ABSTRACT

The learning system is changing substantially in the modern Industrial age, and students are becoming more progressive. This work argues that students must be well-prepared for the future by having a learning platform that complements the learner. So, to engage the students in learning, educational platforms must consider their interests. Augmented Reality (AR) aims to integrate digital items into the real world and make user-object interactions seamless. To achieve genuine advance in computer vision, realistic integration must be handled, and archetypical 3D and lighting circumstances must be identified.

The research's initial phase recommends a technical education learning factory to educate professionals and expose them to online training settings. This new teaching method uses micro lessons in AR linked to a learning factory app. To ensure the platform's efficacy, survey features and results were established, indicating the link between the student and the tech perspectives. When the new micro lessons were evaluated, compliance was taken. A sample-paired t-test showed that the AR-based didactic system was successful, with significant levels of 1% and 5%. This work shows how AR may improve technical education by increasing student engagement and performance.

Phase 2 research uses deep learning to test its efficacy in overcoming the archetypical 3D and lighting circumstances problems. The networks must be provided with the object's estimated posture in the preceding timestep of the sequence at most, except the presently active frame. It also helps the network reflect the inaccuracy that may occur during closed-loop tracking, improving accuracy. The suggested approach generates synthetic frames of the monitored object based on its present posture. This decision-making approach needs a 3D representation of the item and instructions for the tracking device. The proposed method of using deep machine learning for dynamic six-degrees of freedom object tracking aims to use advanced tracking technology not used in previous methods. The outcomes rely on large dataset training of deep convolution neural network models that leverage the latest advances in AR tracking technologies.

Phase 3 research addresses these issues and creates a new method for object detection and digital data representation in AR. In the recent decade, visual SLAM has gained traction in VR, AR, and self-driving cars. Feature-based visual SLAM has issues

with translation and light sensitivity but is useful. Today's AR systems depend on markers to position virtual objects, limiting the marker area and reducing low latency and high precision on mobile devices with limited processing capacity. A solution around these restrictions is the application of the suggested study in using the CLAHE approach for image pre-processing, which enhances picture contrast and results in more feature information being retrieved. The study provides the client-server partitioning technique to facilitate multi-user SLAM with low latency for numerous users at the same time. Thus, the method allows for precise object characterization and localization based on the relationship between regions with a point cloud in real-time AR applications. This geometric, feature-based visual SLAM algorithm claims to have low drift and excellent precision, making AR systems more flexible.