Abstract— **Eye is a vital organ that contributes about 80% of the brain's knowledge and memory. Retina is essential to eye function. Characteristics of retinal blood vessels serve as indicators for diagnosing eye diseases, including glaucoma and cataract. Retinal vessel segmentation is critical for diagnosis and treatment but faces challenges such as low edge visibility, structural complexity, and varying vascular scales. Various segmentation approaches, including manual and algorithmic methods, exhibit significant limitations. Deep Learning, particularly U-Net-based architectures, has been widely utilized and has become a reliable method. One prominent U-Net-based architecture that excels at capturing the complex structure of retinal vessels is IMFF-Net. However, there remains uncertainty regarding the optimal configuration of the encoder and decoder at each level. This study proposes the implementation of Komodo Mlipir Algorithm (KMA) to optimize the type combination of encoder-decoder. KMA has successfully searched for combinations of encoder-decoder, improving the performance of IMFF-Net with an accuracy of 97.42% and an F1-score of 79.31%.**

Keywords—retinal vessel segmentation, komodo mlipir algorithm, imff-net