**Abstract**

Diabetic Retinopathy (DR) is a common complication of diabetes mellitus that causes blood leaks in the retina, which causes lesions on the retina that affect vision. If it is not detected early, it can cause blindness. They are two main stages of diabetic eye diseases named, Non-Proliferative Diabetic Retinopathy (NPDR), which is an early stage of diabetic eye disease, and in this stage, the vision will be blurry. And the second one is Proliferative Diabetic Retinopathy (PDR), which is an advanced stage of diabetic eye disease and in this stage, the vision might see a few dark floaters. However, diabetic retinopathy has isolated symptoms, if it gets worse you can notice some of the symptoms like blurry vision, seeing blank or dark areas, and fringe-like patterns.

DR early detection and treatment can significantly reduce the risk of vision loss. Haemorrhages, hard Exudates and Micro-aneurysms (HEM) that appear in the retina are the early sign of DR. The manual diagnosis process of DR retina fundus images by ophthalmologists is time, effort, and cost consuming process.

Computer-aided diagnosis results in much better accuracy and more economical. There are so many different computer-aided techniques available to detect the stage of DR based on different constraints. One method is Local Ternary Pattern (LTP) and Local Energy-based Shape Histogram (LESH) is used to detect the DR. This method uses Support Vector Machine (SVM) to classify the DR, it has very less accuracy and requires features like LTP and LESH. Another method is a quite recent one that is based on deep learning which is one of the most common techniques that has achieved better performance in many areas. Convolution Neural Network (CNN) are more widely used as a deep learning method in medical image analysis, and they are highly effective. Here we are going to study different deep learning models to detect the DR and analysing with a real-time environment.

***Keywords:*** Diabetic Retinopathy (DR), Non-Proliferative Diabetic Retinopathy (NPDR), Proliferative Diabetic Retinopathy (PDR), Deep Learning, CNN.