10.1 CONCLUSION

Gait recognition is the most challenging task in biometric-based authentication systems. In part-based gait recognition system, only most effective parts are utilized for recognition process whereas the less effective parts are neglected. The removal of entire less effective parts minimizes the recognition accuracy since it also has some significant information which is utilized for recognition process. Therefore, the major objective of this research is to improve the recognition accuracy in human gait-based recognition system using advanced optimization algorithm.

In this study, gait recognition system is proposed which utilizes both most effective and most informative less effective parts for recognition process. The most effective parts and less effective parts are obtained by partitioning the extracted silhouettes based on the weight value. The most effective parts with dynamic parts and the most informative less effective parts with static parts are selected by using the DFT based entropy gait representation method. Then, the selected features are fused by multi-objective particle swarm optimization (MPSO) algorithm. The efficiency of the system is further improved by adding the shape features. The shape features are extracted by using the shape descriptor with angular radial transform. The extracted shape features are then converted from frequency domain by using the Fast Fourier Transform (FFT). The extracted features are fused by using multi-objective BAT (MBAT) algorithm and also using MPSO and the performance analysis proves that MBAT provides more efficiency in recognition. In order to reduce the recognition time, gender classification is proposed the Sparse Multi-kernel Support Vector Machine (SM-SVM) according to the extracted spatiotemporal features. After that, the gait recognition is achieved based on the gender which reduces the search space of recognition process by selecting the number of features that are related to the identified gender.

The efficiency of the system is further enhanced by including the additional gait features such as velocity moment and depth of the hands and legs. In the proposed approach, the velocity moment is measured by using the velocity measurement with distance and time. The depth of hands and legs are measured in terms of angle values by
using the feature vector measurement. Once, the features are extracted, and then the effective enhanced BAT algorithm is used for fusing the selected features. The fused features are given to the recognition process for classifying the person effectively. Further enhancement of the system is done by utilizing the hybrid MPSO-BAT optimization algorithm. Initially all gait features are extracted and the extracted features are fused by using the proposed hybridization of MPSO-BAT algorithm. The proposed hybrid MPSO-BAT algorithm is used for selecting the best solution and to avoid the drawbacks of MPSO algorithm. Then the fused features are utilized for recognition process. Thus, the proposed recognition system using hybrid algorithm enhances the recognition accuracy compared with the other approaches. The experimental results prove that the proposed efficient gait recognition system using hybrid MPSO-BAT algorithm approach has high performance than the other recognition approaches.

10.2. SCOPE FOR FUTURE WORK

In future, more advance techniques can be used for enhancing the extraction of features, recognition process.

- Efficient data mining algorithms can be used for feature extraction process
- More effective techniques can be used for improving the computational power of the system when different features are extracted for recognition.
- The system of gait recognition can be used for crime detection and also in the detection of alcohol driven driving