

## Investigation of New Gait Representations for Improving Gait Recognition

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**Abstract :** This study presents new gait representations for improving gait recognition accuracy on cross gait appearances, such as normal walking, wearing a coat and carrying a bag. Based on the Gait Energy Image (GEI), two ideas are implemented to generate new gait representations. One is to append lower knee regions to the original GEI, and the other is to apply convolutional operations to the GEI and its variants. A set of new gait representations are created and used for training multi-class Support Vector Machines (SVMs). Tests are conducted on the CASIA dataset B. Various combinations of the gait representations with different convolutional kernel size and different numbers of kernels used in the convolutional processes are examined. Both the entire images as features and reduced dimensional features by Principal Component Analysis (PCA) are tested in gait recognition. Interestingly, both new techniques, appending the lower knee regions to the original GEI and convolutional GEI, can significantly contribute to the performance improvement in the gait recognition. The experimental results have shown that the average recognition rate can be improved from 75.65% to 87.50%.

**Keywords :** convolutional image, lower knee, gait

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020