VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI

A PROJECT REPORT ON

"DIFFUSE REFLECTION IMAGING"

Submitted in partial fulfillment for the award of Degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE & ENGINEERING

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CERTIFICATE

This is to certify that the project entitled **"DIFFUSE REFLECTION IMAGING"** 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 Assessment have been incorporated in the report deposited in the departmental library. The project report has 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

Diffuse reflection imaging is a technique used to capture images by measuring the light scattered from a surface, enabling visualization of objects in various lighting conditions. It relies on the scattering of light in multiple directions upon hitting a surface, as opposed to specular reflection where light is reflected at a specific angle Diffuse reflection imaging offers valuable insights into surface properties and has diverse applications across multiple fields. Continued research and technological advancements are crucial for its further development and widespread adoption. Diffuse reflection is the reflection of light from a surface such that an incident ray is reflected at many angles, rather than at just one angle as in the case of specular reflection. An illuminated ideal diffuse reflecting surface will have equal luminance from all directions in the hemisphere surrounding the surface, i.e. Lambertian reflectance. A surface built from a non-absorbing powder such as plaster, or from fibres such as paper, or from a polycrystalline material such as white marble, reflects light diffusely with great efficiency. Many common materials exhibit a mixture of specular and diffuse reflection. When a beam of light falls at a particular angle onto a very smooth opaque surface, almost the whole light will be reflected from the interface along a narrow set of directions. The surface would be judged as very glossy. At certain viewing angles on the surface, an observer can view the reflected images of the surroundings. The interface of a very rough surface will tend to reflect light at many different angles, because the light meets the surface at many different angles. The reflected light is so diffused that the observer cannot view images of the surroundings.