IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, June 2025
Impact Factor: 7.67

Air-Writing Recognition using Deep Learning and Artificial Intelligence

Mohsin Arab, Aman Sande, Sushil Deelip Sonawane, Vikas Mahadev Morabagi, Dr. Vilas Joshi
Department of Computer Engineering
ISBM College of Engineering Nande, Pune, India
mohsinarab063@gmail.com , aamansande6@gmail.com,
sushilsonawane2002@gmail.com,vikasmorabagi24680@gmail.com

Abstract: *This research introduces a real-time air-writing recognition system that allows users to write letters and numbers in the air using intuitive hand gestures captured via a webcam. By fusing computer vision with deep learning techniques, the system bypasses the need for physical contact or writing surfaces, providing a hygienic and accessible solution ideal for interactive learning, accessibility tools, and creative expression. MediaPipe is utilized for efficient hand landmark detection, while OpenCV and PyGame support a dynamic virtual drawing interface. Deep learning models—based on Convolutional Neural Networks (CNNs)—classify air-drawn alphabets and digits with high accuracy using EMNIST and MNIST datasets. A lightweight Flask-based web interface ensures easy deployment across platforms. Our implementation maintains real-time responsiveness, averaging under 100 ms prediction latency while operating smoothly at 30 FPS. Experimental results validate the feasibility and reliability of air-writing recognition in constrained environments, positioning this system as a promising tool for natural human-computer interaction.*

Keywords: *air-writing recognition system*

DOI: 10.48175/IJARSCT-27443