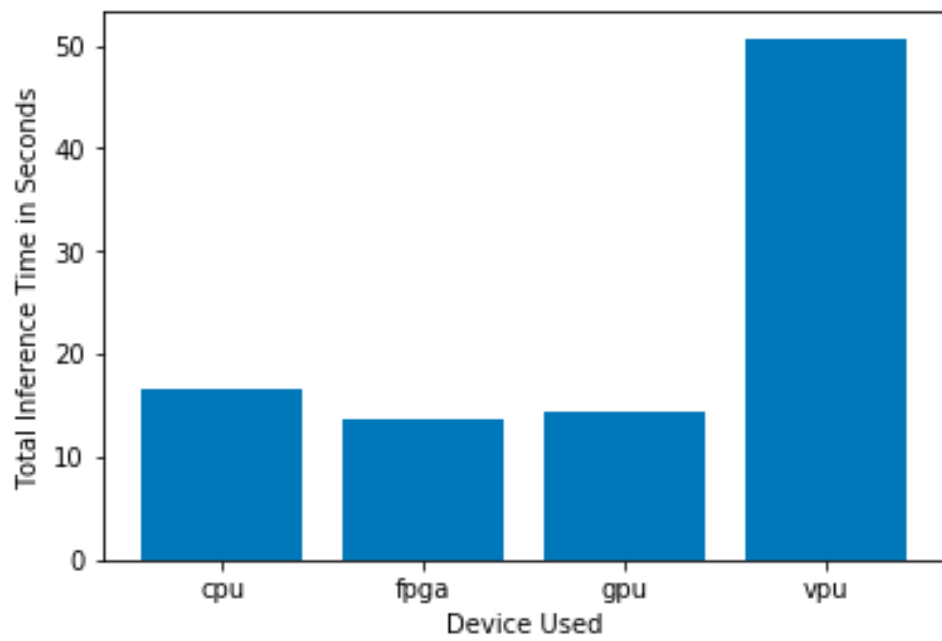## Queue Monitoring Requirements

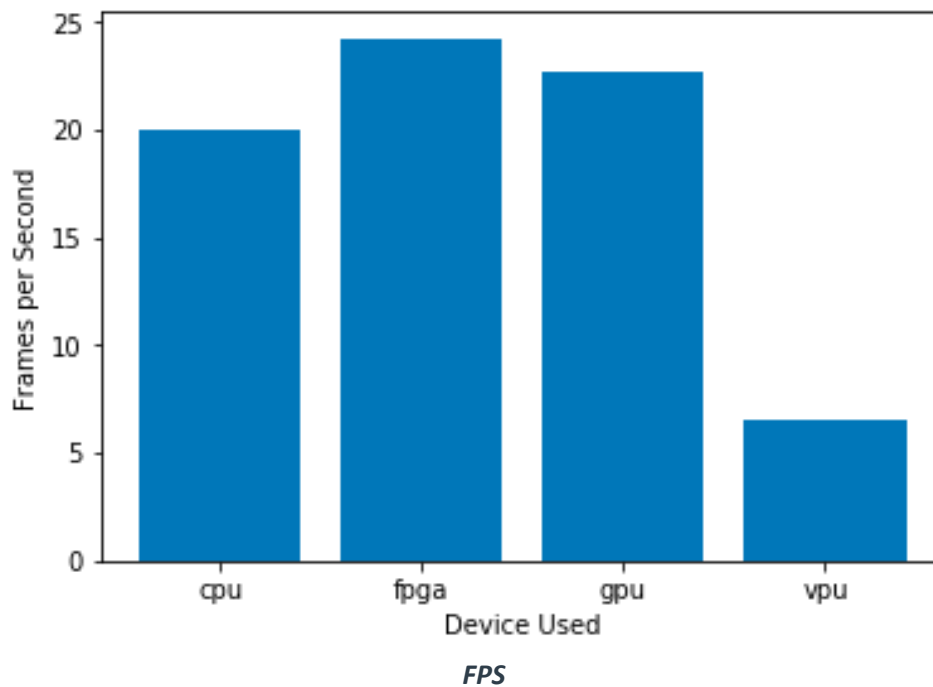| Maximum number of people in the queue	4 (chosen because there is 2 queue areas on the image, not well positioned, but 4x2 is enough to monitor the 7 passengers on the platform)
Model precision chosen (FP32, FP16, or Int8)	FP16

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
The recommendation is to use 2 Myriad-X USB sticks, one on each of 2 All-in-one PC. They could do the desired processing with a performance of around 5fps. This can be enough for this application. They will spend less the $200 total and would be functioning for a long time as there is no intention of improve the detection system. Even if the All-in-one PCs are retired, the USB stick can be used with new PCs (maybe a USB-C to USB 3 adaptor will be needed in the future).