

Image Dehazing using Convolutional Neural Networks (CNN)

A PROJECT REPORT

Submitted by,

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Under the guidance of,

Dr.Taranath N.L

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

At



PRESIDENCY UNIVERSITY

BENGALURU


MAY 2025

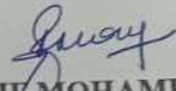
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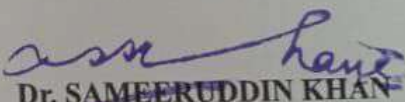
CERTIFICATE

This is to certify that the Project report "Image Dehazing using Convolutional Neural Networks (CNN)" being submitted by
"ROHAN G, ANJAN K S, JAYANTH D ,
S KUSHAL" bearing roll number(s) "20211CSE0233, 20211CSE0219,
20211CSE0246, 20211CSE0336" in partial fulfillment of the requirement for
the award of the degree of Bachelor of Technology in Computer Science and
Engineering is a bonafide work carried out under my supervision.


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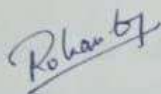
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DECLARATION

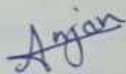
We hereby declare that the work, which is being presented in the project report entitled **Image Dehazing using Convolutional Neural Networks (CNN)** in partial fulfillment for the award of Degree of **Bachelor of Technology in Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Dr.Taranath N.L, Associate Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.



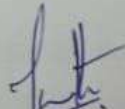
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ABSTRACT

Unclear visuals resulting from environmental factors like fog, smoke, and pollution greatly impact the clarity and effectiveness of visual data in various practical uses. These circumstances result in diminished visibility and color distortion, consequently impairing the effectiveness of computer vision systems utilized in fields such as autonomous driving, surveillance, and outdoor photography.

Image dehazing proves to be a crucial initial step that effectively enhances images and recovers missing details as well. This project demonstrates a method for employing deep learning, particularly Convolutional Neural Networks (abbreviated as CNNs), to restore clarity to hazy images. While conventional techniques often rely on fixed patterns or assumptions regarding the variations of fog or haze, CNNs excel at directly learning various details from the available data. They independently find that information without anyone instructing them on what to search for.

In this project, we implemented a model that learns from pairs of images that appear smoky, hazy and sharply clear. It employs numerous layers of convolutions and transpose convolutions, along with various ReLU activation functions, to convert blurred input images into sharp, clear visuals. We've created a fantastic interface that is very simple to navigate with Gradio. We are transforming this system into an engaging platform that many can enjoy and interact with.

Users can submit unclear images directly into the application, and the model functions rapidly to produce a picture that is free of any blur. Collaborating effortlessly, the integration of CNN models with Gradio user interfaces provides an exceptionally smooth final experience. Experimental findings show that the system successfully enhances the visual quality of hazy images.

The model retains the essential attributes, reflects the natural hues, and significantly enhances the contrast. And it operates incredibly quickly as well, which truly excels for live applications.

ACKNOWLEDGEMENT

First of all, we indebted to the **GOD ALMIGHTY** for giving me an opportunity to excel in our efforts to complete this project on time.

We express our sincere thanks to our respected dean **Dr. Md. Sameeruddin Khan**, Pro-VC, School of Engineering and Dean, School of Computer Science Engineering & Information Science, Presidency University for getting us permission to undergo the project.

We express our heartfelt gratitude to our beloved Associate Dean **Dr. Mydhili Nair**, School of Computer Science Engineering & Information Science, Presidency University, and **Dr. Asif Mohamed H B**, Head of the Department, School of Computer Science Engineering & Information Science, Presidency University, for rendering timely help in completing this project successfully.

We are greatly indebted to our guide **Dr. Taranath N.L, Associate Professor** School of Computer Science Engineering & Information Science, Presidency University for his inspirational guidance, and valuable suggestions and for providing us a chance to express our technical capabilities in every respect for the completion of the project work.

We would like to convey our gratitude and heartfelt thanks to the CSE7301 Capstone Project Coordinators **Dr. Sampath A K** and **Mr. Md Zia Ur Rahman**, department Project Coordinators **Mr.Jerrin Joe Francis** and Git hub coordinator **Mr. Muthuraj**. We thank our family and friends for the strong support and inspiration they have provided us in bringing out this project.

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