

PROBLEM STATEMENT:

In this study, we have demonstrated a diabetic retinopathy detection system based on deep learning. Diabetic retinopathy is a diabetes complication that affects eyes. It's caused by damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina). At first, diabetic retinopathy might cause no symptoms or only mild vision problems. But it can lead to blindness. The condition can develop in anyone who has type 1 or type 2 diabetes. The longer you have diabetes and the less controlled your blood sugar is, the more likely you are to develop this eye complication. Approximately 8 in 100 people affected by diabetic retinopathy have diabetic macula oedema. A study done over 14 years to analyse diabetic macula oedema in people with diabetes reported that the number of people with type 2 diabetes affected by diabetic macula oedema was more than double as compared to diabetic macula oedema in people with type 1 diabetes. In severe non-proliferative diabetic retinopathy, more blood vessels become affected and swell, leading to a loss of blood flow to the retina. In response to this, the retina starts to secrete chemicals for new blood vessels to grow. People with severe non-proliferative diabetic retinopathy have a 52% risk of developing proliferative diabetic retinopathy within 1 year of diagnosis. Visually impaired and blind people due to diabetic retinopathy were 2.6 million in 2015 and estimated to be 3.2 million in 2020 globally. Though the incidence of diabetic retinopathy is expected to decrease for high-income countries, detection and treatment of it in the early stages are crucial for low-income and middle-income countries. Due to the recent advancement of deep learning technologies,

researchers showed that automated screening and grading of diabetic retinopathy are efficient in saving time and workforce. However, most automatic systems utilize conventional fundus photography, despite ultra-wide-field fundus photography provides up to 82% of the retinal surface. In this study, we present a diabetic retinopathy detection system based on ultra-wide-field fundus photography and deep learning. In experiments, we show that the use of early treatment diabetic retinopathy study 7-standard field image extracted from ultra-wide-field fundus photography outperforms that of the optic disc and macula centered image in a statistical sense. This project is a part of the whole process of identifying Diabetic Retinopathy in its early stages. In this project, we'll extract basic features which can help us in identifying Diabetic Retinopathy in its early stages.