

## **Algorithm of local features fusion and modified covariance-matrix technique for hand motion position estimation and hand gesture trajectory tracking approach**

### **ABSTRACT**

Nowadays, visual recognition based dynamic hand gesture tracking has gained very considerable attention. Hand gestures can play an important role as a non-touchable communication tool between machines and humans based on using the affordable built-in webcam. The need for replacing touch-based computing devices interaction has been increasing in many fields like healthcare, security, and generally as interface-based devices controlling. Especially with COVID19 outbreak spreading around the world, where people take a risk and avoid dealing with electronic consumer machines that required hand touching. However, in any dynamic hand gesture recognition system, dynamic hand gesture tracking is a very hard task, where position estimation over video frames for freely moving hand in the air is quite challenging. This shortcoming is due to hand great scale changes, posture variations, and translation problems. Hence, to tackle these difficulties and extract gesture features for gesture recognition phase accurately, this paper proposed an algorithm of dynamic hand trajectory tracking for gesture recognition. The presented algorithm proposes local features fusion based on Gabor-Canny- Hog features embedded an updated compact covariance matrix technique as sophisticated feature-based tracking, utilizing video sequences of IBGHT dataset. As a result, the proposed approach has shown adorable optimization achieving an accuracy rate of 96.97%, overcoming the problems of hand appearance variation in the complicated environment.

**Keyword:** Hand gesture tracking; Gabor filter; Brisk feature; Fast marching method (FMM); Entropy filter; Region covariance matrix (RCM); Minimum eigenvalue; Hog feature; Canny feature