
List of Publications

International Journals

1. **Kathing Margaret ,Brahma Rishang , Ray Kaushik and Saharia Sarat.** (2023). CNN based Gait Analysis for Human Identification in Covariate Conditions. *Science and Technology Journal*. 11. 121-130. DOI:10.22232/stj.2023.11.01.13. (Published)(UGC care list)
2. **Kathing.M, Rishang. K, Kalita .N,Sarat.S,** 2023 “Small Vision-based Gait Dataset for Human Identification in Varying Surface Conditions”, *International Journal of Information Technology, Spinger*,(Under review)

International Conferences

1. **Kathing, M., Brahma, R. K., Saharia, S.** (“2022). Comparative Study on Different Classifiers for Gait-Based Human Identification. In *Advanced Machine Intelligence and Signal Processing* (pp. 137-146). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-19-0840-8_10
2. **Kathing, M., Brahma, R. K., Saharia, S.** (“2022, June). Effective method to reduce Covariate issues in gait-based human identification. In *2022 2nd International Conference on Intelligent Technologies (CONIT)* (pp. 1-5). IEEE. DOI:10.1109/CONIT55038.2022.9847713
3. **Kathing, M., Brahma, R. K., Saharia, S.** (“2023, February). Features Fusion-Based Gait Recognition with Covariate Conditions. In *International Conference on Advanced Computational and Communication Paradigms* (pp. 273-279). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-99-4284-8_22



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CHAPTER 1

Introduction

Human identification and verification systems use a variety of biometric traits like fingerprints, voice, palm prints, iris, gait, and the face. Each has its own unique set of advantages and disadvantages. Among these biometrics, gait recognition aims to recognize an individual based on the way they walk and has been studied in a wide range of computer vision problems. The advantages of gait over other biometric traits are that it can be applied unobtrusively and offers potential for distance-based identification at low resolution with few image pixels [48]. Since human gait analysis includes both subjective and objective components, the presence of covariate issues has a significant impact on gait recognition performances. The covariates are the continuous variable that affects an outcome [26]. Human gait is influenced by variables like clothing, carrying conditions, walking surface, camera viewing, walking speed, etc. These are the covariate conditions in human gait analysis. As a result, whether gait can be used as a unique individual identifier or not, like other biometric indices, is a continuing research problem in the computer vision community [82]. There have been numerous approaches and frameworks reported in the past to address covariate issues in gait-based human identification, and this remains a recurring challenge. According to the studies, gait recognition using a model-free approach has been mostly used for empirical studies. The main aim of this research is to improve the performance of gait recognition, which is influenced by covariate factors, by employing gait representation approaches that are currently in use. This study explores a variety of gait representation techniques, including model-free and model-based gait analysis methods, with the goal of addressing the various covariate challenges associated with gait recognition.

Early studies on gait were primarily used in the medical field to monitor and track the health of a patient's walking pattern, with or without injuries, with the help of devices that were attached to the patient's body or could sense his or her movements. However, numerous studies on gait have shown that gait recognition is a unique method for identifying a person from a distance. In 1994, the gait analysis algorithm to study human gait patterns was developed

Vision- Based Gait Analysis for human identification with covariate conditions

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