

# Air Handwriting by Using CNN Model

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**Abstract:** *Gesture recognition has been a popular research field under the trend of IoT and intelligent devices. Air-writing is the most challenging and crucial topic in the gesture recognition field. In this paper, we propose a wearable airwriting system that makes users can write the English alphabet in the three-dimensional space without any write rules. The proposed system is based on the Inertial Measurement Unit (IMU), and it uses dynamic time warping (DTW) as the main recognition algorithm. In addition, to improve the recognition accuracy and take a better advantage of the DTW algorithm, we present an adjustment system that gives some new optimization methods to the application of IMU and DTW. In the experiment, the accuracy of recognition is 84.6% for the uppercase alphabet (from „A“ to „Z“) in user-dependent case. And we also confirmed that the recognition method only based on the DTW algorithm is one kind of user-dependent methods, which means this method is heavily dependent on personalization.*

**Keywords:** AI (Artificial Intelligence), Air-writing, Inertial Measurement Unit, Dynamic Time Warping, Gesture Recognition.