

Quantum Bricks: Exploring Particles with Unity ML and AR

Project-II (IT07PPC21) report submitted to

Guru Ghasidas Vishwavidyalaya

in partial fulfilment for the award of the degree of

Bachelor of Technology

in

Information Technology

by

Saumy Sharma

(21036146./GGV/21/01446.)

Under the supervision of

Dr. Manoj Kumar



Department of Information Technology Guru

Ghasidas Vishwavidyalaya October, 2023

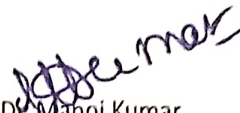
April 4, 2025

DEPARTMENT OF INFORMATION TECHNOLOGY GURU GHASIDAS
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CERTIFICATE

This is to certify that the project report entitled "Quantum Bricks" submitted by Saumy Sharma (21036146./GGV/21/01446..) to Guru Ghasidas Vishwavidyalaya towards partial fulfilment of requirements for the award of degree of Bachelor of Technology in Information Technology is a record of bonafide work carried out by him under my supervision and guidance during April, 2025.


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Date: April 3, 2025
Place: Bilaspur

Abstract

Name of the student: Saumy Sharma Roll No: 21036146./GGV/21/01446.

Degree for which submitted: Bachelor of Technology

Department: Department of Information Technology Thesis title:
Quantum Bricks

Thesis supervisor: Dr. Manoj Kumar

Month and year of thesis submission: April 3, 2025

Quantum Bricks:

"Quantum Bricks" is an innovative Augmented Reality (AR) application designed to democratize quantum education by visualizing complex quantum phenomena through interactive manipulation of LEGO bricks. Utilizing real-time image classification, powered by a custom-trained Convolutional Neural Network (CNN) and TensorFlow.js, the application identifies LEGO brick colors captured by a mobile device's camera. Subsequently, employing Unity and AR Foundation, the system overlays virtual AR rays connecting these bricks, visually representing quantum correlations and entanglement. This project aims to bridge the gap between abstract quantum concepts and tangible, interactive learning experiences. By integrating machine learning and AR, "Quantum Bricks" provides an intuitive and engaging platform for exploring quantum mechanics, fostering experiential learning and promoting global accessibility to quantum education. This project demonstrates a proof-of-concept for AR-based educational tools that can simplify complex scientific concepts, potentially revolutionizing STEM education. The research addresses the challenges of integrating closed-source AR SDKs and deploying machine learning models in AR environments, highlighting the need for further exploration into open-source solutions and streamlined development workflows.