DHGNet: Devatha Hastha Gesture Network with Advanced Graph Enhancement for Gesture Identification and Recognition

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Abstract

This study aims to develop an AI-powered system to classify and interpret Devatha Hasthas in Indian classical dance. By combining cultural preservation with modern technology, the system enhances accessibility and supports effective learning and documentation of intricate hand gestures, contributing to the promotion and understanding of this traditional art form.The study utilized a dataset of 16 Devatha Hasthas, MediaPipe hand tracking for segmentation, and feature extraction combining Hu moments and VGG19. Dimensionality reduction was performed using an Ensemble learning method called ExtraTree classifier, followed by gesture classification through a Dense Neural Network. A Neo4j graph database was used for structured visualization and interaction.The AI system achieved an impressive classification accuracy of 96%, highlighting its effectiveness in accurately identifying Devatha Hasthas. Additionally, the integration of the Neo4j graph database provided insightful interpretations of gesture relationships, demonstrating the potential of graph-based modeling to enhance the analysis of gesture interactions and cultural dynamics in Indian classical dance.This study holds significant value for fields such as gesture recognition, artificial intelligence, cultural heritage preservation, dance education, and digital humanities.

Keywords

Devatha hasthas classification; Gesture Identification; Deep Neural Network, Neo4j; MediaPipe Segmentation.