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.

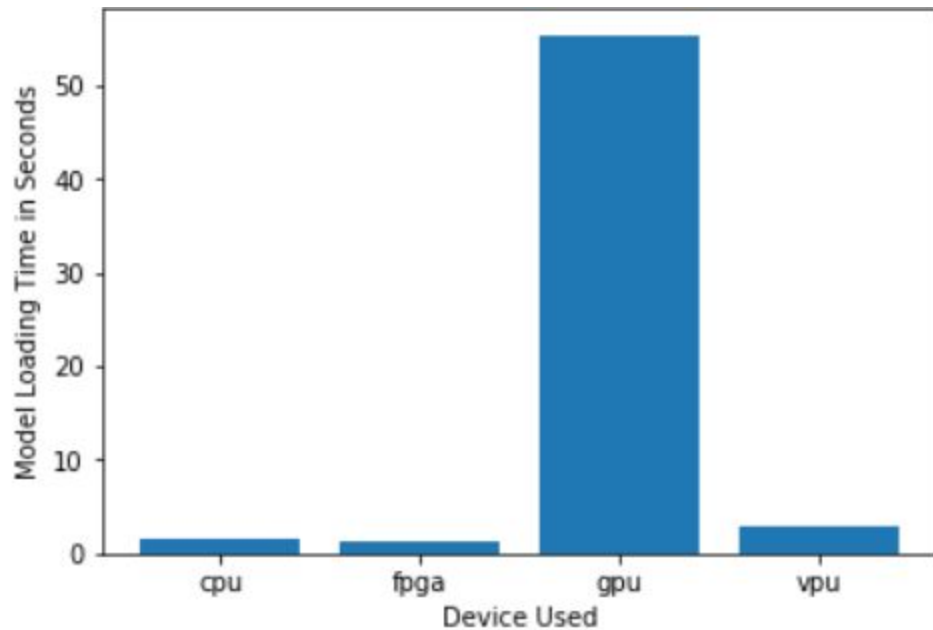| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| FPGA |

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Able to detect the chip flaws, without slowing down the packaging process, the system would need to be able to run Inference on the video stream quickly	FPGAs met specification with high performance, very little latency.
There are different multiple chips designs and the system should be flexible so that it can be reprogrammed and optimized to quickly detect flaws in different chip designs.	Flexibility: FPGA are flexible in a new different ways: - They are field-programmable; they can be reprogrammed to adopt new, evolving, and custom networks - Various precision options(FP16, 11 and 9bit) are supported-allowing developers a balance between speed and accuracy. - The bitstreams being used can be updated without changing the hardware. This allows you to improve the performance of your system without replacing the FPGA's
Naomi semiconductor has plenty of revenue to install a quality system, this is still a significant investment and they would ideally like it to last for at least 5-10 years.	ROBUST: FPGA's are designed to have 100% on-time performance, meaning they can be continuously running 24hrs a day. 7 days a week, 365 days a year. They are also able to function a wide range of temperratures. This means FPGA's can be deployed at harsh environments like factory floods.
[TODO: Type your answer here]	[TODO: Type your answer here]

UDACITY
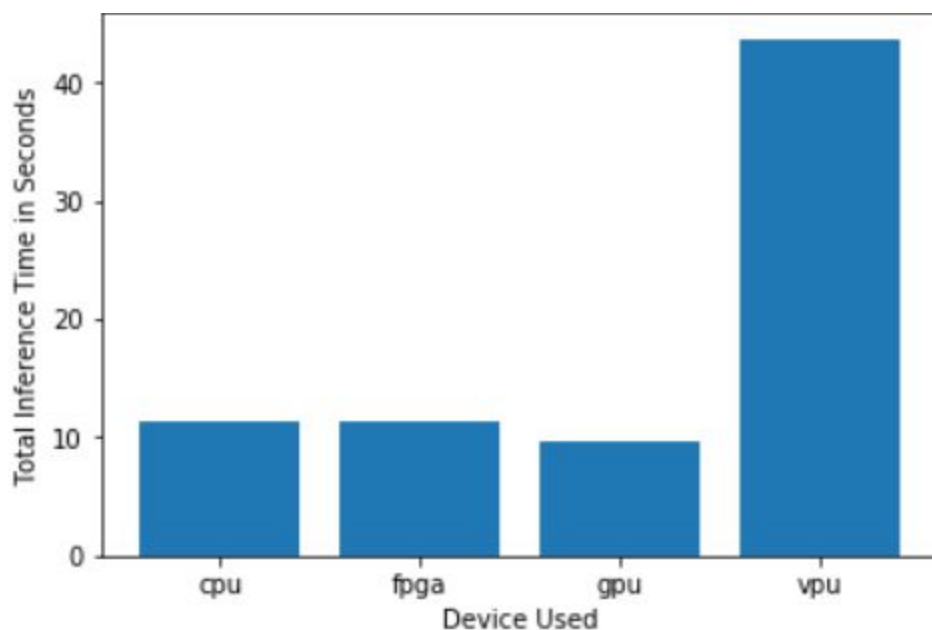
Queue Monitoring Requirements

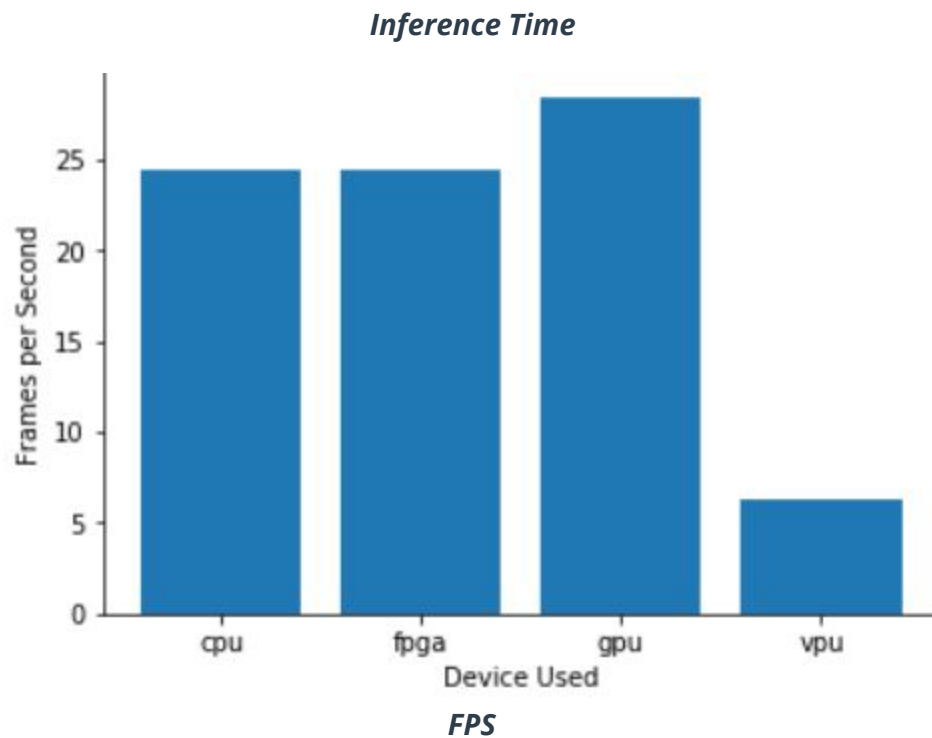|	
Maximum number of people in the queue	8
Model precision chosen (FP32, FP16, or Int8)	FP16

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
Naomi Semiconductors has plenty of revenue to install a quality system, this is still a significant investment and they would ideally like it to last for at least 5-10 years. To be able to detect chip flaws without slowing down the packaging process, the system would need to be able to run inference on the video stream very quickly. Additionally There are different multiple chips designs and the system should be flexible so that it can be reprogrammed and optimized to quickly detect flaws in different chip designs FPGA: High performance, low latency as the test results Flexibility: FPGA are flexible in a new different ways: • They are field-programmable; they can be reprogrammed to adopt new, evolving, and custom networks • Various precision options(FP16, 11 and 9bit) are supported-allowing developers a balance between speed and accuracy. • The bitstreams being used can be updated without changing the hardware. This allows you to improve the performance of your system without replacing the FPGA's ROBUST:

UDACITY

FPGA's are designed to have 100% on-time performance, meaning they can be continuously running 24hrs a day. 7 days a week, 365 days a year. They are also able to function a wide range of temperrratures. This means FPGA's can be deployed at harsh environments like factory floods.

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.

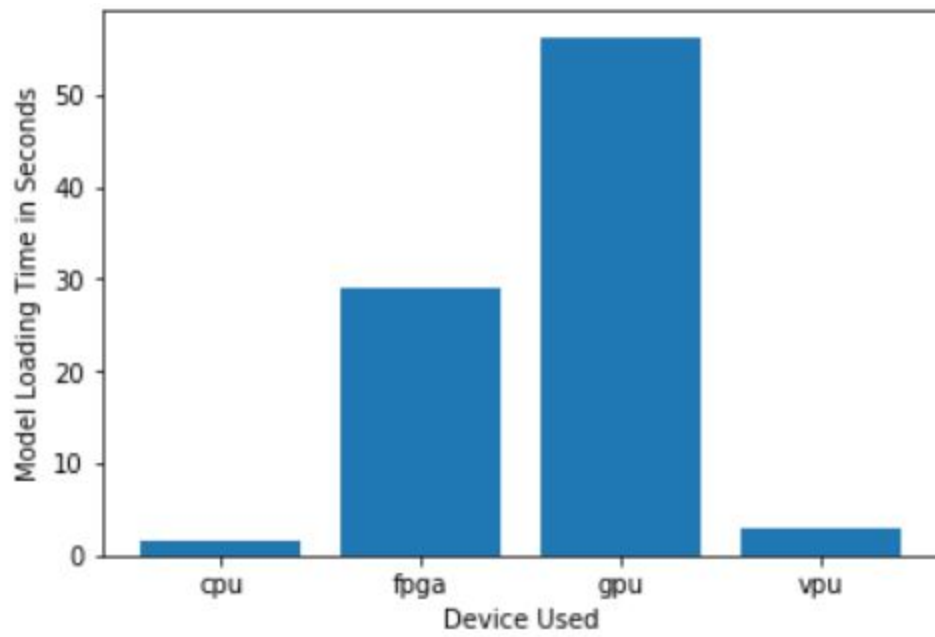| Which hardware might be most appropriate for this scenario?
(CPU / IGPU / VPU / FPGA) |
| --- |
| CPU and IGPU |

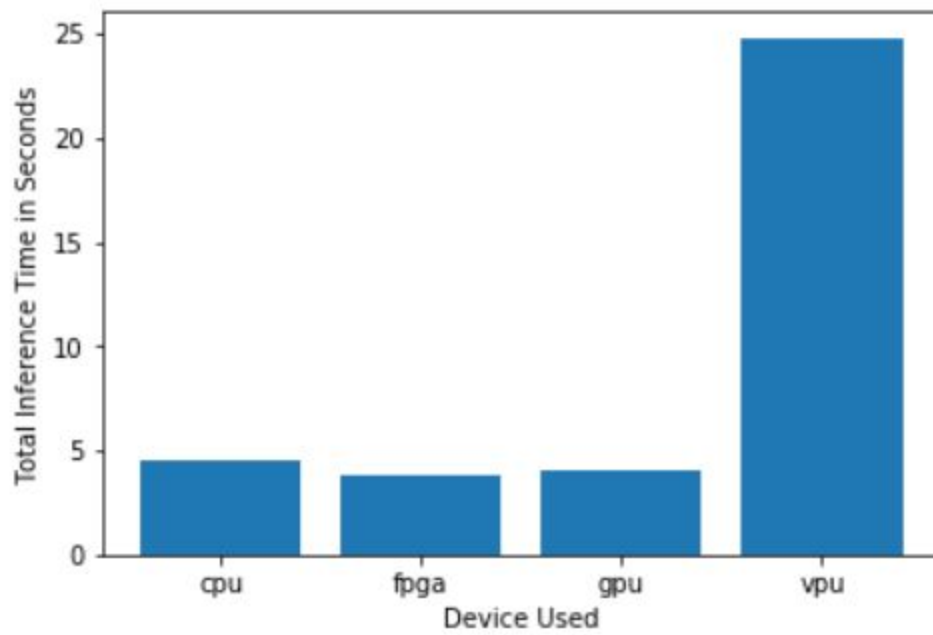| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Most of the stores checkout counters already have a modern computer, each of which has an intel i7 processor. Currently these processors are only used to carry out some minimal tasks that are not computationally expensive	We can utilize the entire existing hardware. (CPU and IGPU)
Mr.Lino does not have much money to invest in additional hardware, and also would like to save much as possible on his electric bill	Configurable Power Consumption. Clock rate for the slice and unslice can be controlled separately. This means that sections in a GPU can be powered down to reduce power consumption.
[TODO: Type your answer here]	[TODO: Type your answer here]
[TODO: Type your answer here]	[TODO: Type your answer here]

Queue Monitoring Requirements

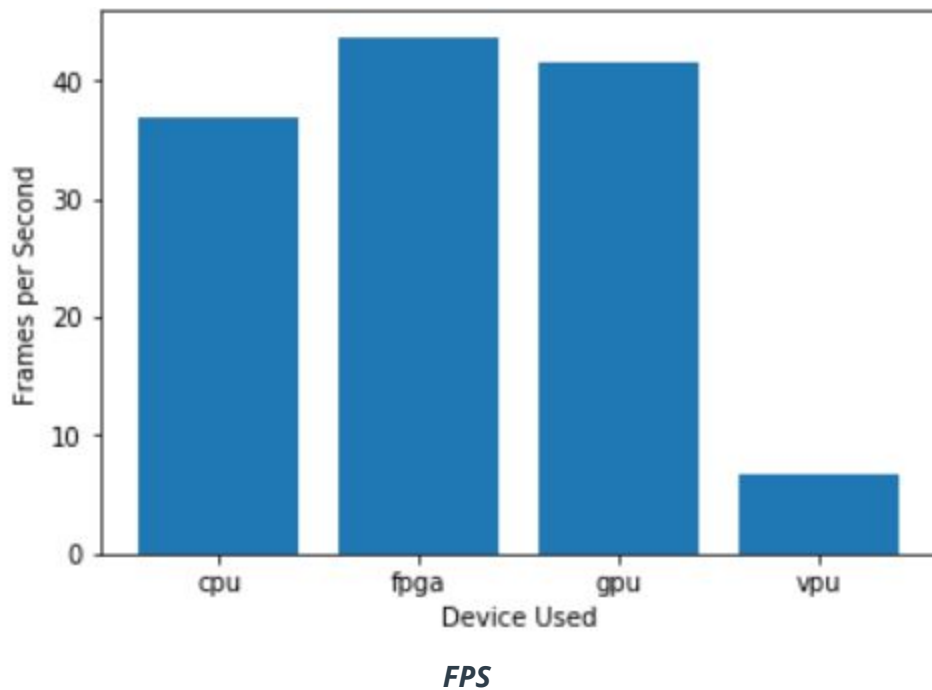| Maximum number of people in the queue	6
Model precision chosen (FP32, FP16, or Int8)	FP16

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
Mr.Lino does not have much money to invest in additional hardware, and also would like to save much as possible on his electric bill. Most of the stores checkout counters already have a modern computer, each of which has an intel i7 processor. Currently these processors are only used to carry out some minimal tasks that are not computationally expensive CPU and IGPU: Since these processor are only used to carry out some minimal tasks that are not computationally expensive, we can entirely utilize the existing hardware hardware (CPU and IGPU). Configurable Power Consumption: Clock rate for the slice and unslice can be controlled separately. This means that 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

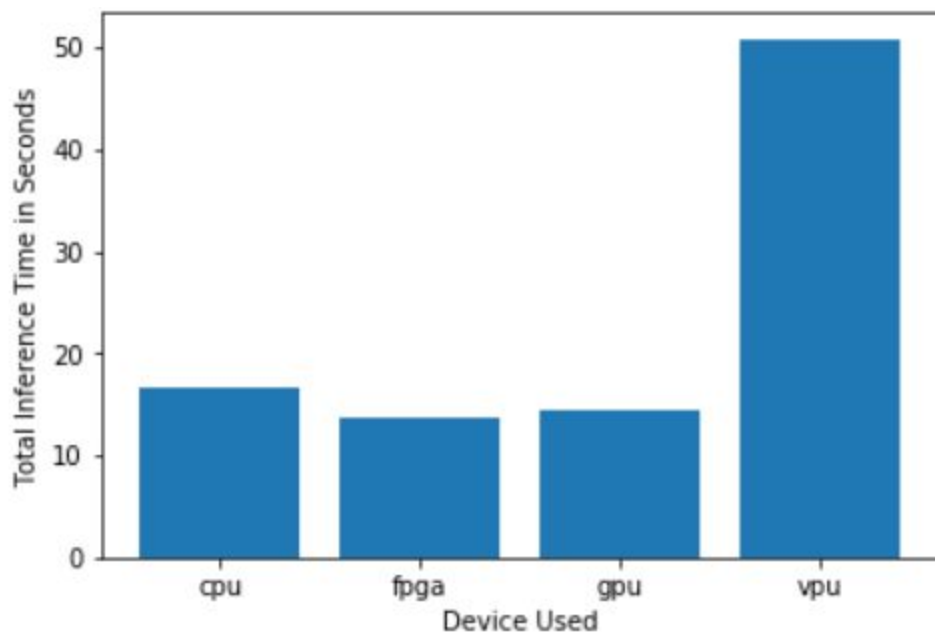| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Ms.Leah would like to automate this using an Edge AI system that would monitor the queues in real-time and quickly direct the crowd in the right manner.	VPU is a low cost device that can be used to accelerate the performance of a pre-existing system.
They monitor the entire situation with 7 CCTV cameras on the platform. These are connected to close All-In-One PCs that are located in a nearby security booth. The CPU's in these machines are currently being used to process and view CCTV footage for security purposes and no significant additional processing power is available to run inference.	All the CPU's including the IGPU's have been fully utilized already. Therefore, we need to add additional hardware.
[TODO: Type your answer here]	[TODO: Type your answer here]
[TODO: Type your answer here]	[TODO: Type your answer here]

Queue Monitoring Requirements

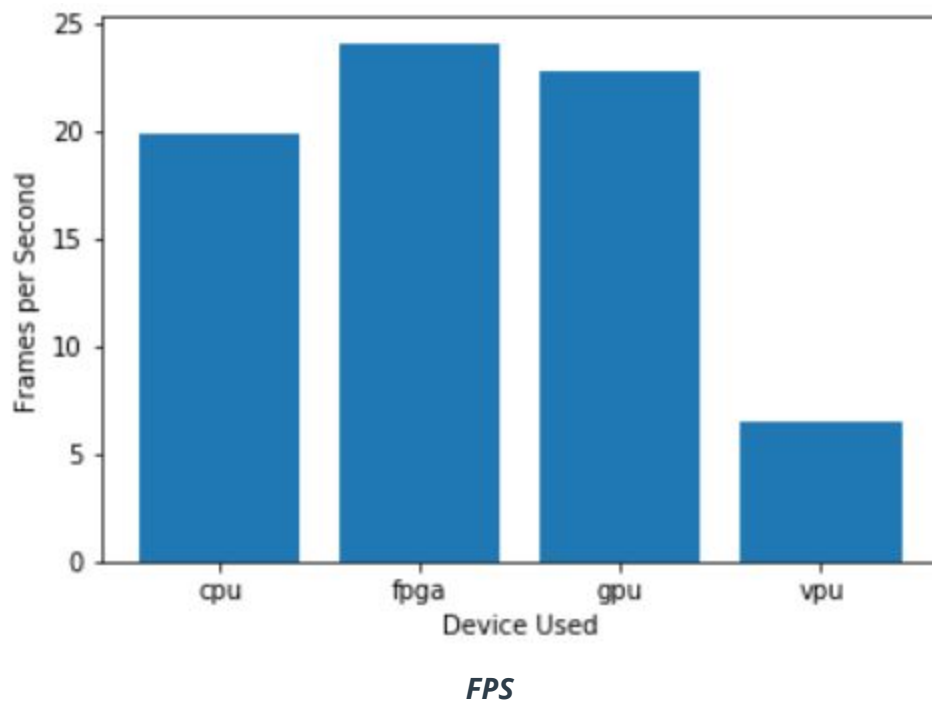|	
Maximum number of people in the queue	12
Model precision chosen (FP32, FP16, or Int8)	FP16

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
Ms.Leah would like to automate this using an Edge AI system that would monitor the queues in real-time and quickly direct the crowd in the right manner. They monitor the entire situation with 7 CCTV cameras on the platform. These are connected to close All-In-One PCs that are located in a nearby security booth. The CPU's in these machines are currently being used to process and view CCTV footage for security purposes and no significant additional processing power is available to run inference. Ms.Leah's budget allows for a maximum of $300 per machine, and she would like to save as much as possible both on hardware and future power requirement VPU is a low cost device that can be used to accelerate the performance of a pre-existing system. VPU is a low cost device that can be used to accelerate the performance of a pre-existing system.