City University Of London

MSc in Artificial Intelligence

Project Report

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Ablation Study on Faster-RCNN for Hepatocellular Carcinoma Detection

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**Declaration**

By submitting this work, I declare that this work is entirely my own except those parts duly identified and referenced in my submission. It complies with any specified word limits and the requirements and regulations detailed in the assessment instructions and any other relevant programme and module documentation. In submitting this work I acknowledge that I have read and understood the regulations and code regarding academic misconduct, including that relating to plagiarism, as specified in the Programme Handbook. I also acknowledge that this work will be subject to a variety of checks for academic misconduct.

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**ABSTRACT**

Hepatocellular carcinoma (HCC) is one of the most prevalent causes of cancer incidences and deaths. Despite many years of research and the creation of new medical interventions, patients with HCC continue to have poor treatment outcomes. Patients with HCC suffer from unfulfilled concerns like risk prediction, individualised treatments, accurate prognosis and early diagnosis. In recent years, there has been a massive growth in Artificial Intelligence (AI) applications in medical research, and the field of HCC is no exception. Deep learning algorithms are among the most advanced AI-based machine learning algorithms for processing and analysing complicated multimodal data, from routine diagnostic factors to high-resolution medical images. In this research project, I present my experiment results and review for early diagnosis of HCC using deep learning techniques, specifically Computer Vision. I have done detailed experiments on the object detection model Faster Region-Based Convolutional Neural Network (Faster R-CNN) for detecting HCC. I experimented with different backbones for the Faster R-CNN model. I concluded that the backbone plays a significant role in the Faster-RCNN architecture for good accuracy results and performance. The codebase is available at: <https://github.com/Ben74x/Indiv_Proj>

**Keywords:** Hepatocellular carcinoma (HCC), Artificial intelligence, Deep learning, Computer Vision, Object Detection.