VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI

A PROJECT REPORT ON

"DEEP LEARNING APPROACH FOR PREDICTION OF DIABETIC RETINOPATHY"

Submitted in partial fulfillment for the award of Degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE & ENGINEERING

By

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CERTIFICATE

This is to certify that the project entitled **"DEEP LEARNING APPROACH FOR PREDICTION OF DIABETIC RETINOPATHY"** has been successfully completed by

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The bonafide students of **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–24. It is certified that all corrections/suggestions indicated for Internal Assessmenthave been incorporated in the report deposited in the departmental library. The project reporthas been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

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ABSTRACT

Diabetic retinopathy is one of the most threatening complications of diabetes that leads to permanent blindness if left untreated. Diabetic retinopathy is an eye condition that can cause vision loss and blindness in people who have diabetes. It affects blood vessels in the retina (the light-sensitive layer of tissue in the back of your eye). If you have diabetes, it's important to get a comprehensive dilated eye exam at least once a year. Diabetic retinopathy may not have any symptoms at first — but finding it early can help you take steps to protect your vision. One of the essential challenges is early detection, which is very important for treatment success. Unfortunately, the exact identification of the diabetic retinopathy stage is notoriously tricky and requires expert human interpretation of fundus images. Simplification of the detection step is crucial and can help millions of people. However, the high cost of big labeled datasets, as well as inconsistency between different doctors, impede the performance of these methods. Convolutional neural networks (CNN) have been successfully applied in many adjacent subjects, and for diagnosis of diabetic retinopathy itself. In this thesis, we propose a deep-learning-based method for automatic stage detection of diabetic retinopathy by single photography of the human fundus. Additionally, we propose the multistage approach to transfer learning, which makes use of similar datasets with different labeling. The presented method can be used as a screening method for early detection of diabetic retinopathy