**ENABLING HOME AUTOMATION AND EDGE INTELLIGENCE OVER RESOURCE CONSTRAINT IOT DEVICES FOR DISABLED PEOPLE**

**Abstract DATE: 07/10 /2022**

Smart home applications are pervasive and have gained popularity due to the overwhelming use of Internet of Things (IoT). The revolution in IoT technologies made homes more convenient, efficient and perhaps more secure. The need to advance smart home technology is necessary at this stage as IoT is abundantly used in automation industry. However, most of the proposed solutions are lacking in certain key areas of the system i.e., high interoperability, data independence, privacy, and optimization in general. The use of machine learning algorithms requires high-end hardware and are usually deployed on servers, where computation is convenient, but at the cost of bandwidth. However, more recently edge AI enabled systems are being proposed to shift the computation burden from the server side to the client side enabling smart devices. In this paper, we take advantage of the edge AI enabled technology to propose a fully featured cohesive system for smart home based on IoT and edge computing. The proposed system makes use of industry standards adopted for fog computing as well as providing robust responses from connected IoT sensors in a typical smart home. The proposed system employs edge devices as a computational platform in terms of reducing energy costs and provides security, while remotely controlling all appliances behind a secure gateway. A case study of human fall detection is evaluated by a custom lightweight deep neural network architecture implemented over the edge device of the proposed framework. The case study was validated using the Le2i dataset. During the training, the early stopping threshold was achieved with 98% accuracy for training set and 94% for validation set. The model size of the network was 6.4 MB which is significantly lower than other networks with similar performance.

**Keywords**—: Artificial intelligence Edge intelligence IoT Smart home Deep learning Human fall detection

**PUBLISHED BY :** ScienceDirect

**PUBLISHED YEAR :** 2022

**AUTHORS :** Mansoor Nasir a , Khan Muhammad b,⇑ , Amin Ullah c , Jamil Ahmad a , Sung Wook Baik d , Muhammad Sajjad a,e,⇑ aDigital Image Processing Laboratory, Department of Computer Science, Islamia College Peshawar, Peshawar 25000, KP, Pakistan b Visual Analytics for Knowledge Laboratory (VIS2KNOW Lab), School of Convergence, College of Computing and Informatics, Sungkyunkwan University, Seoul 03063, Republic of Korea c CORIS Institute, Oregon State University, Corvallis, OR 97331, USA d Sejong University, Seoul 143-747, Republic of Korea e Color and Visual Computing Lab, Department of Computer Science, Norwegian University of Science and Technology (NTNU), Gjøvik 2815, Norway

**GUIDE NAME**  : NASRIN JUMANA K T

**GROUP NUMBER** : 6

**GROUP MEMBERS** : AJAY DAS K

RABEEH C

MUHAMMED FAIS M T

FATHIMA IRFANA T P