

I. INTRODUCTION

Cardiomegaly, meaning the enlargement of the heart, is a designated umbrella term for various conditions which leads to the enlargement of the heart (Amin & Siddiqui., 2022). Cardiomegaly is diagnosed when the lateral diameter of the heart spans at least 50% of the chest lateral diameter in chest radiograph or computer imaging (Amin & Siddiqui., 2022). Cardiomegaly itself is usually a symptom for an underlying disease, and there are myriads of possible causes of cardiomegaly which includes but not limited to Coronary Artery Disease (CAD) (Távora et al., 2012), sleep apnea, obesity, pulmonary disease (Baguet et al., 2012), systemic disease such as anemia, hyperthyroidism, “beriberi” (Helali et al., 2019), and even stress (Amin & Siddiqui., 2022). Cases of cardiomegaly has been reported worldwide, in diverse regions such as Europe, and USA it is estimated that 1 in 500 people will suffer from cardiomegaly (Richard et al., 2003), It is also estimated that about half of the people diagnosed with cardiomegaly die in 5 years after the initial diagnosis (Bui et al., 2011). Making cardiomegaly to be a very prevalent and highly lethal disease. In addition to that, cardiomegaly is hard to detect due to the potential subtlety and highly varied characteristic of cardiomegaly and can take a considerable manpower to detect which may prove to be even more challenging for understaffed hospitals (Bougias et al., 2020).

Artificial Intelligence (AI), specifically computer vision, has assumed an important role in the field of medical imaging and diagnostics (Harned et al., 2019). By harnessing complex algorithms, computer vision systems can analyze medical images with exceptional precision, aiding clinicians in detecting subtle anomalies and patterns (Harned et al., 2019). This technology has proven particularly valuable in interpreting radiological images, such as echocardiograms and cardiac MRIs, enabling earlier and more accurate identification of various cardiovascular disorders (Öztaş et al., 2021). As such, the integration of AI-driven computer vision has the potential to not only expedite the diagnostic process but also enhance diagnostic accuracy, thereby empowering healthcare professionals to make well-informed decisions.

Convolutional Neural Network (CNN) is a type of general architecture in AI and machine learning systems, CNN has proven itself to be suitable for complex pattern recognition in images for computer vision (Sarker, 2018). Throughout the year, various CNN architectures have been developed all with their own distinct design which also comes with their advantages and disadvantages. With each architecture having their own sub-architecture, it can prove to be difficult to determine which architecture is best suited for a specific task. This study aims to compare popular CNN architectures such as You Only Look Once (YOLO), Residual Neural Network (ResNet), and EfficientNet, together with their own respective sub-architecture to determine the best CNN architecture for detecting cardiomegaly.