**Image Detection using Faster R-CNN**

**Introduction**

Image detection is a fundamental task in computer vision, enabling machines to recognize and locate objects within images. In this project, we focus on detecting people using the Faster R-CNN model, a widely used deep learning architecture known for its accuracy and speed (Ren et al., 2015). With the rise of real-time applications such as surveillance, autonomous vehicles, and smart systems, efficient person detection has become increasingly important. This work explores a dataset of person ,car, dog images, applies modern detection techniques, and evaluates the model’s ability to identify individuals across various test cases.

**Literature Review**

Ren et al. (2015) introduced Faster R-CNN, a two-stage object detection model that combines region proposal and classification, improving both accuracy and speed. This architecture is well-suited for tasks like person detection.

Redmon and Farhadi (2018) proposed YOLOv3, a fast one-stage detector. While it offers high speed, it may sacrifice accuracy for small or overlapping objects compared to Faster R-CNN.

Zhao et al. (2019) reviewed object detection models and confirmed that two-stage models like Faster R-CNN generally provide higher precision, making them suitable for detailed detection tasks such as identifying people in complex images.

**References**

1. **He, K., Gkioxari, G., Dollár, P. and Girshick, R., 2017.** *Mask R-CNN*. Proceedings of the IEEE International Conference on Computer Vision (ICCV), pp.2961–2969.  
   <https://doi.org/10.1109/ICCV.2017.322>
2. **Ren, S., He, K., Girshick, R. and Sun, J., 2015.** *Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks*. IEEE Transactions on Pattern Analysis and Machine Intelligence, 39(6), pp.1137–1149.  
   <https://doi.org/10.1109/TPAMI.2016.2577031>
3. **Zhao, Z., Zheng, P., Xu, S. and Wu, X., 2019.** *Object Detection with Deep Learning: A Review*. IEEE Transactions on Neural Networks and Learning Systems, 30(11), pp.3212–3232.<https://doi.org/10.1109/TNNLS.2018.2876865>

**GitHub link :**