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@hidden\_cell\n# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.\n# You might want to remove those credentials before you share the notebook.\ncos\_client = ibm\_boto3.client(service\_name='s3',\n ibm\_api\_key\_id='mT4yG1S3H9nBBV3UAwsgkb5FH89r-koWMhH4gnnWTjhN',\n ibm\_auth\_endpoint=\"https://iam.cloud.ibm.com/oidc/token\",\n config=Config(signature\_version='oauth'),\n endpoint\_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')\n\nbucket = 'imageclassification-donotdelete-pr-u5ptdjnvogkjw6'\nobject\_key = 'Dataset.zip'\n\nstreaming\_body\_2 = cos\_client.get\_object(Bucket=bucket, Key=object\_key)['Body']\n\n# Your data file was loaded into a botocore.response.StreamingBody object.\n# Please read the documentation of ibm\_boto3 and pandas to learn more about the possibilities to load the data.\n# ibm\_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/\n# pandas documentation: http://pandas.pydata.org/\n", "execution\_count": 5, "outputs": []}, {"metadata": {}, "id": "f280560f", "cell\_type": "code", "source": "# Unzip the Dataset Zip File\nfrom io import BytesIO\nimport zipfile\nunzip = zipfile.ZipFile(BytesIO(streaming\_body\_2.read()), 'r')\nfile\_paths = unzip.namelist()\nfor path in file\_paths:\n unzip.extract(path)", "execution\_count": 7, "outputs": []}, {"metadata": {}, "id": "ea8e0258", "cell\_type": "code", "source": "%%bash\nls Dataset", "execution\_count": 8, "outputs": [{"output\_type": "stream", "text": "test\_set\ntraining\_set\n", "name": "stdout"}]}, {"metadata": {}, "id": "abb15498-7081-4159-8bc2-9446325480b8", "cell\_type": "code", "source": "# Training Dataset\nx\_train=train\_datagen.flow\_from\_directory(r'/home/wsuser/work/Dataset/training\_set',target\_size=(64,64), class\_mode='categorical',batch\_size=900)\n# Testing Dataset\nx\_test=test\_datagen.flow\_from\_directory(r'/home/wsuser/work/Dataset/test\_set',target\_size=(64,64), class\_mode='categorical',batch\_size=900)", "execution\_count": 9, "outputs": [{"output\_type": "stream", "text": "Found 15750 images belonging to 9 classes.\nFound 2250 images belonging to 9 classes.\n", "name": "stdout"}]}, {"metadata": {}, "id": "95d51502-6c7f-481f-93d1-fbbf8d4b8312", "cell\_type": "code", "source": "print(\"Len x-train : \", len(x\_train))\nprint(\"Len x-test : \", len(x\_test))", "execution\_count": 10, "outputs": [{"output\_type": "stream", "text": "Len x-train : 18\nLen x-test : 3\n", "name": "stdout"}]}, {"metadata": {}, "id": "0c7bd1a5-f00c-4e38-8b2b-7d72b87c8342", "cell\_type": "code", "source": "# The Class Indices in Training Dataset\nx\_train.class\_indices", "execution\_count": 11, "outputs": [{"output\_type": "execute\_result", "execution\_count": 11, "data": {"text/plain": "{'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}"}, "metadata": {}}]}, {"metadata": {}, "id": "587735d2-c2e1-41d9-9977-c2cc95d292d1", "cell\_type": "markdown", "source": "### Model Creation"}, {"metadata": {}, "id": "ce455129-151f-4d93-b620-f9db2406426a", "cell\_type": "code", "source": "# Importing Libraries\nfrom tensorflow.keras.models import Sequential\nfrom tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense", "execution\_count": 12, "outputs": []}, {"metadata": {}, "id": "c153d655-bf2a-4736-86b6-ec89a4e165c9", "cell\_type": "code", "source": "# Creating Model\nmodel=Sequential()", "execution\_count": 13, "outputs": [{"output\_type": "stream", "text": "2022-11-09 13:34:42.826857: W tensorflow/stream\_executor/platform/default/dso\_loader.cc:64] Could not load dynamic library 'libcuda.so.1'; 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Please use `Model.fit`, which supports generators.\n model.fit\_generator(x\_train,steps\_per\_epoch=len(x\_train),epochs=10,validation\_data=x\_test,validation\_steps=len(x\_test))\n", "name": "stderr"}, {"output\_type": "stream", "text": "Epoch 1/10\n18/18 [==============================] - 74s 4s/step - loss: 1.3704 - accuracy: 0.5568 - val\_loss: 0.4835 - val\_accuracy: 0.8809\nEpoch 2/10\n18/18 [==============================] - 74s 4s/step - loss: 0.3403 - accuracy: 0.8987 - val\_loss: 0.2734 - val\_accuracy: 0.9187\nEpoch 3/10\n18/18 [==============================] - 74s 4s/step - loss: 0.1527 - accuracy: 0.9580 - val\_loss: 0.2531 - val\_accuracy: 0.9444\nEpoch 4/10\n18/18 [==============================] - 75s 4s/step - loss: 0.0862 - accuracy: 0.9771 - val\_loss: 0.2031 - val\_accuracy: 0.9622\nEpoch 5/10\n18/18 [==============================] - 73s 4s/step - loss: 0.0526 - accuracy: 0.9865 - val\_loss: 0.2335 - val\_accuracy: 0.9640\nEpoch 6/10\n18/18 [==============================] - 75s 4s/step - loss: 0.0343 - accuracy: 0.9923 - val\_loss: 0.2349 - val\_accuracy: 0.9724\nEpoch 7/10\n18/18 [==============================] - 73s 4s/step - loss: 0.0252 - accuracy: 0.9944 - val\_loss: 0.2387 - val\_accuracy: 0.9738\nEpoch 8/10\n18/18 [==============================] - 74s 4s/step - loss: 0.0176 - accuracy: 0.9962 - val\_loss: 0.2614 - val\_accuracy: 0.9693\nEpoch 9/10\n18/18 [==============================] - 74s 4s/step - loss: 0.0152 - accuracy: 0.9968 - val\_loss: 0.2669 - val\_accuracy: 0.9724\nEpoch 10/10\n18/18 [==============================] - 74s 4s/step - loss: 0.0145 - accuracy: 0.9970 - val\_loss: 0.2757 - val\_accuracy: 0.9747\n", "name": "stdout"}, {"output\_type": "execute\_result", "execution\_count": 16, "data": {"text/plain": "<keras.callbacks.History at 0x7f41ec41c850>"}, "metadata": {}}]}, {"metadata": {}, "id": "05ad001b-c47a-4d0b-9cdb-d085afd83383", "cell\_type": "markdown", "source": "### Saving the Model"}, 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/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.18.21)\nRequirement already satisfied: pandas in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.3.4)\nRequirement already satisfied: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (0.8.9)\nRequirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2.26.0)\nRequirement already satisfied: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2022.9.24)\nRequirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)\nRequirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.10.0)\nRequirement already satisfied: s3transfer<0.6.0,>=0.5.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.5.0)\nRequirement already satisfied: botocore<1.22.0,>=1.21.21 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (1.21.41)\nRequirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (2.8.2)\nRequirement already satisfied: six>=1.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from python-dateutil<3.0.0,>=2.1->botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (1.15.0)\nRequirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)\nRequirement already satisfied: ibm-cos-sdk-core==2.11.0 in 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To display more use 'limit' parameter.\n", "name": "stdout"}]}, {"metadata": {}, "id": "321900d6", "cell\_type": "code", "source": "software\_spec\_uid = client.software\_specifications.get\_uid\_by\_name(\"tensorflow\_rt22.1-py3.9\")\nsoftware\_spec\_uid", "execution\_count": 27, "outputs": [{"output\_type": "execute\_result", "execution\_count": 27, "data": {"text/plain": "'acd9c798-6974-5d2f-a657-ce06e986df4d'"}, "metadata": {}}]}, {"metadata": {}, "id": "2f14f100", "cell\_type": "code", "source": "model\_details = client.repository.store\_model(model='trainedModel.tgz', meta\_props={\n client.repository.ModelMetaNames.NAME: \"CNN\",\n client.repository.ModelMetaNames.SOFTWARE\_SPEC\_UID: software\_spec\_uid,\n client.repository.ModelMetaNames.TYPE: \"tensorflow\_2.7\"})\nmodel\_id = client.repository.get\_model\_id(model\_details)", "execution\_count": 31, "outputs": []}, {"metadata": {}, "id": "05aa1f51", "cell\_type": "code", "source": "model\_id", "execution\_count": 32, "outputs": [{"output\_type": "execute\_result", "execution\_count": 32, "data": {"text/plain": "'eec72d86-8ba8-46cc-8588-c9ff4bf89c85'"}, "metadata": {}}]}, {"metadata": {}, "id": "e65f53c9", "cell\_type": "code", "source": "client.repository.download(model\_id,'aslpng1.tar.gz')", "execution\_count": 35, "outputs": [{"output\_type": "stream", "text": "Successfully saved model content to file: 'aslpng1.tar.gz'\n", "name": "stdout"}, {"output\_type": "execute\_result", "execution\_count": 35, "data": {"text/plain": "'/home/wsuser/work/aslpng1.tar.gz'"}, "metadata": {}}]}, {"metadata": {}, "id": "3451fb10", "cell\_type": "code", "source": "", "execution\_count": null, "outputs": []}], "metadata": {"interpreter": {"hash": "4f0f97fd6c5ecc85c2cf8f5e01f5fe1d66323d0c47c6f4b81bd3f87b7ad3ebb6"}, "kernelspec": {"name": "python3", "display\_name": "Python 3.9", "language": "python"}, "language\_info": {"name": "python", "version": "3.9.13", "mimetype": "text/x-python", "codemirror\_mode": {"name": "ipython", "version": 3}, "pygments\_lexer": "ipython3", "nbconvert\_exporter": "python", "file\_extension": ".py"}}, "nbformat": 4, "nbformat\_minor": 5}