

Chapter 11

A Review on Vision-Based Hand Gesture Recognition and Applications

Ananya Choudhury
Gauhati University, India

Anjan Kumar Talukdar
Gauhati University, India

Kandarpa Kumar Sarma
Gauhati University, India

ABSTRACT

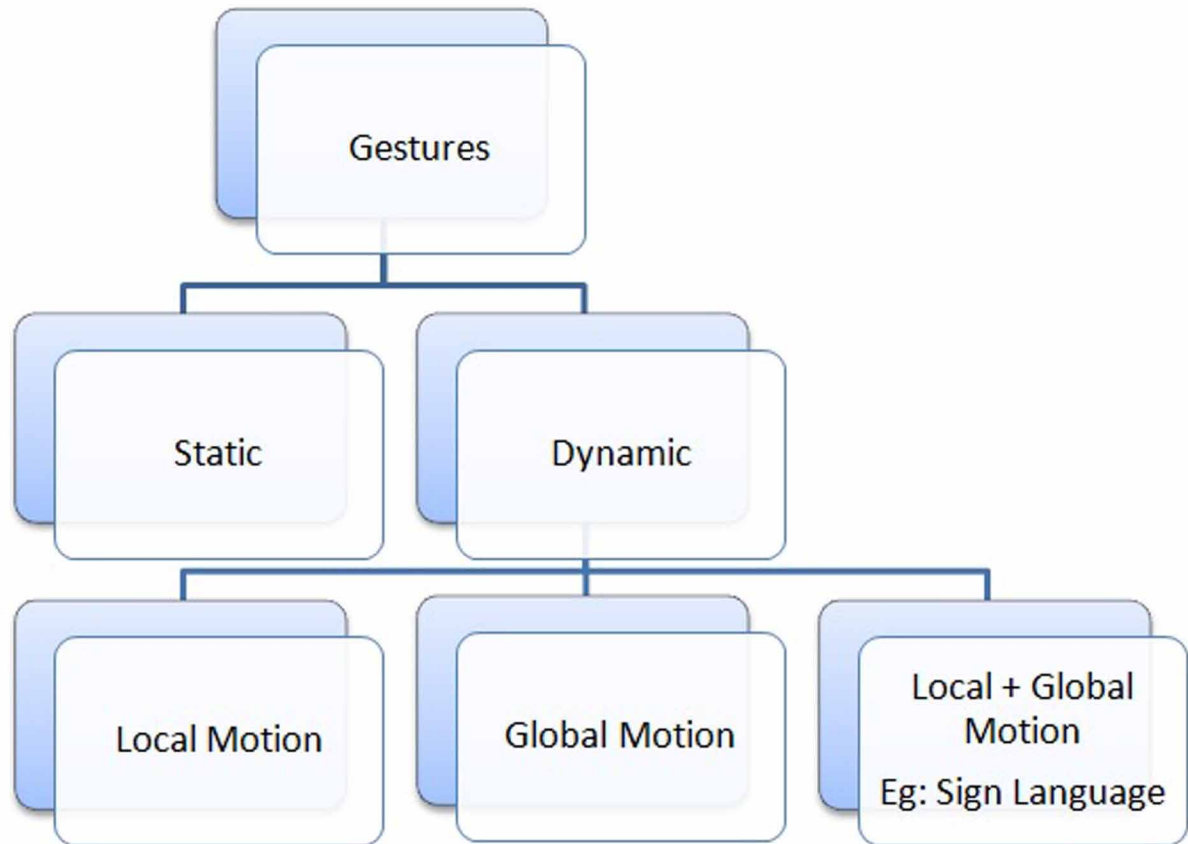
In the present scenario, vision based hand gesture recognition has become a highly emerging research area for the purpose of human computer interaction. Such recognition systems are deployed to serve as a replacement for the commonly used human-machine interactive devices such as keyboard, mouse, joystick etc. in real world situations. The major challenges faced by a vision based hand gesture recognition system include recognition in complex background, in dynamic background, in presence of multiple gestures in the background, under variable lighting condition, under different viewpoints etc. In the context of sign language recognition, which is a highly demanding application of hand gesture recognition system, coarticulation detection is a challenging task. The main objective of this chapter is to provide a general overview of vision based hand gesture recognition system as well as to bring into light some of the research works that have been done in this field.

INTRODUCTION

Presently, vision based hand gesture recognition has become a highly developing research field for the purpose of human computer interaction. Such recognition systems are deployed to serve as a replacement for the commonly used human-machine interactive (HCI) devices such as keyboard, mouse, joystick etc. in real world situations. Recently, gestures have become an important segment of such HCI devices. A

DOI: 10.4018/978-1-4666-8493-5.ch011

Figure 1. Types of hand gestures



gesture may be defined as a physical movement of body parts such as hands, arms, head, face etc. to express some information or feelings (Murthy & Jadon, 2009). Gestures play an important role in our day to day communication. The ability of a computer or any processing system to understand the meaning of these gestures is referred to as gesture recognition. Among the various types of gestures, hand gestures are the most commonly used, as they are natural, easy to use and more convenient for communication. Hand gestures are basically of two types- static and dynamic (as shown in Figure 1). Static hand gestures do not involve any kind of hand movement in comparison to dynamic hand gestures, where either the entire hand moves (global motion) or only the fingers move (local motion) (Ahmeda, Alexanderb, & Anagnostopoulos, 2008).

There are mainly two approaches of hand gesture recognition: glove-based and vision-based. In glove-based method, the user needs to wear a sensor glove or a colored glove, which serves as an interface to communicate with the computer. Although, this approach gives accurate results, it affects the ease and naturalness with which the user interacts with the computer. Vision-based approach overcomes the drawback of glove based approach as it serves as a natural means of interaction. This method adopts computer vision and machine learning algorithms for recognizing the hand gestures. However, obtaining highly accurate results is a challenging task for vision based approaches (Rautaray & Agarwal, 2012).

24 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/a-review-on-vision-based-hand-gesture-recognition-and-applications/135889

Related Content

Service and Billing Management Method for ICT Services

Motoi Iwashita and Shigeaki Tanimoto (2016). *International Journal of Software Innovation* (pp. 1-16).
www.irma-international.org/article/service-and-billing-management-method-for-ict-services/149136

Design of a Framework to Implement Agility at Organizational Level

Jagadeesh Balakrishnan (2016). *Emerging Innovations in Agile Software Development* (pp. 127-140).
www.irma-international.org/chapter/design-of-a-framework-to-implement-agility-at-organizational-level/145037

Location-Based Service (LBS) System Analysis and Design

Yuni Xia, Jonathan Munson, David Wood and Alan Cole (2009). *Handbook of Research on Modern Systems Analysis and Design Technologies and Applications* (pp. 55-75).
www.irma-international.org/chapter/location-based-service-lbs-system/21061

A Comparative Study of Machine Learning Techniques for Android Malware Detection

Mohamed Guendouz and Abdelmalek Amine (2022). *International Journal of Software Innovation* (pp. 1-13).
www.irma-international.org/article/a-comparative-study-of-machine-learning-techniques-for-android-malware-detection/309719

Content and Popularity-Based Music Recommendation System

Mamata Garanayak, Suwendu Kumar Nayak, Sangeetha K., Tanupriya Choudhury and Shitharth S. (2022). *International Journal of Information System Modeling and Design* (pp. 1-14).
www.irma-international.org/article/content-and-popularity-based-music-recommendation-system/315027