

Health Monitoring at Home using Deep Transfer Learning

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ABSTRACT

During certain situations, the healthcare system is put under extreme pressure. Isolated non-critical infected patients may benefit from receiving health care services in their homes and can have the comfort, as this can reduce their burden and their stress levels. For this process keeping tabs on at home seniors health related activities is another important application. In this paper, we mention about a home health monitoring system based on transfer learning that uses an edge computing approach. In particular, edge devices may be used to train a model based on a pre-trained convolutional neural network using just a minimum quantity of data that has been tagged on the ground and a fine-tuning technique. Hence, there is no need to transmit the raw data picked up by these sensors to an external source. That is why you will not have to worry about any kind of data leakage, insecurity, or bandwidth scarcity. Moreover, real-time computation for the above mentioned works costs should be affordable. An AI-enabled health monitoring system, a computer vision system, the COVID-19 epidemic, deep learning, computing, transfer learning, and visual sensors are some of the terms that may be used to describe this system.

KEYWORDS: Health Monitoring at Home, Edge Computing, Convolutional Neural Network, Transfer Learning, Deep Learning.

1. SCOPE

The population of our country is very huge in number. Accordingly, there are just 1.4 beds for per 1,000 individuals. In addition, this is not much better in equivalent foreign contexts. Furthermore, those nations that rank similarly high there may also be unable face the difficulties caused by a pandemic. In addition, since the number of persons with elderly parents is rising consistently, similarly it is useful to one's health is the utilization of home health services, seniors who still occupy their own homes.

2. INTRODUCTION

Health is the most important thing for everyone. As AI improves human performance in several service-oriented domains. Therefore, there are several ways in which AI can help home health care services. Remote, robotic surveillance of sick or elderly people (in a nutshell, we are One such non-invasive technique is "Health Monitoring at Home," which is an economically significant practice. For these, the services may be Tracking our Activities, Sleep, and Breathing keeping an eye on things, seeing when someone has fallen, recognizing emotions, voice analysis, hand hygiene record keeping, etc.,. Machine learning

(ML) and Computational Intelligence (CI) are useful tools that are effective. We use Cloud Computing where information must be sent to a server in the cloud, located somewhere other than our house, for processing. Yet, in this concept, it depends about privacy, security, and bandwidth limitation are it's feasible that huge problems and real-time computers cannot coexist. These penalties encourage the adoption of cutting-edge technology called as EC, or "computing on the edge". Computing with EC is possible. Health Monitoring at Home data is collected while at home. Yet, as ED become more in usage, there are also certain disadvantages to overcome. Sometimes little and lacking in pc power. Here, we put forward a deep transferable learning-based Health Monitoring at Home Using an Edge Computing Approach (TL-ECHM). A transfer learning strategy is used in this, in which a Convolutional Neural Network (CNN) with the already there training model that has been trained using the data respectively. ED that is tuned with a little bit of ground labelled dataset. As a result, a lot less processing power would be required, requisite local visual computing resources and do able in an emergency room. It should be feasible to lessen the effects of the problems. A potential combination situation of TL-EC-HM in what way, a IoT gadget, cloud provider, ED, and central hub for caregivers (sensor) link to one another to create a whole. The article's most important points are as follows.

3. RELATED WORK

"An Ideal Smart City Internet of Things Infrastructure Based on Machine Learning to Protect Individual Privacy"

The nature of the network, edge-assisted IoT security has to be properly checked.. Network security is the process of protecting an existing network against intrusion or other attacks that might disrupt its normal operation. Issues like unlawful access to network-accessible resources and their abuse are also something that network security has to deal with. Secure data transfer and deep learning-based optimization with the World Wide Web of Things are proposed as a new way to enhance data privacy in edge computing. Collaborative architectural and hybrid federated server-based stochastic vector networks are used to keep data private in an edge network. After the data has been optimized via firefly grey optimization, it is securely sent utilizing the investment amount multiple encryption process.

"Edge computing in intelligent healthcare systems: a literature review, key obstacles, and future research objectives."

These days patients are searching for a health care system that is working fastly and individualized as their lives. In order to meet the requirements as well as energy efficiency for real-time health data gathering and analysis. Firstly, this study is to evaluate existing and future edge computing architecture and methodologies for healthcare applications, and secondly, it intends to define the needs and difficulties of devices for different scenarios. Edge computing is most useful for applications that need the categorization of health data, such as monitoring of vital signs and fall detection. Some low-latency applications track disease-specific symptoms, including the gait impairments seen by those with Parkinson's. We have suggested potential future research areas in edges computing for healthcare that, if pursued, might improve users' quality of life.

“The Internet of Things (IoT) and its potential applications in smart agriculture.”

With the rise of IoT, scientists have a fresh window of opportunity to pursue groundbreaking work in the agriculture sector. As the Internet of Things is still in its infancy, extensive testing is required before it can be extensively used in a broad range of agricultural contexts. In this article, I discuss the many ways in which the Internet of Things may be put to use in agriculture, as well as the unique complications that would arise from its widespread use. The devices and technologies for wireless communication related with IoT in farming and agricultural applications are thoroughly investigated so that attention may be directed toward the particular needs involved. Sensor-enabled Internet of Things (IoT) systems that provide smart and intelligent services to smart agriculture are studied. In order to better understand the current IoT-based solutions implemented by different enterprises, people, and groups according to their installation characteristics, many case studies are provided. Challenges in these approaches are addressed, as are areas for development and a plan for continuing IoT-based work in the future.

4. METHODOLOGY

There would be no organizational or geographical impediments to open lines of contact between healthcare practitioners and patients in a conventional healthcare system. Safe platforms and applications for exchanging health data should also flourish as a result. Better medical care and diagnosis would result from this. These concerns are shown in Fig. 1. Under the standard healthcare model, physicians conduct exams and manually enter their results into patient records or the hospital's primary database. As the regional system is not connected to the user's smartphone, real-time diagnostics is not an option. The hospital just has to look in one place to get a patient's whole medical record. It is difficult for individuals to have autonomy over their personal health data because of a lack of privacy, transparency, and data integrity.

5. RESULTS

In the scenario that this study proposes, in-home IoT sensors solely monitor the patient's status, and all collected data remains on the sensor itself, eliminating any potential security or bandwidth issues. The author uses a pre-trained AI transfer learning model to create this project; after training, the model is able to predict fall detection, facial expression, and sneezing from fresh test photographs.

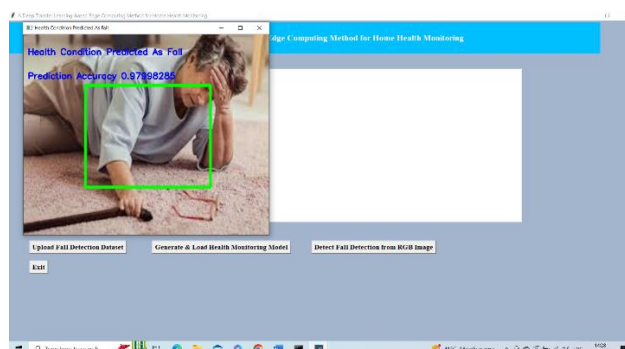


Figure 1 Fall Prediction

In the Figure 1, it was detected as FALL by AI, and it is currently being compared to others.

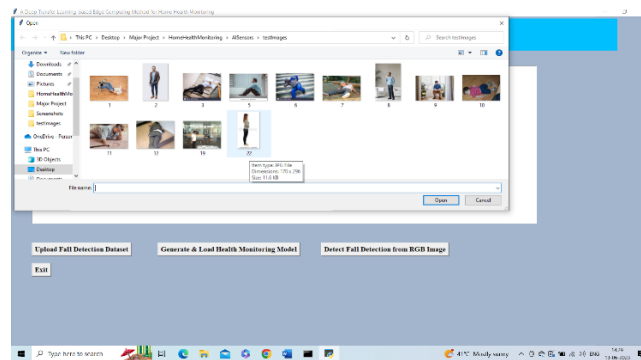


Figure 2 Images of human activities

All sensor photos sent to the cloud hospital will be stored in the aforementioned folder. This software makes it possible to monitor patients at home without involving the hospital.

6. CONCLUSION

The early identification of falls or prompt administration of medicine is made possible by smart healthcare monitoring. Edge gateways provide the seamless transfer of data in the context of IoT or AI integration. In addition to discussing the many uses and benefits of smart health systems, this research also introduces a convolutional neural network-based technique for detecting falls. A real-world dataset is used to evaluate the suggested methodology. Two classifications, "fall" (F) and "non-fall," are included in the dataset for categorization purposes (NF). High levels of precision, accuracy, and recall are shown by the hypothesized mechanism in this study. The accuracy of the hypothesized mechanism is 99.23%. As compared to methods like ANN and SVM. To improve accuracy while decreasing classification costs, we want to use this approach on huge datasets in the future. In addition, offloading frameworks for mobile edge computing have been used to deal with massive volumes of patient data.

7. REFERENCES

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