IBM Project Name: Real-Time Communication System Powered by AI for Specially Abled

TEAM ID: PNT2022TMID51692

```python
from tensorflow.keras.models import Sequential from tensorflow.keras.layers import Dense,

Conv2D, Flatten, Dropout, MaxPooling2D from tensorflow.keras.preprocessing.image import

ImageDataGenerator

import numpy as np

import matplotlib.pyplot as plt

import cv2 unzip the file

!unzip '/content/drive/MyDrive/IBMPROJECT/conversation engine for deaf and dumb.zip'
```

Streaming output truncated to the last 5000 lines.

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  inflating: Dataset/training_set/G/2.png

  inflating: Dataset/training_set/G/20.png

  inflating: Dataset/training_set/G/200.png

      Dataset/training_set/G/201.png

    Dataset/training_set/G/202.png

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    Dataset/training_set/G/204.png
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inflating: Dataset/training_set/G/449.png

Dataset/training_set/G/45.png

Dataset/training_set/G/450.png

Dataset/training_set/G/451.png

Dataset/training_set/G/452.png

inflating: inflating:

inflating: inflating:

inflating: inflating:

inflating: inflating:

Dataset/training_set/G/453.png

Dataset/training_set/G/454.png

Dataset/training_set/G/455.png

Dataset/training_set/G/456.png

inflating: Dataset/training_set/G/457.png

inflating: Dataset/training_set/G/458.png

inflating: Dataset/training_set/G/459.png

inflating: Dataset/training_set/G/46.png

inflating: Dataset/training_set/G/460.png

inflating: Dataset/training_set/G/461.png

inflating: Dataset/training_set/G/462.png

inflating: Dataset/training_set/G/463.png

inflating: Dataset/training_set/G/464.png

inflating: Dataset/training_set/G/465.png

inflating: Dataset/training_set/G/466.png

extracting: Dataset/training_set/G/467.png

extracting: Dataset/training_set/G/468.png

inflating: Dataset/training_set/G/469.png

inflating: Dataset/training_set/G/47.png

inflating: Dataset/training_set/G/470.png

inflating: Dataset/training_set/G/471.png

inflating:

inflating:
extracting: Dataset/training_set/G/472.png

extracting: Dataset/training_set/G/473.png

extracting: Dataset/training_set/G/474.png

Dataset/training_set/G/475.png

Dataset/training_set/G/476.png extracting:

Dataset/training_set/G/477.png inflating:

Dataset/training_set/G/478.png inflating:

Dataset/training_set/G/479.png inflating:

Dataset/training_set/G/48.png extracting:

Dataset/training_set/G/480.png inflating:

Dataset/training_set/G/481.png inflating:

Dataset/training_set/G/482.png extracting:

Dataset/training_set/G/483.png inflating:

Dataset/training_set/G/484.png inflating:

Dataset/training_set/G/485.png inflating:

Dataset/training_set/G/486.png extracting:

Dataset/training_set/G/487.png inflating:

Dataset/training_set/G/488.png inflating:

Dataset/training_set/G/489.png inflating:

Dataset/training_set/G/49.png inflating:

Dataset/training_set/G/490.png inflating:

Dataset/training_set/G/491.png inflating:

inflating: inflating:

inflating: inflating:

inflating: inflating:

inflating: inflating:

    Dataset/training_set/G/492.png inflating:

        Dataset/training_set/G/493.png

  inflating: Dataset/training_set/G/494.png

        Dataset/training_set/G/495.png

        Dataset/training_set/G/496.png

        Dataset/training_set/G/497.png

        Dataset/training_set/G/498.png
        Dataset/training_set/G/499.png

    Dataset/training_set/G/5.png

    Dataset/training_set/G/50.png

    Dataset/training_set/G/500.png

inflating: Dataset/training_set/G/501.png

inflating: Dataset/training_set/I/528.png

inflating: Dataset/training_set/I/529.png

inflating: Dataset/training_set/I/53.png

inflating: Dataset/training_set/I/530.png

inflating: Dataset/training_set/I/531.png

inflating: Dataset/training_set/I/532.png

inflating: Dataset/training_set/I/533.png

extracting: Dataset/training_set/I/534.png

inflating: Dataset/training_set/I/535.png

inflating: inflating:

inflating:

inflating:
inflating: Dataset/training_set/I/536.png

inflating: Dataset/training_set/I/537.png

inflating: Dataset/training_set/I/538.png

inflating: Dataset/training_set/I/539.png

inflating: Dataset/training_set/I/54.png

inflating: Dataset/training_set/I/540.png

extracting: Dataset/training_set/I/541.png

extracting: Dataset/training_set/I/542.png

Dataset/training_set/I/543.png

Dataset/training_set/I/544.png

Dataset/training_set/I/545.png

inflating: inflating:

inflating: inflating:

inflating: inflating:

inflating: inflating:

Dataset/training_set/I/546.png

Dataset/training_set/I/547.png

Dataset/training_set/I/548.png

Dataset/training_set/I/549.png

inflating: Dataset/training_set/I/55.png

inflating: Dataset/training_set/I/550.png

inflating: Dataset/training_set/I/551.png

inflating: Dataset/training_set/I/552.png

inflating: Dataset/training_set/I/553.png

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inflating: Dataset/training_set/I/557.png

inflating: Dataset/training_set/I/558.png

inflating: Dataset/training_set/I/559.png

inflating: Dataset/training_set/I/56.png

inflating: Dataset/training_set/I/560.png

inflating: Dataset/training_set/I/561.png

inflating: Dataset/training_set/I/562.png

inflating: Dataset/training_set/I/563.png

inflating: inflating:

inflating: inflating:

inflating:
    inflating: Dataset/training_set/I/564.png

                Dataset/training_set/I/565.png

            Dataset/training_set/I/566.png

            Dataset/training_set/I/567.png

            Dataset/training_set/I/568.png
            Dataset/training_set/I/569.png

            Dataset/training_set/I/57.png

            Dataset/training_set/I/570.png

            Dataset/training_set/I/571.png

inflating: Dataset/training_set/I/572.png

inflating: Dataset/training_set/I/573.png

extracting: Dataset/training_set/I/574.png

extracting: Dataset/training_set/I/575.png

inflating: Dataset/training_set/I/576.png

inflating: Dataset/training_set/I/577.png

inflating: Dataset/training_set/I/578.png

extracting: Dataset/training_set/I/579.png

inflating: Dataset/training_set/I/58.png

inflating: Dataset/training_set/I/580.png

inflating: Dataset/training_set/I/581.png

inflating: Dataset/training_set/I/582.png

inflating: Dataset/training_set/I/583.png

inflating: Dataset/training_set/I/584.png
 inflating: inflating:

inflating: inflating:

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inflating: Dataset/training_set/I/585.png

inflating: Dataset/training_set/I/586.png

inflating: Dataset/training_set/I/587.png

Dataset/training_set/I/588.png

Dataset/training_set/I/589.png

Dataset/training_set/I/59.png

Dataset/training_set/I/590.png

Dataset/training_set/I/591.png

extracting:

Dataset/training_set/I/592.png

inflating:

Dataset/training_set/I/593.png

inflating:

Dataset/training_set/I/594.png

inflating:

Dataset/training_set/I/595.png

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Dataset/training_set/I/596.png

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Dataset/training_set/I/597.png

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inflating:

Dataset/training_set/I/598.png

inflating:

Dataset/training_set/I/599.png

inflating:

Dataset/training_set/I/6.png

inflating:

Dataset/training_set/I/60.png

extracting:

Dataset/training_set/I/600.png

inflating:

Dataset/training_set/I/601.png

inflating:

Dataset/training_set/I/602.png

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Dataset/training_set/I/603.png

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Dataset/training_set/I/604.png

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Dataset/training_set/I/605.png

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Dataset/training_set/I/606.png

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Dataset/training_set/I/607.png

inflating:

Dataset/training_set/I/608.png

inflating: Dataset/training_set/I/609.png

Dataset/training_set/I/61.png

Dataset/training_set/I/610.png

Dataset/training_set/I/611.png

Dataset/training_set/I/612.png

inflating: inflating:

inflating: inflating:

inflating:
Dataset/training_set/I/613.png

extracting: Dataset/training_set/I/614.png

inflating: Dataset/training_set/I/615.png

inflating: Dataset/training_set/I/616.png

inflating: Dataset/training_set/I/617.png

inflating: Dataset/training_set/I/618.png

inflating: Dataset/training_set/I/619.png

inflating: Dataset/training_set/I/62.png

inflating: Dataset/training_set/I/620.png

inflating: Dataset/training_set/I/621.png

inflating: Dataset/training_set/I/622.png

inflating: Dataset/training_set/I/623.png

inflating: Dataset/training_set/I/624.png

inflating: Dataset/training_set/I/625.png

inflating: Dataset/training_set/I/626.png

inflating: Dataset/training_set/I/627.png

inflating: Dataset/training_set/I/628.png

inflating: Dataset/training_set/I/629.png

inflating: Dataset/training_set/I/63.png

inflating: Dataset/training_set/I/630.png

inflating: Dataset/training_set/I/631.png

Dataset/training_set/I/632.png

Dataset/training_set/I/633.png

Dataset/training_set/I/634.png

inflating: inflating:

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Dataset/training_set/I/635.png
Dataset/training_set/I/636.png

Dataset/training_set/I/637.png

inflating: Dataset/training_set/I/638.png

inflating: Dataset/training_set/I/639.png

inflating: Dataset/training_set/I/64.png

inflating: Dataset/training_set/I/640.png

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inflating: Dataset/training_set/I/65.png

inflating: Dataset/training_set/I/650.png

inflating: Dataset/training_set/I/651.png

inflating: Dataset/training_set/I/652.png

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inflating: Dataset/training_set/I/655.png

inflating: Dataset/training_set/I/656.png

inflating: inflating:

inflating:

inflating: inflating:

extracting: Dataset/training_set/I/657.png

extracting: Dataset/training_set/I/658.png

Dataset/training_set/I/659.png

Dataset/training_set/I/66.png

inflating: Dataset/training_set/I/660.png

inflating: Dataset/training_set/I/661.png

inflating: Dataset/training_set/I/662.png

inflating: Dataset/training_set/I/663.png

extracting: Dataset/training_set/I/664.png

inflating: Dataset/training_set/I/665.png

inflating: Dataset/training_set/I/666.png

inflating: Dataset/training_set/I/667.png

inflating: Dataset/training_set/I/668.png

inflating: Dataset/training_set/I/669.png

inflating: Dataset/training_set/I/67.png

inflating: Dataset/training_set/I/670.png

inflating: Dataset/training_set/I/671.png

inflating: Dataset/training_set/I/672.png

inflating: Dataset/training_set/I/673.png

inflating: Dataset/training_set/I/674.png

inflating: Dataset/training_set/I/675.png

inflating: Dataset/training_set/I/676.png

inflating: Dataset/training_set/I/677.png

inflating: inflating:

extracting: Dataset/training_set/I/678.png

Dataset/training_set/I/679.png

Dataset/training_set/I/68.png

Dataset/training_set/I/680.png

inflating: inflating:

inflating:

inflating: inflating:

Dataset/training_set/I/681.png

Dataset/training_set/I/682.png

extracting: Dataset/training_set/I/683.png

inflating: Dataset/training_set/I/684.png

inflating: Dataset/training_set/I/685.png

inflating: Dataset/training_set/I/686.png

inflating: Dataset/training_set/I/687.png

inflating: Dataset/training_set/I/688.png

inflating: Dataset/training_set/I/689.png

inflating: Dataset/training_set/I/69.png

inflating: Dataset/training_set/I/690.png

inflating: Dataset/training_set/I/691.png

inflating: Dataset/training_set/I/692.png

inflating: Dataset/training_set/I/693.png

extracting: Dataset/training_set/I/694.png

inflating: Dataset/training_set/I/695.png

extracting: Dataset/training_set/I/696.png

extracting: Dataset/training_set/I/697.png

inflating: Dataset/training_set/I/698.png

inflating: Dataset/training_set/I/699.png

extracting: Dataset/training_set/I/7.png

extracting: Dataset/training_set/I/70.png

extracting: Dataset/training_set/I/700.png

inflating:

inflating: inflating:

inflating: Dataset/training_set/I/701.png

Dataset/training_set/I/702.png

Dataset/training_set/I/703.png

Dataset/training_set/I/704.png

extracting: Dataset/training_set/I/705.png

inflating: Dataset/training_set/I/706.png

inflating: Dataset/training_set/I/707.png

inflating: Dataset/training_set/I/708.png

inflating: Dataset/training_set/I/709.png

inflating: Dataset/training_set/I/71.png

inflating: Dataset/training_set/I/710.png

inflating: Dataset/training_set/I/711.png

inflating: Dataset/training_set/I/712.png

inflating: Dataset/training_set/I/713.png

inflating: Dataset/training_set/I/714.png

inflating: Dataset/training_set/I/715.png

inflating: Dataset/training_set/I/716.png

inflating: Dataset/training_set/I/717.png

inflating: Dataset/training_set/I/718.png

inflating: Dataset/training_set/I/719.png

inflating: inflating:

inflating: inflating:

inflating: inflating:

inflating: inflating:

inflating: Dataset/training_set/I/72.png

inflating: Dataset/training_set/I/720.png

inflating: Dataset/training_set/I/721.png

Dataset/training_set/I/722.png

Dataset/training_set/I/723.png

Dataset/training_set/I/724.png

Dataset/training_set/I/725.png
Dataset/training_set/I/726.png

Dataset/training_set/I/727.png

Dataset/training_set/I/728.png

Dataset/training_set/I/729.png

inflating: Dataset/training_set/I/73.png

inflating: Dataset/training_set/I/730.png

extracting: Dataset/training_set/I/731.png

inflating: Dataset/training_set/I/732.png

inflating: Dataset/training_set/I/733.png

inflating: Dataset/training_set/I/734.png

inflating: Dataset/training_set/I/735.png

inflating: Dataset/training_set/I/736.png

inflating: Dataset/training_set/I/737.png

inflating: Dataset/training_set/I/738.png

extracting: Dataset/training_set/I/739.png

inflating: Dataset/training_set/I/74.png

inflating:

inflating: inflating:

extracting: Dataset/training_set/I/740.png

inflating: Dataset/training_set/I/741.png

inflating: Dataset/training_set/I/742.png

inflating: Dataset/training_set/I/743.png

inflating: Dataset/training_set/I/744.png

inflating: Dataset/training_set/I/745.png

inflating: Dataset/training_set/I/746.png

extracting: Dataset/training_set/I/747.png

Dataset/training_set/I/748.png

inflating: inflating:

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Dataset/training_set/I/749.png

Dataset/training_set/I/75.png

Dataset/training_set/I/750.png

Dataset/training_set/I/751.png

inflating: Dataset/training_set/I/752.png

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inflating: Dataset/training_set/I/758.png

inflating: Dataset/training_set/I/759.png

inflating: Dataset/training_set/I/76.png

inflating: Dataset/training_set/I/760.png

inflating: Dataset/training_set/I/761.png

inflating: Dataset/training_set/I/762.png

inflating: Dataset/training_set/I/763.png

inflating: Dataset/training_set/I/764.png

extracting: Dataset/training_set/I/765.png

inflating: Dataset/training_set/I/766.png

inflating: Dataset/training_set/I/767.png

Dataset/training_set/I/768.png

Dataset/training_set/I/769.png

inflating: inflating:

inflating: inflating:

Dataset/training_set/I/77.png

Dataset/training_set/I/770.png
Dataset/training_set/I/771.png

Dataset/training_set/I/772.png

Dataset/training_set/I/773.png

Dataset/training_set/I/774.png

inflating: Dataset/training_set/I/775.png

inflating: Dataset/training_set/I/776.png

inflating: Dataset/training_set/I/777.png

inflating: Dataset/training_set/I/778.png

inflating: Dataset/training_set/I/779.png

inflating: Dataset/training_set/I/78.png

inflating: Dataset/training_set/I/780.png

inflating: Dataset/training_set/I/781.png

inflating: Dataset/training_set/I/782.png

inflating: Dataset/training_set/I/783.png

inflating: Dataset/training_set/I/784.png

inflating: Dataset/training_set/I/785.png

inflating: Dataset/training_set/I/786.png

inflating: Dataset/training_set/I/787.png

inflating: Dataset/training_set/I/788.png

inflating: Dataset/training_set/I/789.png

inflating: Dataset/training_set/I/79.png

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Dataset/training_set/I/790.png

Dataset/training_set/I/791.png

Dataset/training_set/I/792.png

Dataset/training_set/I/793.png

extracting:

Dataset/training_set/I/794.png

inflating:

Dataset/training_set/I/795.png

inflating:

Dataset/training_set/I/796.png

inflating:

Dataset/training_set/I/797.png

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Dataset/training_set/I/798.png

inflating:

Dataset/training_set/I/799.png

inflating:

Dataset/training_set/I/8.png

inflating:

Dataset/training_set/I/80.png

inflating:

Dataset/training_set/I/800.png

inflating:

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Dataset/training_set/I/801.png

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Dataset/training_set/I/802.png

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Dataset/training_set/I/803.png

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Dataset/training_set/I/804.png

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Dataset/training_set/I/805.png

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Dataset/training_set/I/806.png

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Dataset/training_set/I/807.png

inflating:

Dataset/training_set/I/808.png

inflating:

Dataset/training_set/I/809.png

inflating:

Dataset/training_set/I/81.png

extracting:

Dataset/training_set/I/810.png

inflating: Dataset/training_set/I/811.png

Dataset/training_set/I/812.png

inflating: inflating:

inflating: inflating:

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inflating: inflating:

Dataset/training_set/I/813.png

Dataset/training_set/I/814.png

Dataset/training_set/I/815.png

inflating: inflating:

inflating: inflating:

inflating: inflating:

Dataset/training_set/I/816.png

Dataset/training_set/I/817.png

inflating: Dataset/training_set/I/818.png

inflating: Dataset/training_set/I/819.png

inflating: Dataset/training_set/I/82.png

inflating: Dataset/training_set/I/820.png

inflating: Dataset/training_set/I/821.png

inflating: Dataset/training_set/I/822.png

inflating: Dataset/training_set/I/823.png

inflating: Dataset/training_set/I/824.png

inflating: Dataset/training_set/I/825.png

inflating: Dataset/training_set/I/826.png

inflating: Dataset/training_set/I/827.png

inflating: Dataset/training_set/I/828.png

inflating: Dataset/training_set/I/829.png

inflating: Dataset/training_set/I/83.png

inflating: Dataset/training_set/I/830.png

inflating: Dataset/training_set/I/831.png

inflating: Dataset/training_set/I/832.png

inflating: Dataset/training_set/I/833.png

inflating: Dataset/training_set/I/834.png

Dataset/training_set/I/835.png

inflating: inflating:

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inflating: inflating:

Dataset/training_set/I/836.png

Dataset/training_set/I/837.png

Dataset/training_set/I/838.png
Dataset/training_set/I/839.png

Dataset/training_set/I/84.png

inflating: Dataset/training_set/I/840.png

extracting: Dataset/training_set/I/841.png

inflating: Dataset/training_set/I/842.png

inflating: Dataset/training_set/I/843.png

inflating: Dataset/training_set/I/844.png

inflating: Dataset/training_set/I/845.png

inflating: Dataset/training_set/I/846.png

inflating: Dataset/training_set/I/847.png

inflating: Dataset/training_set/I/848.png

inflating: Dataset/training_set/I/849.png

inflating: Dataset/training_set/I/85.png

inflating: Dataset/training_set/I/850.png

inflating: Dataset/training_set/I/851.png

inflating: Dataset/training_set/I/852.png

inflating: Dataset/training_set/I/853.png

inflating: Dataset/training_set/I/854.png

extracting: Dataset/training_set/I/855.png

inflating: Dataset/training_set/I/856.png

inflating: Dataset/training_set/I/857.png
inflating:

inflating: inflating:

inflating: Dataset/training_set/I/858.png

inflating: Dataset/training_set/I/859.png

extracting: Dataset/training_set/I/86.png

Dataset/training_set/I/860.png
Dataset/training_set/I/861.png

Dataset/training_set/I/862.png

extracting: Dataset/training_set/I/863.png

inflating: Dataset/training_set/I/864.png

inflating: Dataset/training_set/I/865.png

inflating: Dataset/training_set/I/866.png

inflating: Dataset/training_set/I/867.png

extracting: Dataset/training_set/I/868.png

inflating: Dataset/training_set/I/869.png

inflating: Dataset/training_set/I/87.png

inflating: Dataset/training_set/I/870.png

inflating: Dataset/training_set/I/871.png

inflating: Dataset/training_set/I/872.png

inflating: Dataset/training_set/I/873.png

inflating: Dataset/training_set/I/874.png

inflating: Dataset/training_set/I/875.png

inflating: Dataset/training_set/I/876.png

inflating: Dataset/training_set/I/877.png

inflating: Dataset/training_set/I/878.png

inflating: Dataset/training_set/I/879.png
 inflating:

inflating: inflating:

inflating: Dataset/training_set/I/88.png

inflating: Dataset/training_set/I/880.png

inflating: Dataset/training_set/I/881.png

inflating: Dataset/training_set/I/882.png

Dataset/training_set/I/883.png

inflating:

inflating: inflating:

Dataset/training_set/I/884.png

Dataset/training_set/I/885.png

extracting: Dataset/training_set/I/886.png

extracting: Dataset/training_set/I/887.png

inflating: Dataset/training_set/I/888.png

inflating: Dataset/training_set/I/889.png

inflating: Dataset/training_set/I/89.png

inflating: Dataset/training_set/I/890.png

inflating: Dataset/training_set/I/891.png

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inflating: Dataset/training_set/I/901.png

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inflating: Dataset/training_set/I/904.png

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extracting: Dataset/training_set/I/905.png

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Dataset/training_set/I/908.png

Dataset/training_set/I/909.png

inflating: Dataset/training_set/I/91.png

inflating: Dataset/training_set/I/910.png

extracting: Dataset/training_set/I/911.png

extracting: Dataset/training_set/I/912.png

inflating: Dataset/training_set/I/913.png

inflating: Dataset/training_set/I/914.png

extracting: Dataset/training_set/I/915.png

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Dataset/training_set/I/930.png

Dataset/training_set/I/931.png

inflating: Dataset/training_set/I/932.png

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Dataset/training_set/I/974.png

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inflating: Dataset/training_set/I/979.png

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extracting: Dataset/training_set/I/983.png

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inflating: Dataset/training_set/I/99.png

inflating: Dataset/training_set/I/990.png

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inflating: Dataset/training_set/I/992.png

extracting: Dataset/training_set/I/993.png

inflating: Dataset/training_set/I/994.png

inflating: Dataset/training_set/I/995.png

extracting: Dataset/training_set/I/996.png

inflating: inflating:

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Dataset/training_set/I/997.png

Dataset/training_set/I/998.png

Dataset/training_set/I/999.png

DATA AUGMENTATION

from keras.preprocessing.image import ImageDataGenerator

train_datagen=ImageDataGenerator(rescale = 1./255, shear_range=0.2,
zoom_range=0.2,horizontal_flip=True,vertical_flip=False) test_datagen =
ImageDataGenerator(rescale=1./255)

x_train = train_datagen.flow_from_directory("/content/Dataset/training_set",
target_size=(64,64),batch_size=100,

class_mode='categorical', color_mode ="grayscale")

Found 15750 images belonging to 9 classes.

x_test = test_datagen.flow_from_directory("/content/Dataset/test_set",
target_size=(64,64),batch_size=100,

class_mode='categorical', color_mode ="grayscale")

Found 2250 images belonging to 9 classes.

len(x_train)

158

len(x_test)

23

x_train.class_indices

{'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}

MODEL BUILDING

from keras.models import Sequential from keras.layers import

Dense from keras.layers import Convolution2D from

tensorflow.keras.layers import Conv2D, MaxPooling2D from

keras.layers import Dropout from keras.layers import Flatten

#Creating the model model=Sequential() #Adding the layers

model.add(Convolution2D(32,(3,3), input_shape=(64,64,1), activation = 'relu'))

model.add(MaxPooling2D(pool_size=(2,2))) model.add(Flatten())

#adding hidden layers model.add(Dense(400,

activation='relu')) model.add(Dense(200,

activation='relu')) model.add(Dense(100,

activation='relu'))

#Adding the output layer model.add(Dense(9, activation='softmax'))

model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy'])

model.fit_generator(x_train, steps_per_epoch=30, epochs=10,
validation_data=x_test,validation_steps=50)

Epoch 1/10

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.

  """"Entry point for launching an IPython kernel.

30/30 [==============================] - ETA: 0s - loss: 0.0083 - accuracy: 0.9957

WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps_per_epoch * epochs` batches (in this case, 50 batches). You may need to use the repeat() function when building your dataset.

30/30 [==============================] - 18s 587ms/step - loss: 0.0083 - accuracy: 0.9957 - val_loss: 0.2910 - val_accuracy: 0.9693

Epoch 2/10

30/30 [==============================] - 12s 402ms/step - loss: 0.0081 - accuracy: 0.9980

Epoch 3/10

30/30 [==============================] - 12s 400ms/step - loss: 0.0102 - accuracy: 0.9963

Epoch 4/10

30/30 [==============================] - 12s 402ms/step - loss: 0.0049 - accuracy: 0.9993

Epoch 5/10

30/30 [==============================] - 12s 402ms/step - loss: 0.0030 - accuracy: 0.9997

Epoch 6/10

30/30 [==============================] - 12s 394ms/step - loss: 0.0019 - accuracy: 0.9997

Epoch 7/10

30/30 [==============================] - 12s 401ms/step - loss: 0.0081 - accuracy: 0.9973

Epoch 8/10

30/30 [==============================] - 12s 402ms/step - loss: 0.0124 - accuracy: 0.9960

Epoch 9/10

30/30 [==============================] - 12s 401ms/step - loss: 0.0070 - accuracy: 0.9987

Epoch 10/10

30/30 [==============================] - 12s 399ms/step - loss: 0.0089 - accuracy: 0.9973

```
model.save('Real_time.h5')
```

TEST THE MODEL

```
from tensorflow.keras.models import load_model from

tensorflow.keras.preprocessing import image

import numpy as np

import cv2 model = load_model('/content/Real_time.h5') img =

image.load_img('/content/Dataset/test_set/H/107.png',target_size = (100,100))

img


from skimage.transform import resize def

detect(frame):
```

```python
img=image.img_to_array(frame) img =

resize(img,(64,64,1)) img =

np.expand_dims(img,axis=0)

pred=np.argmax(model.predict(img))

op=['A','B','C','D','E','F','G','H','I']

print("THE PREDICTED LETTER IS ",op[pred])
```

img=image.load_img("/content/Dataset/test_set/H/107.png") detect(img)

1/1 [=============================] - 0s 28ms/step THE

PREDICTED LETTER IS H

img = image.load_img('/content/Dataset/test_set/A/110.png') pred=detect(img)

1/1 [=============================] - 0s 26ms/step THE

PREDICTED LETTER IS A

img=image.load_img('/content/Dataset/test_set/E/111.png') detect(img)

1/1 [============================] - 0s 30ms/step

THE PREDICTED LETTER IS E