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Air Canvas Using MediaPipe for Computer Vision in Unity 3D Hand Tracking

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Abstract: *In this paper, we present the implementation of an Air Canvas using MediaPipe for Computer Vision within a 3D environment using the Unity Game Engine. In our previous work, we found that, regardless of the initial parameters, simulations often led to rapid extinctions. In this model, we implemented an Air Canvas and Computer Vision system integrated with Unity's 3D World. Our goal was to achieve system stabilization, long-term operation, and more realistic simulation by incorporating 3D evolution. Using the Unity Game Engine, we created and managed a closed 3D ecosystem environment, either based on artificial or real-world maps. This simulation of ecosystems and the analysis of the data generated can serve as a starting point for further research, particularly in sustainability. Our system is openly accessible, allowing users to customize and upload their parameters, maps, and objects, and define inheritance and behavioural patterns, enabling them to test their hypotheses based on the data generated. The goal of this article is not to create and validate a model but to provide an IT tool. For evolutionary researchers, the system allows the creation and presentation of simulations, including animated conference presentations for enhanced visualization and engagement. The use of 3D simulation is particularly valuable for educational purposes, engaging students and increasing their interest in 3D interactive worlds. Students can observe how ecosystems behave, how natural selection supports adaptability, and how competition impacts species.*

Keywords: Air Canvas, Computer Vision, Unity, 3D Simulation, Ecosystem

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