



FINAL YEAR PROJECT REPORT

AUGMENTED REALITY BASED ASSEMBLY GUIDE

**In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)**

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DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

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AUGMENTED REALITY BASED ASSEMBLY GUIDE

ABSTRACT

The goal of this project is to create an augmented reality (AR) application that offers a smooth solution for interior design and assembly assistance. This report highlights the initial phase of the project, focusing on the interior design component, where users can interactively position 3D furniture models within their actual surroundings. Utilizing Unity as the development platform, the project takes advantage of its XR framework along with AR Core and AR Kit APIs to ensure it works seamlessly on both Android and iOS devices. To enable real-time furniture placement, we make use of AR's plane detection features to estimate room sizes and identify flat surfaces such as floors and tables. By projecting a spatial mesh, the application can recognize horizontal planes and adjust the scale of 3D objects, accordingly, ensuring they appear proportionate and aligned. The system offers visual cues to help users preview placements, thereby improving accuracy and enhancing the overall user experience.

For creation of the catalog of 3D models a user can view, we will be making a custom algorithm that can use depth estimation and mesh reconstruction techniques to accurately generate a 3D model of an object from a single picture of the object.

The NoSQL database, powered by Firebase Firestore, supports the efficient storage and retrieval of furniture models and user preferences. By merging real-time spatial mapping with advanced AR features—such as on-the-fly conversion of 2D images into fully manipulable 3D assets—the application turns interior design into an engaging and immersive experience. Future phases will look to add AR-based assembly guidance, broadening the application's functionality for practical use by end users.

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