Final Year PROJECT PRESENTATION

COMPUTER ENGINEERING DEPARTMENT

SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY

3D Mapping of Building for Inspection

IN COLLABORATION WITH

RoadGauge

Unlocking Constructional Insights

Streamlined, Comprehensive, Collaborative

3D Mapping of Building for Inspection.

Revolutionizing the Construction Industry

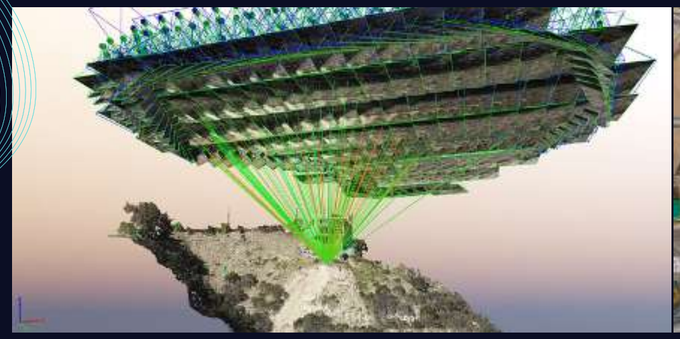
- 3D Reconstruction for Buildings leads the 3D mapping industry, specializing in construction and building inspection sectors.
- Renowned for pioneering, cost-effective solutions, the project transforms traditional building evaluations with state-of-the-art technology.
- Its innovative approach not only enhances accuracy but also significantly reduces time and costs associated with inspections.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

Problem Identification

Labor-intensive	Manual inspections require significant time and effort, leading to higher costs.
Error-prone	Human error can lead to missed problems and inaccurate assessments.
Disruptive	Traditional methods often require shutting down areas for inspection, disrupting building operations.
Limited data capture	Traditional methods lack the ability to capture comprehensive data about a building's condition.



SOLUTION

- The solution addresses inefficiencies in traditional building inspections by automating processes and integrating advanced technologies like synchronized video recording and extraction of frames for data collections with less time .
- It helps in scale estimation , reduces costs, and minimizes disruptions to building operations. Through comprehensive data capture and analysis, it enables informed decision-making in built environment while driving technological innovation.

ORIGINALITY & CREATIVITY

- Integration of advanced technologies ensures precise scale consistency and data accuracy.
- Reduced processing time compared to competitors, enhancing efficiency.
- Further accurate scale estimation capabilities set us apart from existing solutions.
- Overall, our solution offers a significant competitive advantage in terms of efficiency, accuracy, and innovation in the building assessment market.

OUR SYSTEM

V/S

COMPETITORS

FARO

HEXAGON
MANUFACTURING INTELLIGENCE

Trimble

PROJECT VALUE PROPOSITION

Advanced 3D Mapping

Utilizing cutting-edge reconstruction technology to generate highly detailed 3D models of building interiors.

Precise Scale Factor Calculations

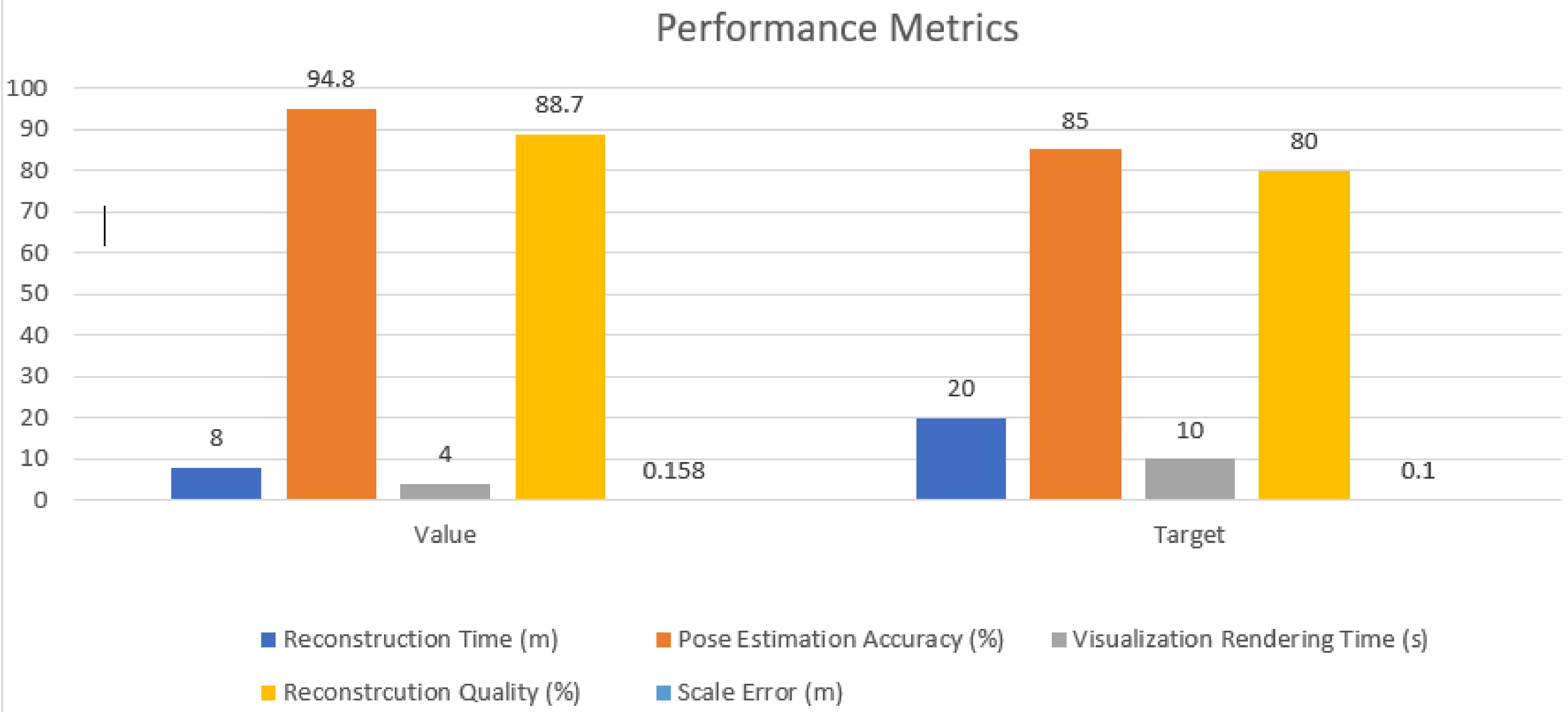
Incorporating precise scale factor calculations into the 3D models for accurate measurements and assessments.

Cost-Effectiveness

Providing a cost-effective solution compared to traditional methods, making it accessible to a wider range of users.

User-Friendly Interface

User-Friendly Interface: Designing an intuitive interface for users to navigate and utilize the platform efficiently.



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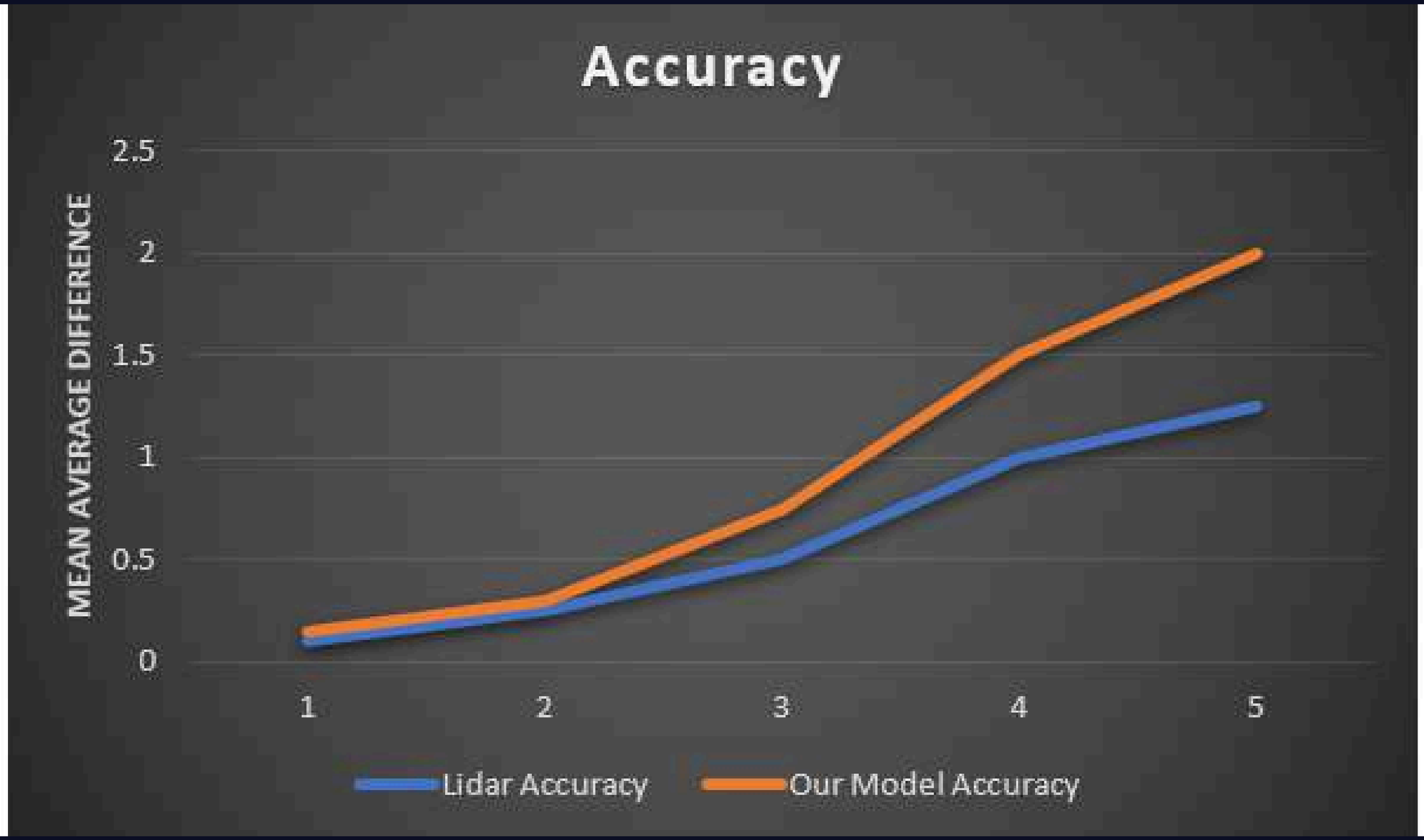
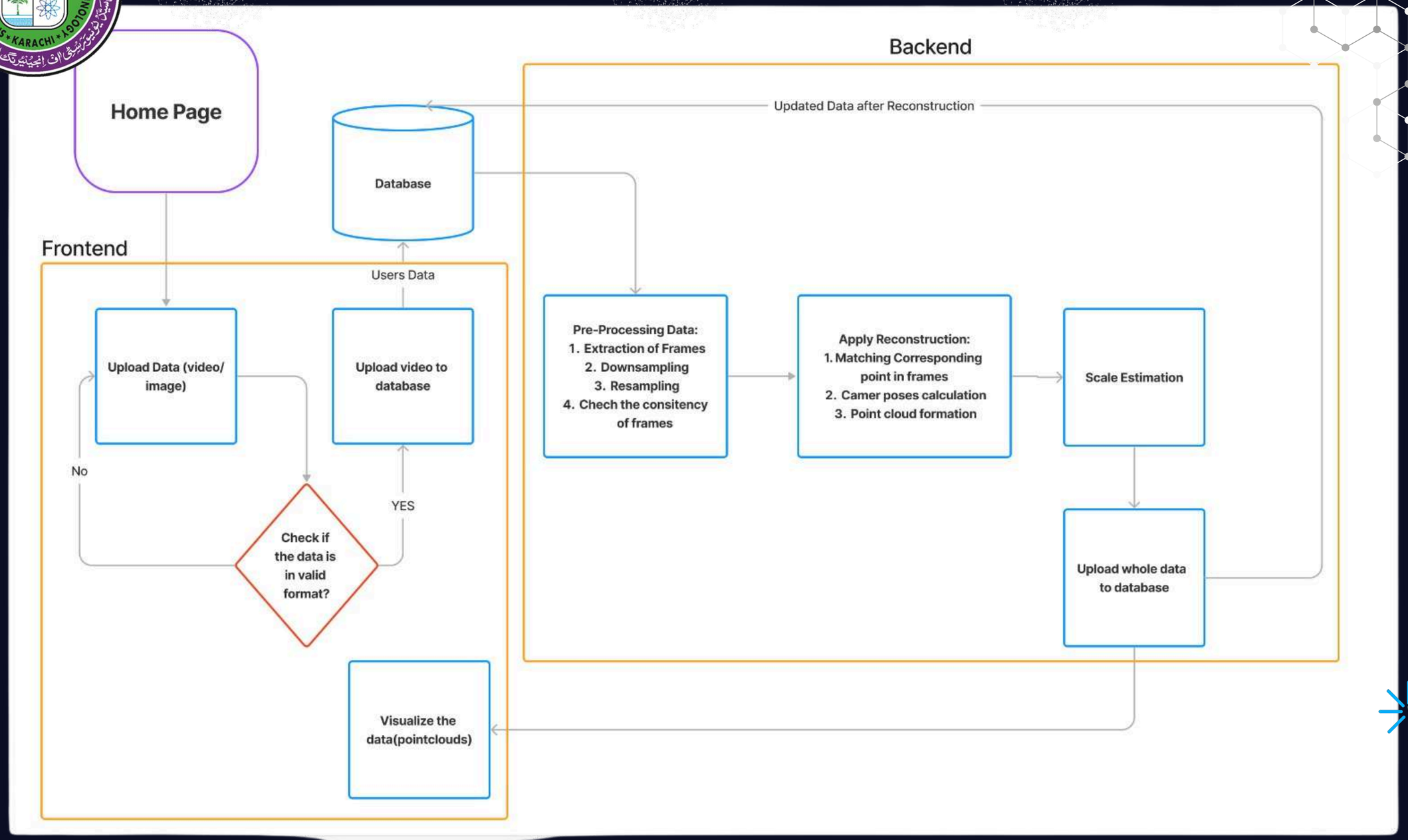

Accuracy
MEAN AVERAGE DIFFERENCE
2.5
2
1.5
1
0.5
0
1
2
3
4
5
Lidar Accuracy
Our Model Accuracy

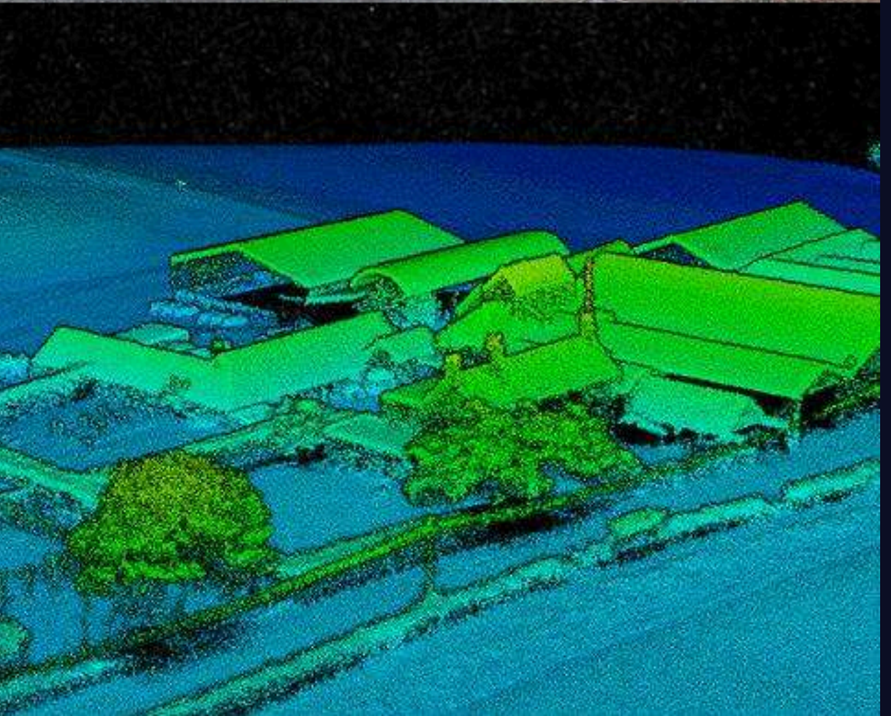
Project Plan

Quiz Bee Schedule

November	December	January	February	March
Make the flow of the project for better understanding	Understanding the concetps of sfm and looked for implemented approches	Research on Implementation for 3d reconstruction & compare the better one.	Frontend for uploading dataset	Research for showing pointcloud as output on frontend.
				Database creation and linking
				Visualisation & Implementation

System Functional Diagram





VIDEO LINK FOR DESCRPTION

point cloud is simplest form of a 3D model.

HARDWARE AND SOFTWARE COMPONENTS

SOFTWARE COMPONENTS

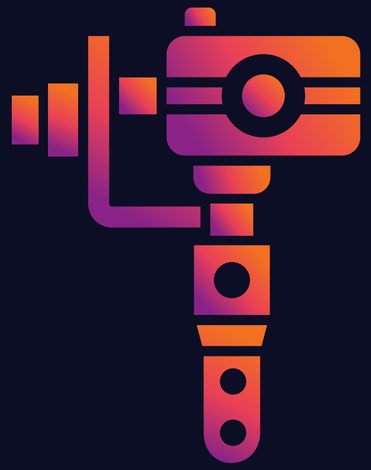
We have used Python as our backend language as it is very easy and provides least cost in terms of execution as compared to other programming languages.

we have used Firebase because it provides combination of real-time database capabilities, security features, scalability, seamless integration

We have used OpenCV . It offers a robust framework for video processing, image manipulation, and IMU data visualization, crucial for the project's efficiency .

We have used visual studio code to create our frontend and have used html/CSS, bootstrap and Java script as our frontend languages.

HARDWARE COMPONENTS



The use of a gimbal in the project enhances video stability, improves data synchronization, streamlines the data capture process, and ultimately contributes to the generation of high-quality 3D models for building evaluation and inspection.

Project Design Progress

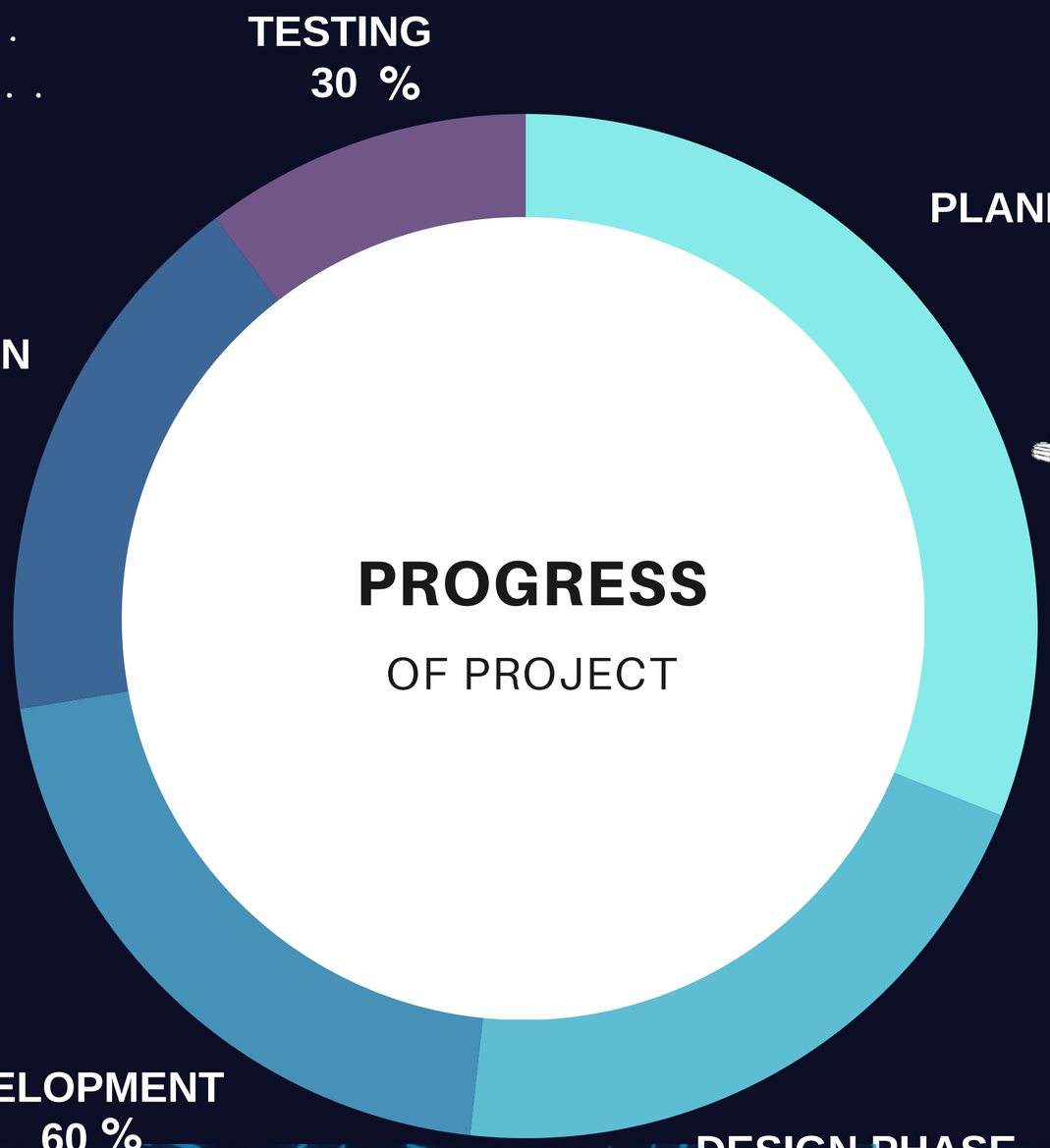
PLANNING PHASE
- Literature review & descriptive research.

DESIGN PHASE
- Study about frontend & backend designing.

DEVELOPMENT PHASE
- Worked on frontend designing & completed firebase setup.

EXECUTION
- Complete execution of frontend.

TESTING
- Modifications and testing



WORK DIVISIONING

AHMD BASEER

PROGRAMMER,
BACKEND DEVELOPER,
CALCULATIONS

TALHA HUSSAIN KHAN

BACKEND DEVELOPER,
SCALE ESTIMATIMATION,
RESEARCH

ARISHA FATEH

FRONT END DEVELOPER,
DATABASE DESIGNER,
DOCUMENTATION

ARBAZ MOIN

FRONT END DEVELOPER,
DOCUMENTATION ,
POINTCLOUD VISUALS

EXPECTED COSTING

ITEM NAME	TOTAL IN (Rs)
Gimbal + Components	*11000*
Reports	*5000*
Panaflex	*2000*
Brochures	*500*
Standee	*1500*
Poster	*1500*
Total in(Rs)	***23500***

MARKET RESEARCH

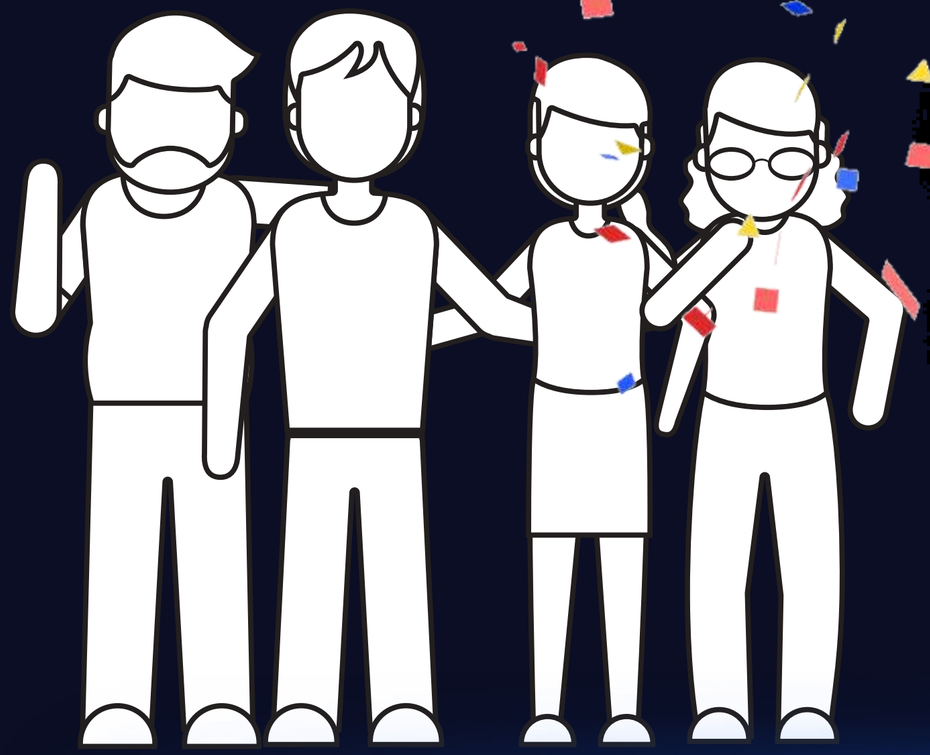
- Identified customer needs and market trends.
- Analyzed competitors and market landscape.
- Conducted primary and secondary research.
- Leveraged insights for project development.
- Aligned project with market demands and opportunities..

Limitations of Project

- COMPLEX TECHNOLOGY: COMPLEXITY MIGHT HINDER ACCESSIBILITY.
- SLOW MARKET ADOPTION: NEWNESS OF THE PRODUCT COULD SLOW ADOPTION.
- REGULATORY COMPLIANCE: MEETING REGULATORY REQUIREMENTS IS CRUCIAL.
- INSTALLATION AND OPERATION MAY LIMITDUE TO INTERNET CONNECTIVTY.
- RUN TIME CHALLENGES ARE FACES IN PRESICE SCALE CALCULATIONS
- DATA QUALITY

CONCLUSION

In conclusion, our solution represents a cutting-edge approach to building assessments, offering unparalleled efficiency, accuracy, and actionable insights. Through intelligent automation, predictive analytics, and seamless integration, it empowers stakeholders to streamline operations, optimize resources, and make informed decisions. With its unique features and competitive edge, our solution stands poised to revolutionize the industry, setting a new standard for excellence.



THANK YOU