A logo for a university

Description automatically generated

**Assignment**

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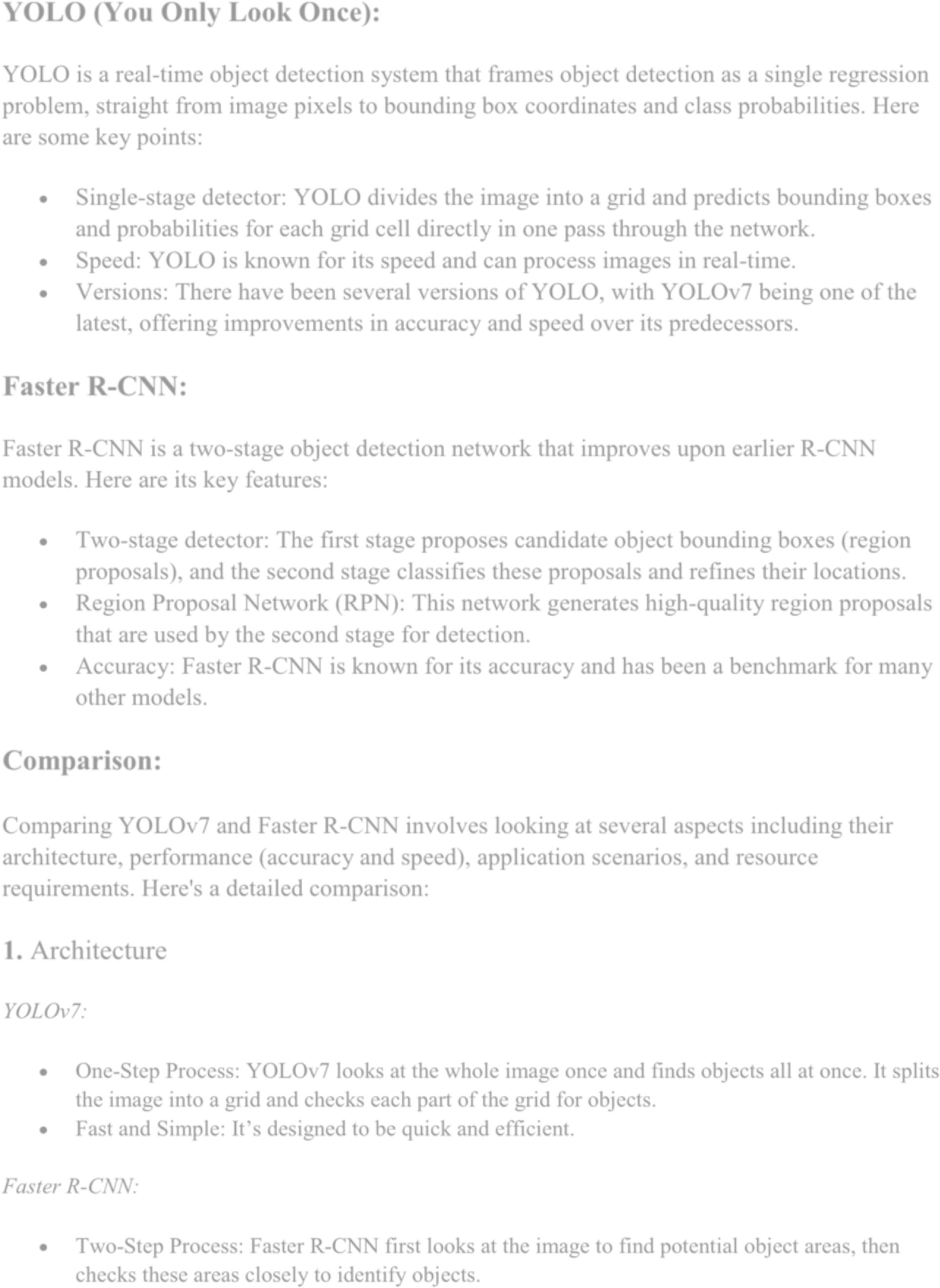
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CSC-407 Digital Image and Processing

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**YOLO (You Only Look Once):**

YOLO is a real-time object detection system that frames object detection as a single regression problem, straight from image pixels to bounding box coordinates and class probabilities. Here are some key points:

* Single-stage detector: YOLO divides the image into a grid and predicts bounding boxes and probabilities for each grid cell directly in one pass through the network.
* Speed: YOLO is known for its speed and can process images in real-time.
* Versions: There have been several versions of YOLO, with YOLOv7 being one of the latest, offering improvements in accuracy and speed over its predecessors.

**Faster R-CNN:**

Faster R-CNN is a two-stage object detection network that improves upon earlier R-CNN models. Here are its key features:

* Two-stage detector: The first stage proposes candidate object bounding boxes (region proposals), and the second stage classifies these proposals and refines their locations.
* Region Proposal Network (RPN): This network generates high-quality region proposals that are used by the second stage for detection.
* Accuracy: Faster R-CNN is known for its accuracy and has been a benchmark for many other models.

**Comparison:**

Comparing YOLOv7 and Faster R-CNN involves looking at several aspects including their architecture, performance (accuracy and speed), application scenarios, and resource requirements. Here's a detailed comparison:

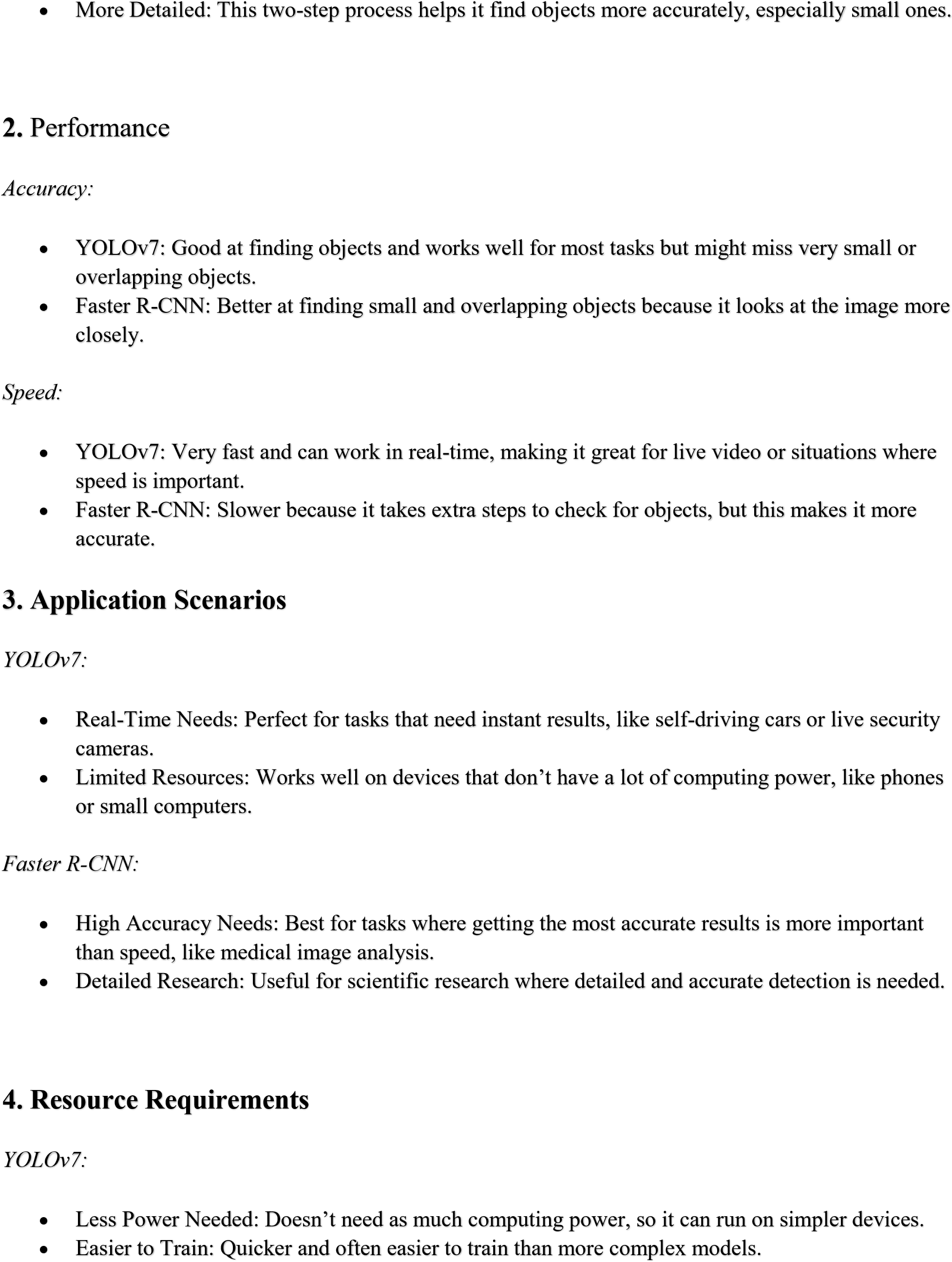
**1.** Architecture

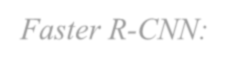
*YOLOv7:*

* One-Step Process: YOLOv7 looks at the whole image once and finds objects all at once. It splits the image into a grid and checks each part of the grid for objects.
* Fast and Simple: It’s designed to be quick and efficient.

*Faster R-CNN:*

* Two-Step Process: Faster R-CNN first looks at the image to find potential object areas, then checks these areas closely to identify objects.





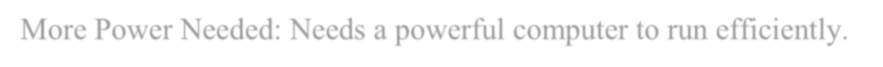
*Faster R*

*-*

*CNN:*



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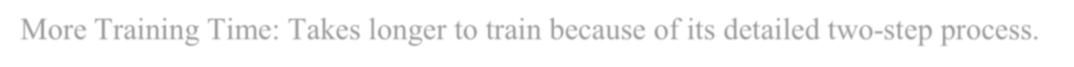
More Power Needed

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Needs a powerful computer to run efficiently.



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More Train

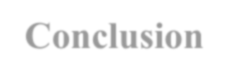
ing Time

Takes longer to train because of its detailed two

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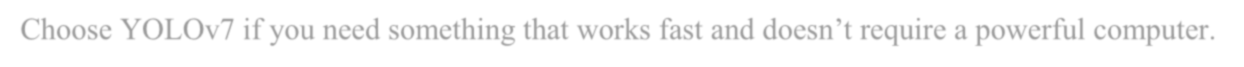
step process.



**Conclusion**

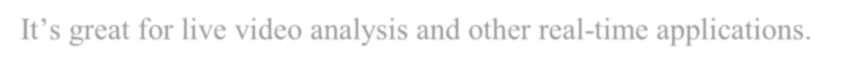


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Choose YOLOv7

if you need something that works fast and doesn’t require a powerful computer.



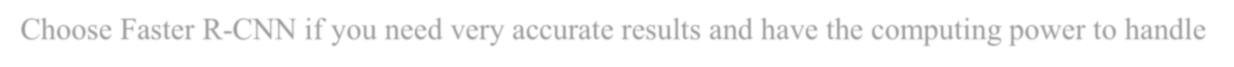
It’s great for live video analysis and other real

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time applications.



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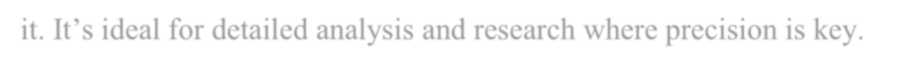


Choose Faster R

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CNN

if you need very accurate results and have the computing power to handle



it. It’s ideal for detailed analysis and research where precision is key.