



SRPCE
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SUBJECT:- cloud Application Development



IBM Cloud ML Development



Write a introduction and module and functions for machine learning and development with IBM cloud in sample program



Certainly! Here's a sample Python program that includes an introduction, module imports, and functions for machine learning development with IBM Cloud using IBM Watson Studio. This program assumes you have already set up your IBM Cloud and Watson Studio environment.

python

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```
# Introduction
```

```
"""
```

```
This sample program demonstrates how to perform machine learning
We will use various modules and functions to create, train, and d
"""
```

```
# Module Imports
```

```
import ibm_boto3
```

```
from ibm_botocore.client import Config
```

```
import pandas as pd
```

```
from sklearn.model_selection import train_test_split
```

```
from sklearn.ensemble import RandomForestClassifier
```

```
from watson_machine_learning import APIClient
```

```
# IBM Cloud Object Storage Configuration
```

```
cos_credentials = {
```

```
    "apikey": "YOUR_API_KEY",
```

```
    "cos_hmac_keys": {
```

```
        "access_key_id": "YOUR_ACCESS_KEY_ID",
```

```
        "secret_access_key": "YOUR_SECRET_ACCESS_KEY"
```

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    },
    "endpoints": "YOUR_ENDPOINT",
    "iam_apikey_description": "YOUR_API_KEY_DESCRIPTION",
    "iam_apikey_name": "YOUR_API_KEY_NAME",
    "iam_role_crn": "YOUR_IAM_ROLE_CRN",
    "iam_serviceid_crn": "YOUR_IAM_SERVICEID_CRN",
    "resource_instance_id": "YOUR_RESOURCE_INSTANCE_ID"
}

cos_client = ibm_boto3.client("s3",
    ibm_api_key_id=cos_credentials["apikey"],
    ibm_service_instance_id=cos_credentials["resource_instance_id"],
    config=Config(signature_version="oauth"),
    endpoint_url=cos_credentials["endpoints"]
)

# Load Data
def load_data():
    cos_client.download_file(Bucket="YOUR_BUCKET_NAME", Key="data.csv")
    data = pd.read_csv("data.csv")
    return data

# Train Machine Learning Model
def train_model(data):
    X = data.drop("target", axis=1)
    y = data["target"]
    X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)

    model = RandomForestClassifier(n_estimators=100)
    model.fit(X_train, y_train)

    return model

# Deploy Model to IBM Watson Machine Learning
def deploy_model(model):
    wml_credentials = {

```

```

        "url": "YOUR_WML_URL",
        "apikey": "YOUR_WML_API_KEY",
        "instance_id": "YOUR_WML_INSTANCE_ID"
    }

    client = APIClient(wml_credentials)

    model_props = {
        client.repository.ModelMetaNames.NAME: "Sample Model",
        client.repository.ModelMetaNames.FRAMEWORK_NAME: "scikit-",
        client.repository.ModelMetaNames.FRAMEWORK_VERSION: "0.23"
    }

    model_details = client.repository.store_model(model, meta_props=model_props)

    deployment_props = {
        client.deployments.ConfigurationMetaNames.NAME: "Sample Deployment",
        client.deployments.ConfigurationMetaNames.ONLINE: {}
    }

    deployment = client.deployments.create(model_details["metadata"], deployment_props)

    return deployment

# Main Function
if __name__ == "__main__":
    data = load_data()
    model = train_model(data)
    deployment = deploy_model(model)
    print("Model deployed to IBM Watson Machine Learning.")

```

Make sure to replace the placeholders (e.g., YOUR_API_KEY, YOUR_ENDPOINT, YOUR_BUCKET_NAME, etc.) with your actual IBM Cloud and Watson Studio information. This sample program demonstrates how to load data from IBM Cloud Object Storage, train a machine learning model, and deploy it to IBM Watson Machine Learning.