Ahmedabad University

CSE541 Computer Vision

Weekly Project Report

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Project title: Real-time medical image disease detection using deep learning methods.

Group 8

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1. **Task performed this week and outcomes of task performed**
    - We implemented our model with the redefined classes.
    - We implemented hyperparameter tuning to improve the accuracy of our ResNet model.
    - We tuned the four parameters of the ImageDataGenerator method used for the image augmentation before running the model. The four parameters are:
        1. **shear_range:** Applying shear transformation to the input images can help the ResNet model generalize better to new and unseen data. Shear transformation can help the model learn to recognize objects from different angles and orientations, which can improve its accuracy. However, if the shear_range value is set too high, it can cause the images to become too distorted, making it difficult for the model to recognize the objects in the images, which can decrease its accuracy.
        2. **zoom_range:** Randomly zooming in or out on the input images can help the ResNet model learn to recognize objects at different scales and sizes, which can improve its accuracy. However, if the zoom_range value is set too high, it can cause the images to become too pixelated or too blurry, making it difficult for the model to recognize the objects in the images, which can decrease its accuracy.
        3. **width_shift_range:** This parameter randomly shifts the image horizontally by a certain fraction of its width. The width_shift_range takes a float value between 0 and 1, where 0 means no shift and 1 means the image can be shifted up to its full width. By applying random horizontal shifts to the images, the ResNet model can learn to recognize objects from different positions and viewpoints, which can improve its accuracy. However, if the width_shift_range value is set too high, it can cause the objects in the images to become too distorted or even move outside of the image boundaries, making it difficult for the model to recognize them, which can decrease its accuracy.
        4. **height_shift_range:** This parameter randomly shifts the image vertically by a certain fraction of its height. The height_shift_range takes a float value between 0 and 1, where 0 means no shift and 1 means the image can be shifted up to its full height. By applying random vertical shifts to the images, the ResNet model can learn to

recognize objects from different positions and viewpoints, which can improve its accuracy. However, if the height_shift_range value is set too high, it can cause the objects in the images to become too distorted or even move outside of the image boundaries, making it difficult for the model to recognize them, which can decrease its accuracy.

- We tried different values for the parameters and compared the accuracy.

Shear_range	Zoom_range	width_shift_range	height_shift_range	Accuracy
0.2	0.2	0.2	0.2	0.9148
0.4	0.2	0.1	0.1	0.9054
0.3	0.2	0.1	0.1	0.9369
0.3	0.3	0.1	0.1	0.9106
0.3	0.2	0.2	0.1	0.9253
0.3	0.2	0.1	0.2	0.9075
0.3	0.2	0.3	0.1	0.9033
0.3	0.2	0.05	0.1	0.9001

- The best accuracy we got is 0.9369.

2. **Tasks to be performed in the upcoming week**
    - We will compute the confusion matrix of our model implementation.
    - We will try to increase the accuracy on the basis of the confusion matrix.