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**Data Visualisation of Architectonic Plats using Reflective
Panoramic Holography with Gesture Recognition**

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ABSTRACT

Three-Dimensional Modelling is one of the most sophisticated, yet efficient designing technique in modern *Interior Architecture*, consequently categorized into two sub-procedures, *modelling* and *visualizing*. A large number of modelling tools available are complex, resource-hungry and time-consuming, imposing a limitation in effectiveness. Despite modelling complexities, the visualisation process of these tools might also impose a limitation in interactivity. Therefore, numerous researchers are engaged in discovering distinctive tools, to address these limitations. Previous work respective to this domain suggests several incorporated software solutions that address the limitations of modelling complexities, but not reliably effective in interactivity. Similarly, there are numerous studies conducted on intensifying the visual interactivity of three-dimensional models, which are not domain specific. Towards addressing these limitations, an *Internet of Things (IoT)* based system was proposed, which caters the ability of three-dimensional visualisation on architectonic plats using panoramic reflective holography. *Holo-Design Arch* system comprises of three major components, *three-dimensional modelling*, *holography visualizing* and *gesture control*. Initially, the application caters the functionality of designing two-dimensional interior spaces based on *JavaScript Canvas*, where the data of the floor map will be stored and used automatically to render the three-dimensional space. Secondly, the application caters a holographic-based structure visualisation functionality converting the rendered scene into a *three-dimensional hologram*, which is demonstrated through the reflective *holography* pyramid. Additionally, the system provides the capability of gesture recognition and holographic scene manipulations based on the gesture command. The application was implemented as a desktop-based solution following the IoT three-tier architecture. The *Holo-Design Arch* application was implemented on top of the *electron framework* and *NodeJS*, which uses *WebGL* and *three.js* for three-dimensional modelling. Gesture recognition was implemented using IoT-based *Flick-Board* uses *Raspberry-pi* to communicate with application using HTTP requests. The testing and evaluation carried out attest the system to be an efficient solution.

KEYWORDS

Internet of Things, Three-Dimensional Modelling, Gesture Control, Reflective Holography