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.

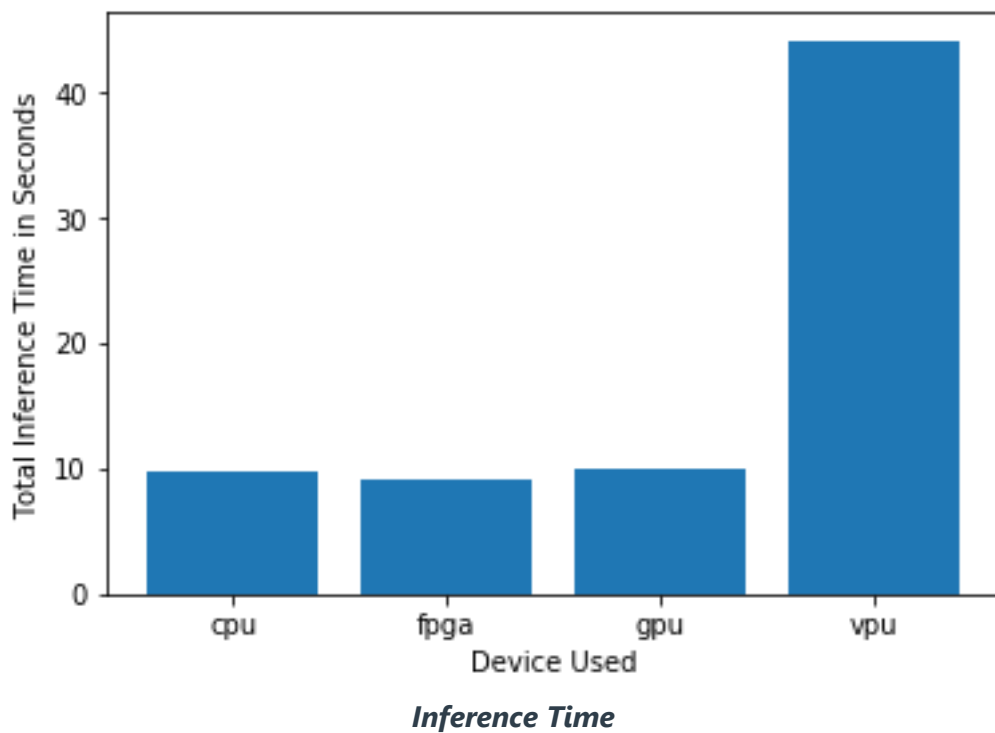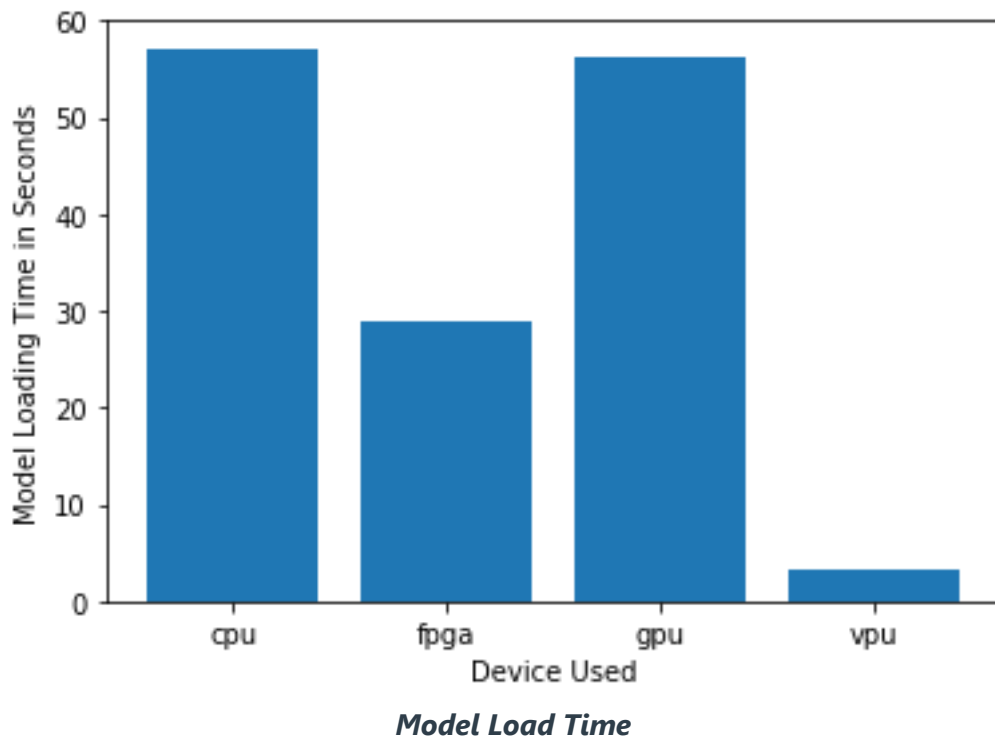| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *FPGA* |

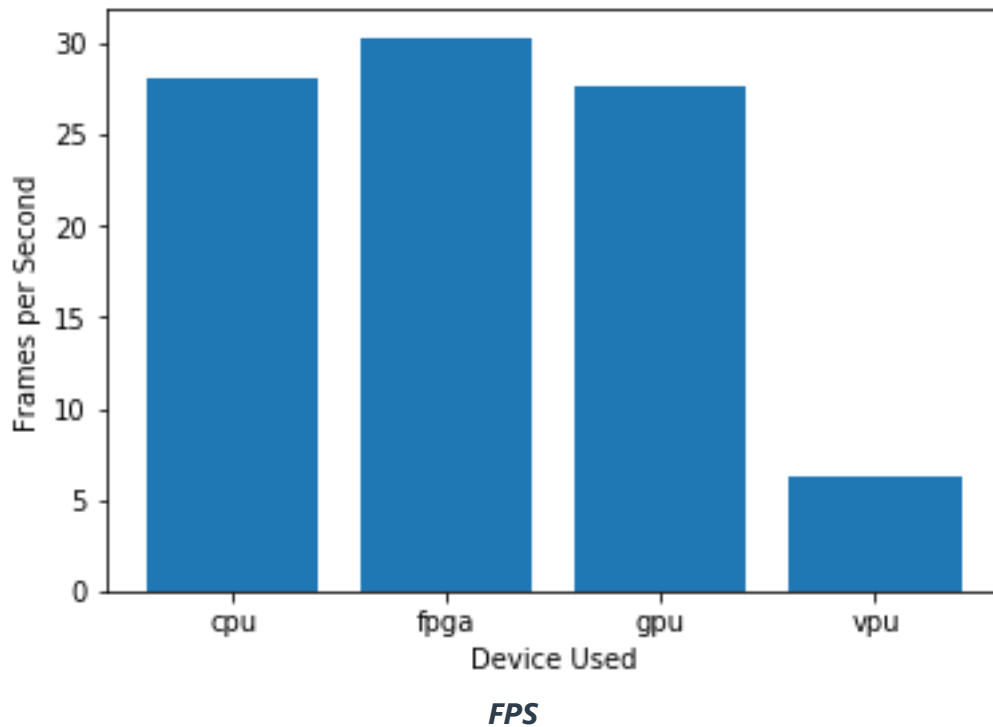| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Camera produces 30-35 FPS and client need image processing task to complete 5 times per seconds	FPGA can handle 30 FPS videos
Inference time should be very less to detect flows in chips	Inference time of FPGA is less than 10 seconds which is lesser than all
The client requires a flexible so that it can be reprogrammed and optimized to quickly detect flaws in different chip designs.	FPGA has model load time 30 seconds which is 2nd after VPU but VPU has more than 40 seconds of inference time and can process only 5 FPS videos
The client requires the hardware to last for at least 5-10 years	FPGA average life span is 5 years.

Queue Monitoring Requirements

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

Test Results

UDACITY

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
Client need a system which can re-programmed so every time when there is a new design, again we need to load the latest model and this should be faster so we can see VPU and FPGA both have less time even VPU has very less load time but at the same time client want inference time very less so we can see in the inference time graph, FPGA has inference time lesser then all. Client existing cameras produces 30-35 FPS videos so we can clearly see that only FPGA can process 30 FPS videos. Hence only FPGA is meeting all the requirements of client. Client need a devices which last for 5-10 years and FPGA average lifespan is 5 years so it will best fit into client needs.

Scenario 2: Retail

Client Requirements and Potential Hardware Solution

U D A C I T Y

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.

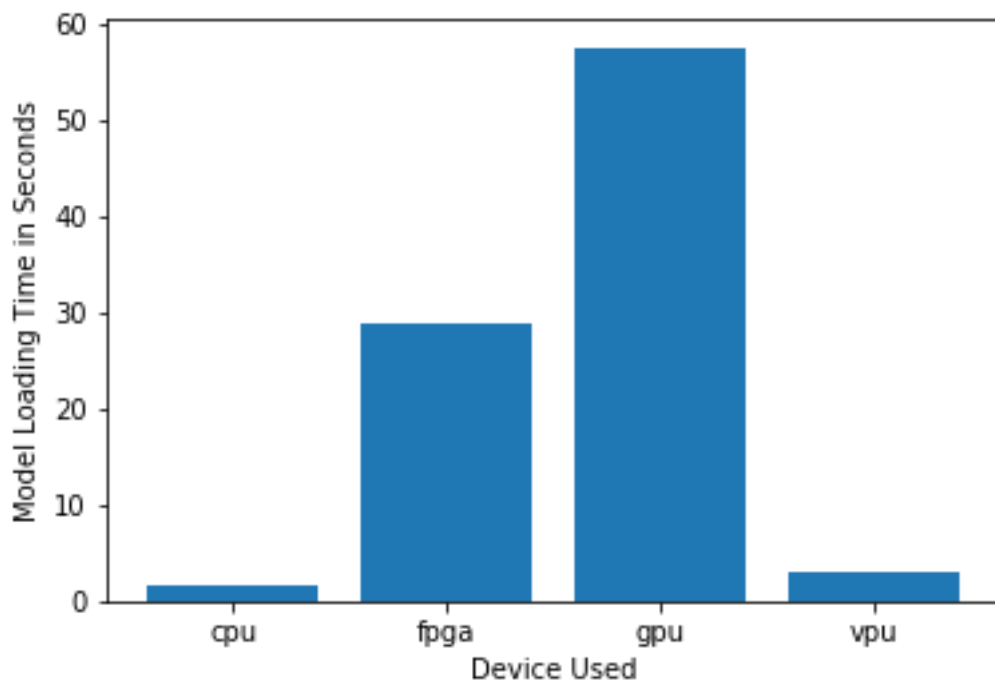| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
| --- |
| *IGPU* |

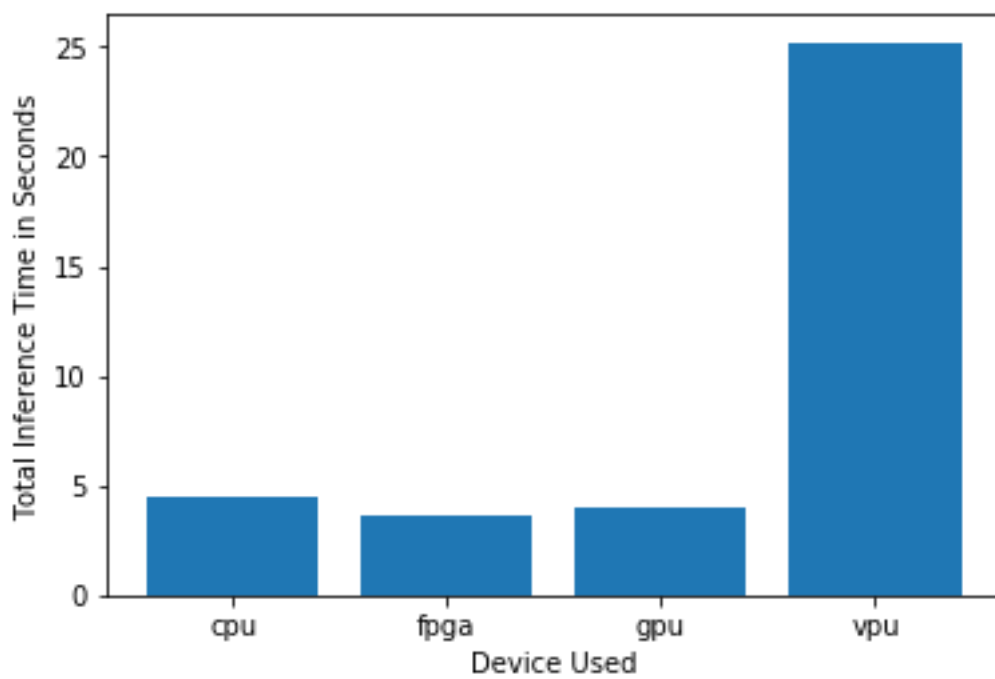| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client has low budget	IGPU is a good option in this range. It will cost around $180
The client wants to keep power consumption where it is.	IGPU has configurable power consumption feature and it requires 40W on average.

Queue Monitoring Requirements

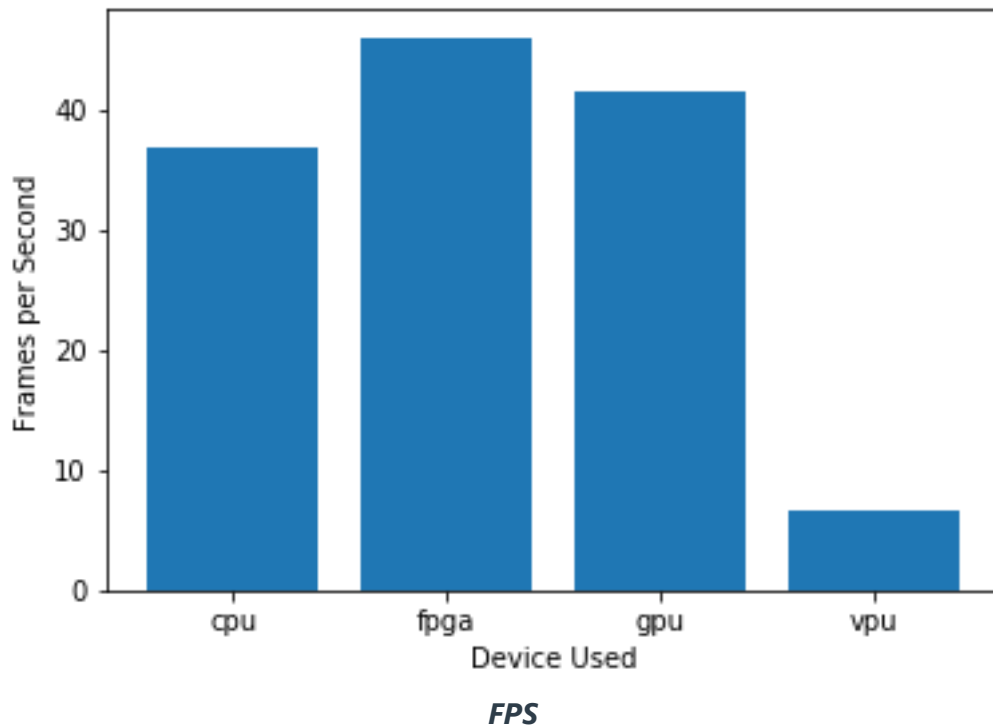| Maximum number of people in the queue	*5*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

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Model Load Time

Inference Time

FPS

Final Hardware Recommendation

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
IGPU is a better choice for client requirements. Client want to spend less so as IGPU and want lesser power consumption for future use. So, in IGPU power consumption is configurable and less than 40W. From test result we can see that IGPU inference time is lesser than 5 seconds and can process approx. 40 FPS as the crowd will be more at cash counters on weekends.

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.

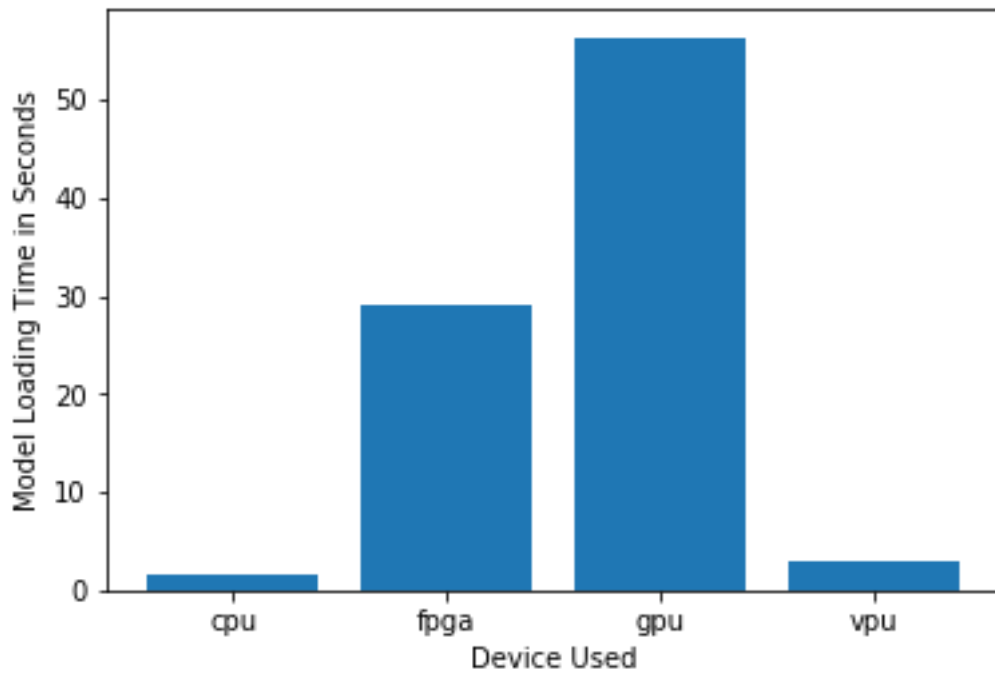| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *VPU* |

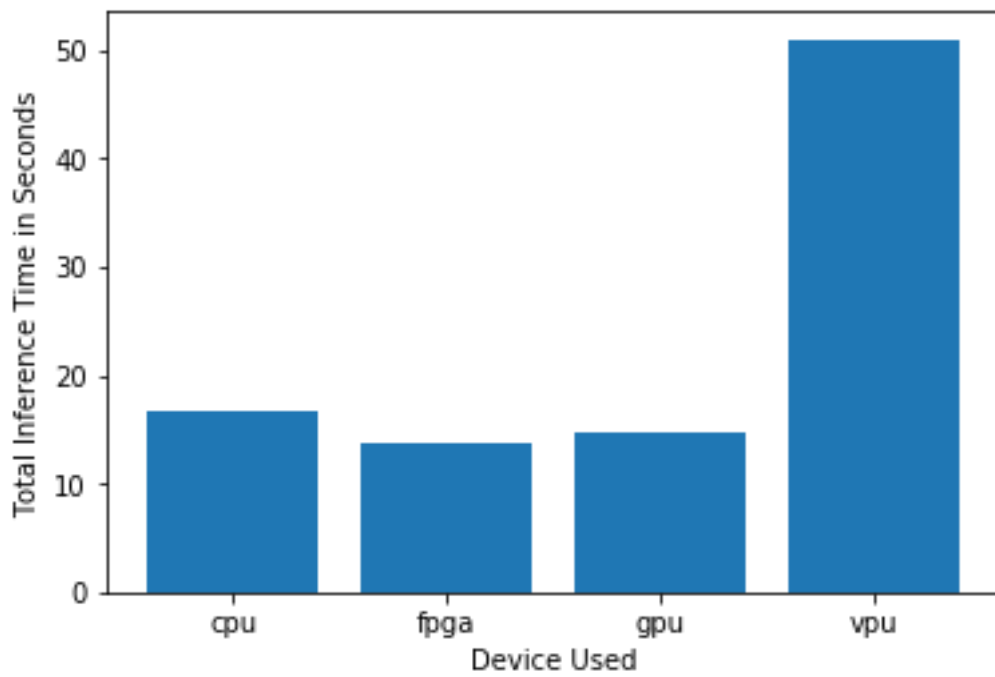| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client would like to save as much as possible both on hardware and future power requirements ($300 foreach device).	VPU is only $70-$100 and need very less power consumption as compared to other devices
The client would like to run the inference in real-time quickly	Inference time for VPU is less than 50 seconds which is high as compared to other devices, but this will fit in client budget.

Queue Monitoring Requirements

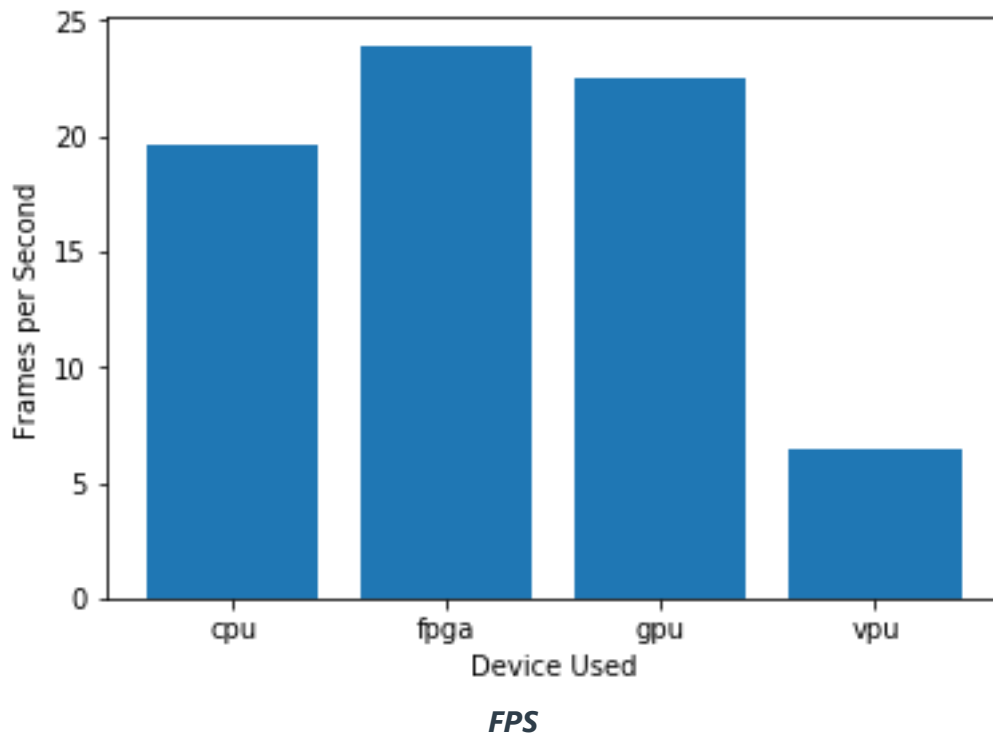| Maximum number of people in the queue	*15*
Model precision chosen (FP32, FP16, or Int8)	FP16

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

UDACITY

FPS

Final Hardware Recommendation

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Write-up: Final Hardware Recommendation
According to client requirements, Client need cheaper and lesser power consumption device to save cost on hardware as well as on future power consumption, so NCS2 will fit into the budget as it only cost $70-$100. VPU has faster model loading time and process 10 FPS videos which is quite enough for client requirement because on average customer spend 5-6 mints on cash counter. Client need to run inference quickly on real-time and VPU is most feasible device, whose inference time is less than 50 seconds which is high then other devices as we can see in the test results from the graph but will fit into client's budget.