

Chemar with 3D Animation

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Abstract: *Augmented Reality (AR) is redefining the way chemistry concepts are taught and understood by enabling the visualization of complex structures and reactions in an interactive environment. This paper presents a web-based AR system for chemistry education developed using HTML, CSS, and JavaScript for the user interface and front-end rendering, with Python Flask (app.py) as the backend framework. The system supports real-time visualization of 3D molecular models, laboratory apparatus, and reaction simulations through standard web browsers, eliminating the need for external applications. The frontend handles animations and user interactions, while Flask manages routing, asset delivery, and client-server communication. The proposed approach demonstrates that lightweight web technologies can effectively deliver immersive AR experiences that enhance conceptual clarity, engagement, and accessibility. The solution is well-suited for applications such as virtual laboratories, classroom demonstrations, and self-directed learning modules.*

Keywords: Augmented Reality, Chemistry Education, Flask, Web Technologies, 3D Visualization, HTML, CSS, JavaScript, Python

