**A System Design with Deep Learning and IoT to Ensure Education Continuity for Post-COVID**

**Alternative Title:**

Using deep learning detect mask and face to ensure education continuity for Covid pandemic.

**Aim:**

Ensure education continuity for post-covid it used to make a attendance for a student with face detection and ensure student were a mask.

**Abstract:**

Deep learning-based comprehensive study to reduce the effects of COVID-19 on the education system is presented. The proposed system consists of an edge device, IoT nodes, and a neural network that runs on a server. The purpose of the proposed system is to protect students and staff against infectious diseases and increase the students’ performance during classes by monitoring the environ- mental conditions via an IoT-based sensor network, during the current pandemic to ensure the use of masks in closed areas by training a customized deep learning model, and to monitor the student attendance data by deep learning and IoT-based solution. Furthermore, effective heating and cooling can be done to save energy by transmitting the environmental conditions of the indoor environment to the relevant destinations. The experiment

is conducted with five different networks to classify the faces in the images as masked or unmasked, and their performances were examined. The networks were trained on the Face Mask Detection Dataset which contains a total of 7553 masked and unmasked images

**Existing System:**

The system consists of several IoT nodes, an edge device, and a server. The IoT nodes are used to monitor the relative humidity, temperature, and air quality of the target classroom. By using the edge device, fast and immediate data communication can be achieved within a local network. The edge device, which consisted of Raspberry Pi, works as a Wi-Fi Hotspot to create the local network with the sensor nodes. An MQTT (Message Queuing Telemetry Transport) Broker that is run on the edge device establishes he data transmission between sensor nodes which are publishers, and boiler control unit, building ventilation system, and server which are subscribers. Other tasks of the edge device are taking students’ photos and measuring their body temperature as inputs, after that guiding them according to the data received from the server. If a student is not registered to the system, it is also responsible for sending the registration information to the server by taking their photos and reading their IDs for the first time. An ACS (Advanced Card Systems) ACR1281U-C1 model card reader integrated into the edge device was used to register the unknown students to the system. The server performs actions of face recognition, mask detection, checking COVID-19 and contacts status, and processing attendance data.

**Problem Definition:**

 The main problem Expense in this paper based on ensure education continuity for covid pandemic. Paper says increase the room temperature, ventilation system and boiler then so we do give information to the user.

**Proposed System:**

 If a mask is on the face, it is requested to be removed for a short time to proceed with the face recognition procedure. Face recognition and body temperature monitoring steps proceed if the student has previously enrolled in the system. If an unregistered face is detected, the student is asked to read his/her student card to the card reader, so the necessary information can be retrieved from the database, and then 50 images of the student are taken and stored in the database. Face mask detection using CNN model with high accuracy and then check allowed a classroom.

**Modules:**

* Dataset Collection
* Algorithm
* Detection

**Dataset Collection:**

The Face Mask Detection Dataset (FMDD) on Kaggle which is used for mask detection consists of 7553 images I total; 3828 of them are unmasked and 3725 masked images. The dataset was split into two sets as training and validation according to the Pareto principle which is the 80/20 rule. While the training set consists of 3062 unmasked and 2980 masked images, the test set consists of 766 unmasked and 745 masked images.

**Algorithm:**

A convolutional neural network (CNN or ConvNet) is a network architecture for deep learning that learns directly from data. CNNs are particularly useful for finding patterns in images to recognize objects, classes, and categories.

**Prediction:**

If a mask is on the face, it is requested to be removed for a short time to proceed with the face recognition procedure. Face recognition and body temperature monitoring steps proceed if the student has previously enrolled in the system. If an unregistered face is detected, the student is asked to read his/her student card to the card reader, so the necessary information can be retrieved from the database, and then 50 images of the student are taken and stored in the database. Face mask detection using CNN model with high accuracy and then check allowed a classroom.

**Hardware Requirements:**

* Hard Disk : 500GB and Above
* RAM : 4GB and Above
* Processor : I3 and Above

**Software Requirements:**

* Operating System : Windows 10 (64 bit)
* Software : Python-3.6.3
* Tools : Anaconda

**Conclusion and Future Work**

Since the end of 2019, the world has been struggling with one of the most dangerous and widespread diseases of our time, COVID-19. Many areas have been negatively affected by the pandemic; education is one of them. The proposed system which aims to reduce these effects is composed of several IoT- based sensor nodes, an edge device, and a neural network that runs on a server. The goal of the proposed system is to prevent the spread of infectious diseases caused by respiratory droplets and aerosols by ensuring the use of face masks and monitoring indoor conditions via the IoT sensor network. Moreover, student attendance can be monitored with this solution based on deep learning and IoT. Moreover, by checking the list of daily infected and contact students, their attendance can be prohibited so that the virus spreading can be prevented. In future studies, by adding real-time video-based heart & respiration rate monitoring, and fever measurement features to the proposed system, a complete solution will be developed to monitor and control the spread of many infectious diseases that may occur in the future.

**Architecture Diagram:**

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