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)
CPU+FPGA

Requirement Observed (Include at least two.)	**How does the chosen hardware meet this requirement?**
Flexibility	As Mr. Vishwas wants to fix the second problem as well where he wants to know the defected chip in advance. So there we will need FPGA, as the model to decide which chip is defective may change over time. So with the feature of reprogrammability, FPGA are best suited with this requirement.
Economic constraint	*Given the condition, Mr. Vishwas already has a great revenue so he doesn't have any economic constraints. So he can easily afford the FPGA.*
Long Term solution	*As Mr. Vishwas wants this solution for 5-10 years. And given the fact the FPGA devices are designed to have 100% on-time performance, meaning they can be continuously running 24 hours a day, 7 days a week and for a whole year.*
Space Requirement	*Since it's a factor line, I don't think space would be a very big constraint and we can easily accommodate the FPGA device which is in fact not a big device.*

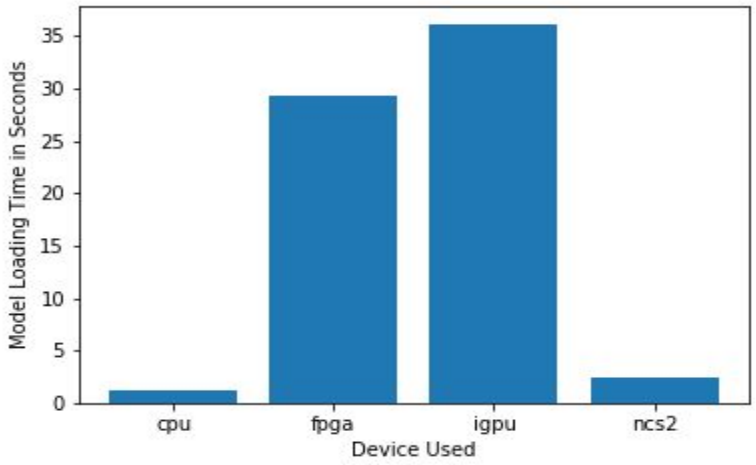
NOTE: device specs:
https://www.intel.in/content/www/in/en/products/programmable/fpga/arria-10.html

Queue Monitoring Requirements

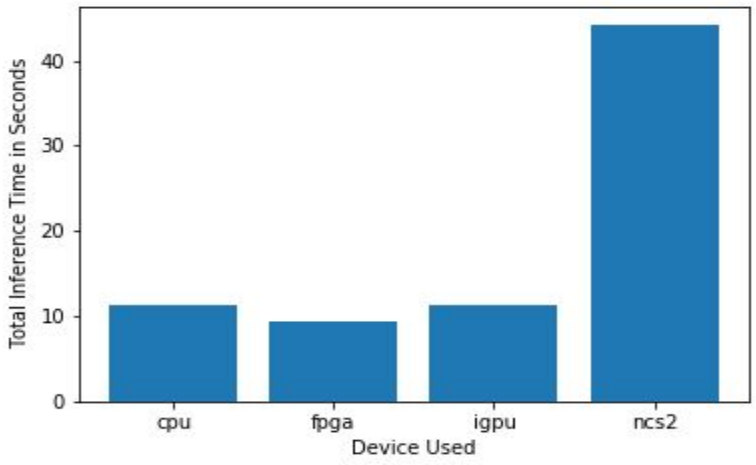
Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

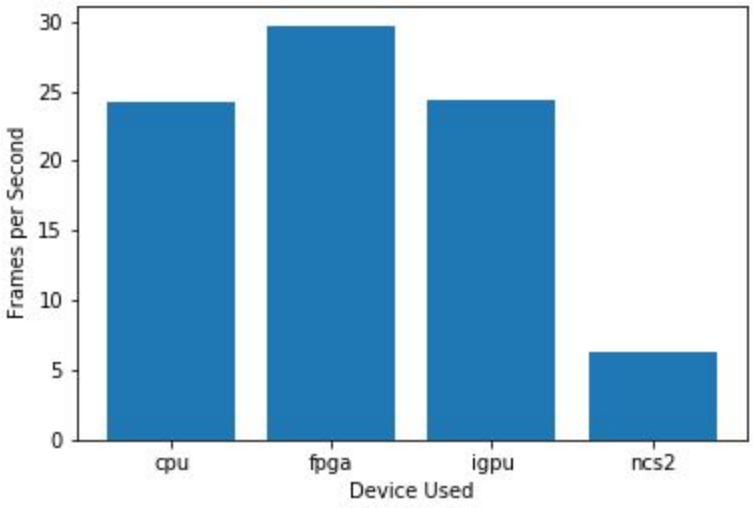
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



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
Considering the most crucial requirement like flexibility and long term solution, and given the fact the FPGA are the devices which can be reprogrammed according to the requirement and have long durability.

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 + IGPU

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Cost constraint	*As clear from the requirements, Mr. Lin can't afford a costly solution here. And also with the fact that, CPU with i7 (which has IGPU) are already installed at the counter so we can use them only.*
Energy/Power Constraint ***would like to save as much as possible on his electric bill***	*In accordance with the low energy/power constraint, pre-installed CPUs are the best possible solution here.*

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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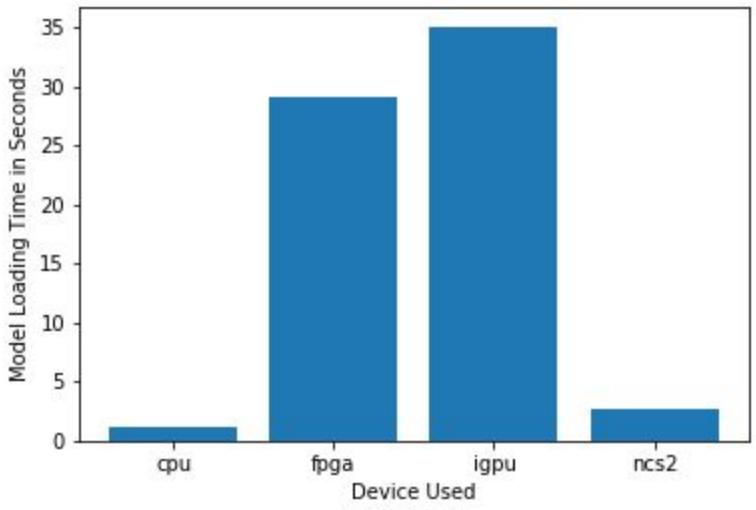
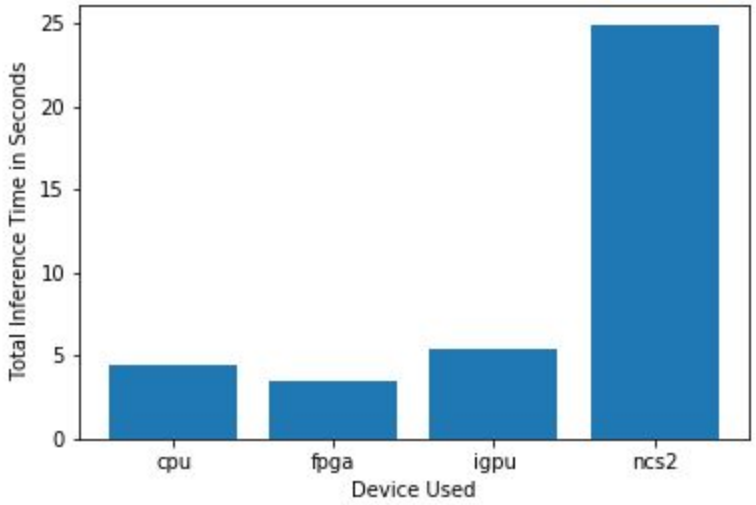
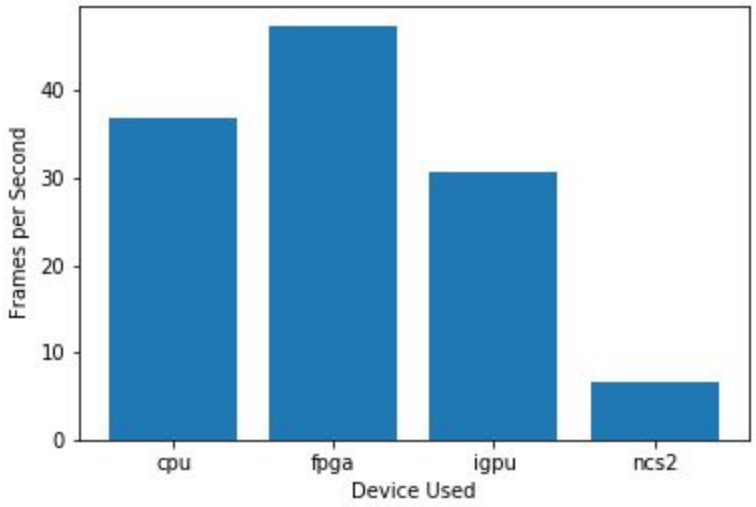


Model Load Time



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
Taking into account the constraints of power and cost, pre-installed CPUs with IGPU are the best possible solution in this scenario. As it won't need any additional hardware and also the increase in the power consumption wouldn't be too much.

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)
CPU+VPU

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Cost constraint	*Client can't invest more than 300$ on one machine which makes the VPU the ideal solution for this scenario. And as we can have NCS2 with Myriad X processor at a price under 100$.*
Power constraint **no significant additional processing power is available to run inference**	*As clear from the client's requirement that all in one PC already processing CCTV footage and significant additional power can't be supplied.*
Space requirement	*Given the fact that there is only one PC located so we don't have much space to use. So in this case, as the size of NCS2 are of size thumb drive, makes the ideal solution*
Performance	As video streams are coming from 7 CCTV cameras, we need a device which can process all of them. As Myriad X VPU is quite high performant, so we can use them easily.

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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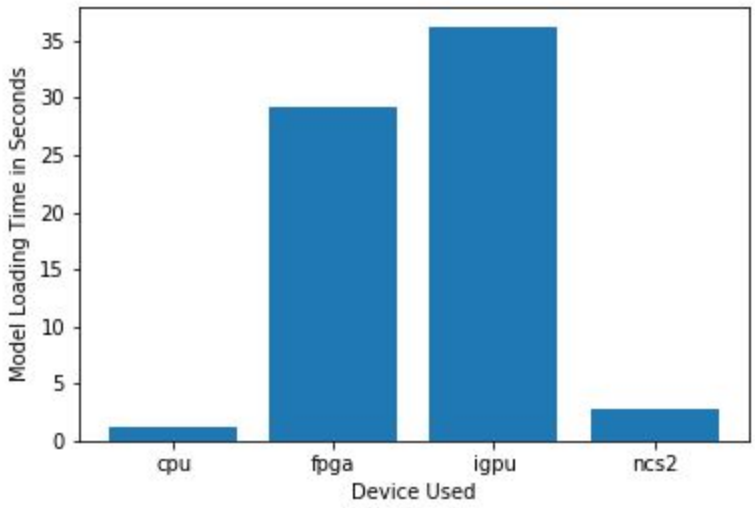
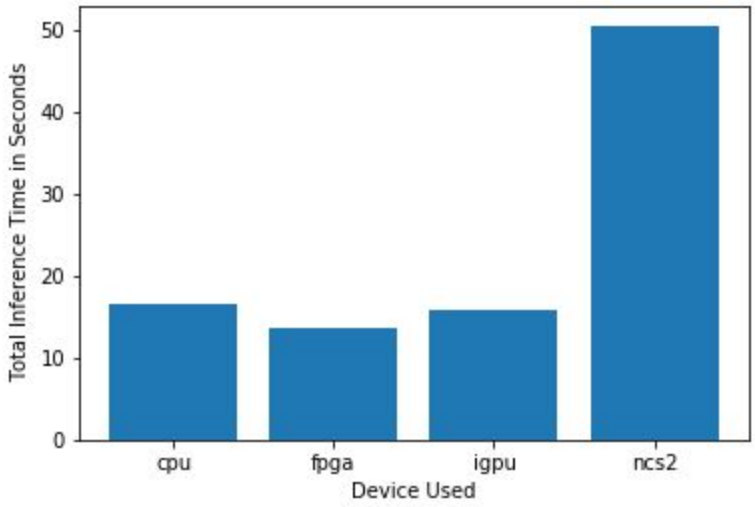
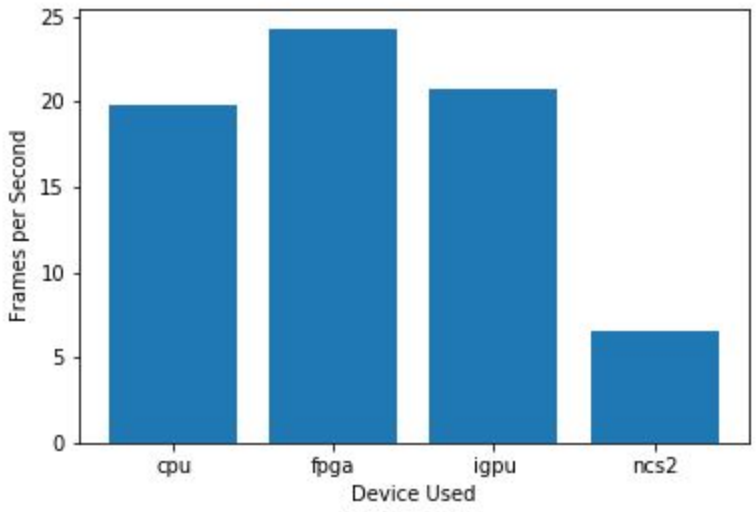


Model Load Time



Inference Time



FPS

Final Hardware Recommendation

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Write-up: Final Hardware Recommendation
In this case, after looking at the performance FPGA seems a more reasonable choice. But because of cost and space constraint we won't be able to use that.