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Anomaly Detection using ConvLSTM Autoencoder in Smart Home Environments

Zahra Atashgahi* Mohammadreza Jafaei† Ehsan Nazerfard‡ Alireza Nadali§

Abstract

As the population ages, there is a growing concern for the safety and well-being of elderly individuals living independently. However, with the emergence of Ambient Intelligence, independent living for the elderly is no longer an impossible feat. Smart homes equipped with advanced technology offer a cost-effective solution to this problem. In this paper, we propose a novel approach to address the challenges of anomaly detection in the daily routines and behaviors of elderly individuals. We introduce a ConvLSTM Autoencoder model for processing spatiotemporal data, which is well-suited for identifying rare and sparse anomalies that are difficult to reproduce in normal behavior. To validate our proposed method, we utilize two datasets from the WSU CASAS smart home project and compare it with other state-of-the-art approaches. Our results demonstrate the effectiveness of our model in accurately detecting anomalies in the behavior of elderly individuals living in smart homes, paving the way for improved safety and quality of life for this vulnerable population.

Keywords: Machine Learning, Smart Homes, Anomaly Detection, ConvLSTM, Autoencoder

*Department of Computer Engineering, Amirkabir University of Technology, zahraatashgahy@aut.ac.ir
†Department of Computer Engineering, Amirkabir University of Technology, mr.jafaei@aut.ac.ir
‡**Corresponding author**: Department of Computer Engineering, Amirkabir University of Technology, nazerfard@aut.ac.ir
§Department of Computer Engineering, Amirkabir University of Technology, a_nadali@aut.ac.ir