MACHINE LEARNING OPERATIONS

FAKULTAS ILMU KOMPUTER

UNIVERSITAS BRAWIJAYA

BAB	: MAKEFILE
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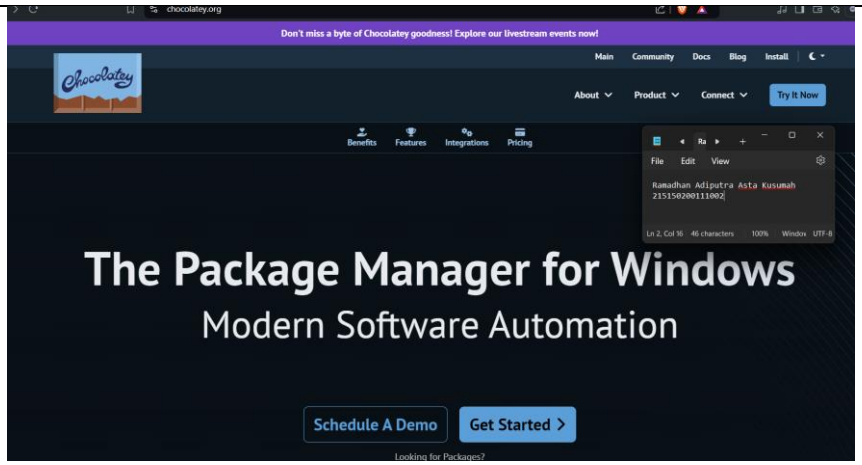
TANGGAL	: 05/09/2024

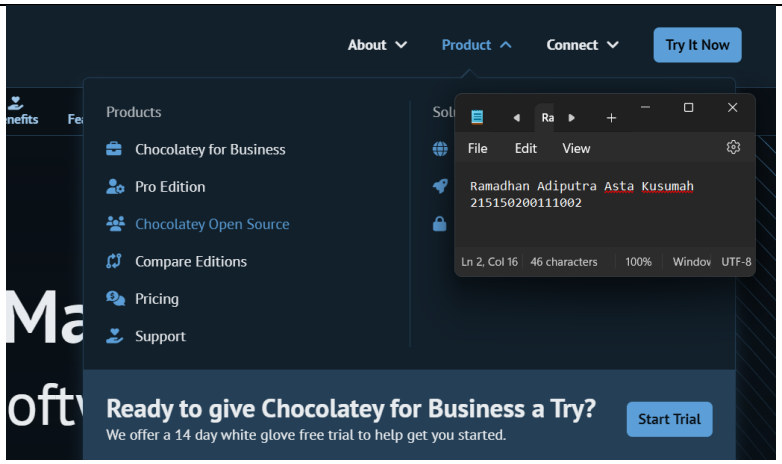
1.1 Instalasi Makefile

1. Instalasi *Chocholatey Package Manager*

    1. Buka Website resmi *Chocolatey*

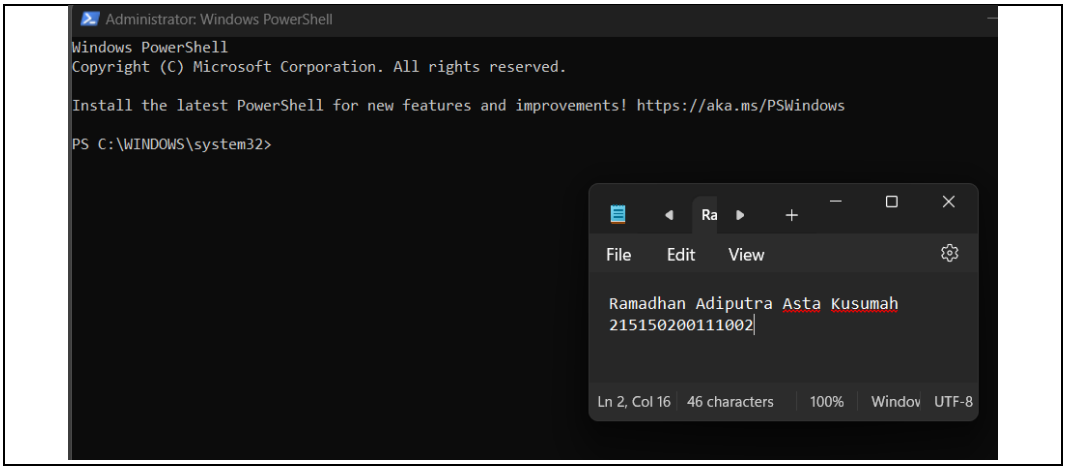


    2. Klik *Product* dan *Chocolatey Open Source*

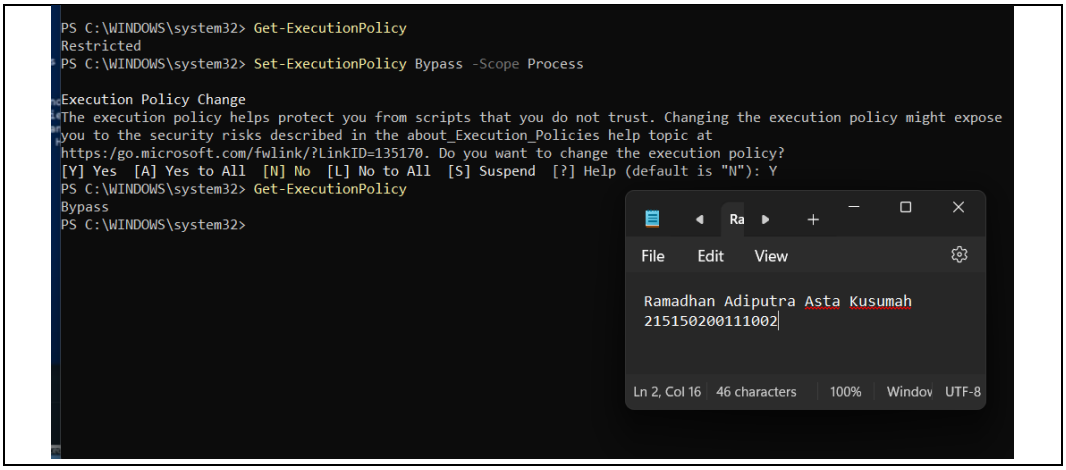


3. Klik *Install Chocolatey*

4. Mengikuti langkah instalasi dengan membuka PowerShell dengan akses administrator

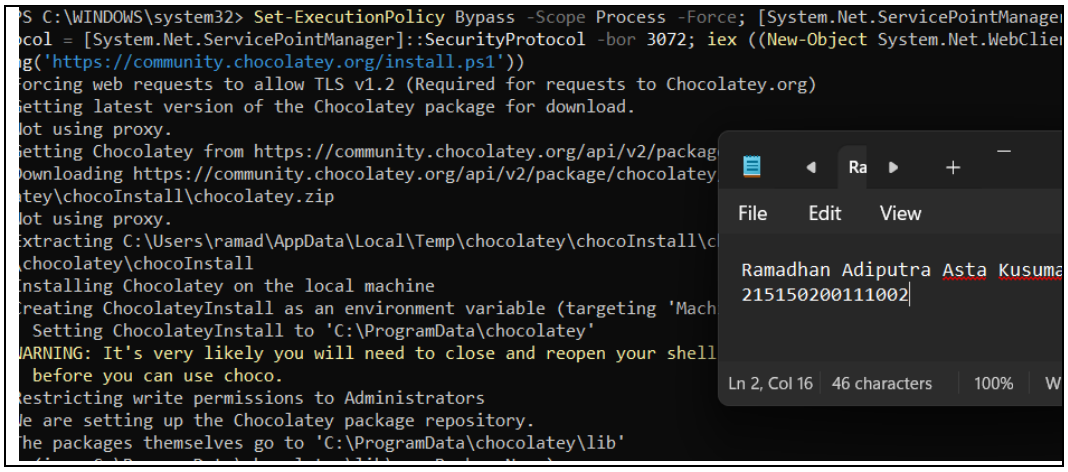


5. Cek *ExecutionPolicy* apabila *Restricted* ubah menjadi *Bypass*

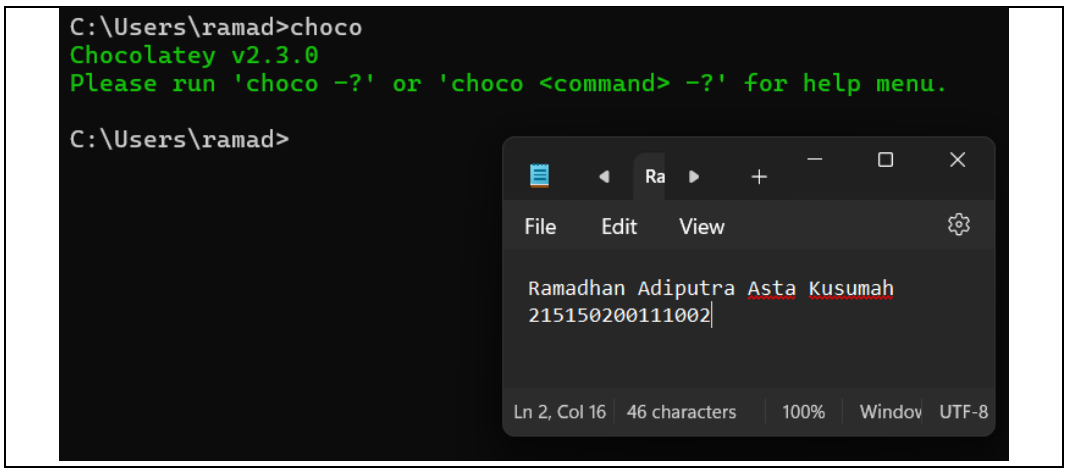


6. Jalankan *command* untuk install *Chocolatey*

```
Set-ExecutionPolicy Bypass -Scope Process -Force; [System.Net.ServicePointManager]::SecurityProtocol = [System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object System.Net.WebClient).DownloadString('https://community.chocolatey.org/install.ps1'))
```

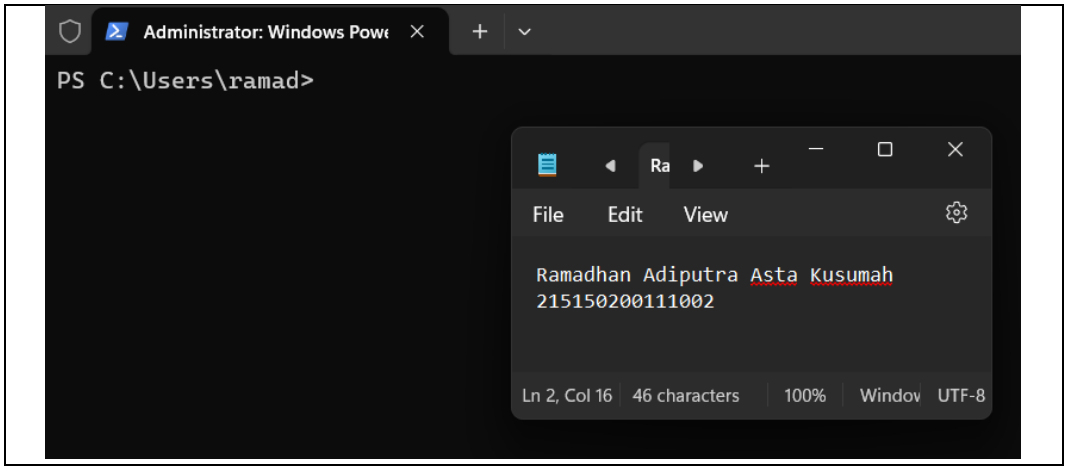


7. *Chocolatey* sudah bisa digunakan



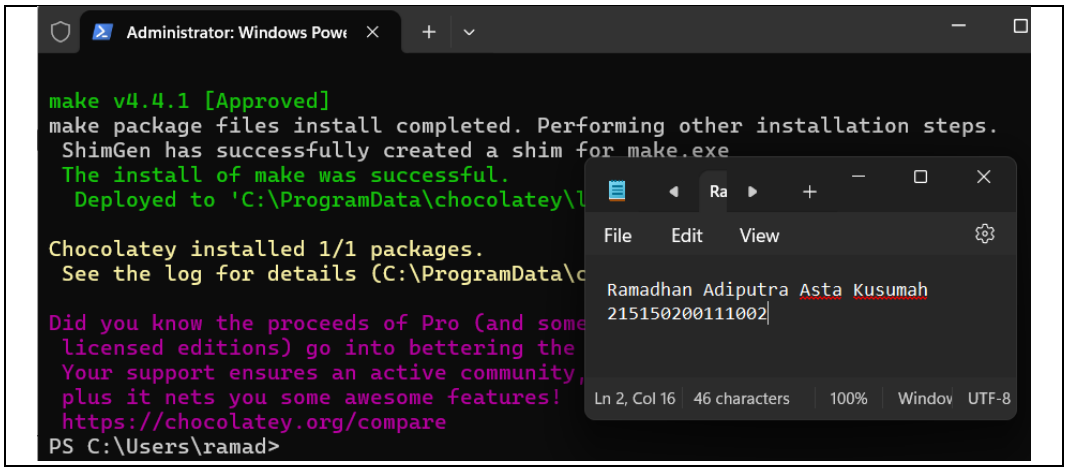
2. Instalasi *Make*

8. Buka aplikasi Terminal dengan akses administrator

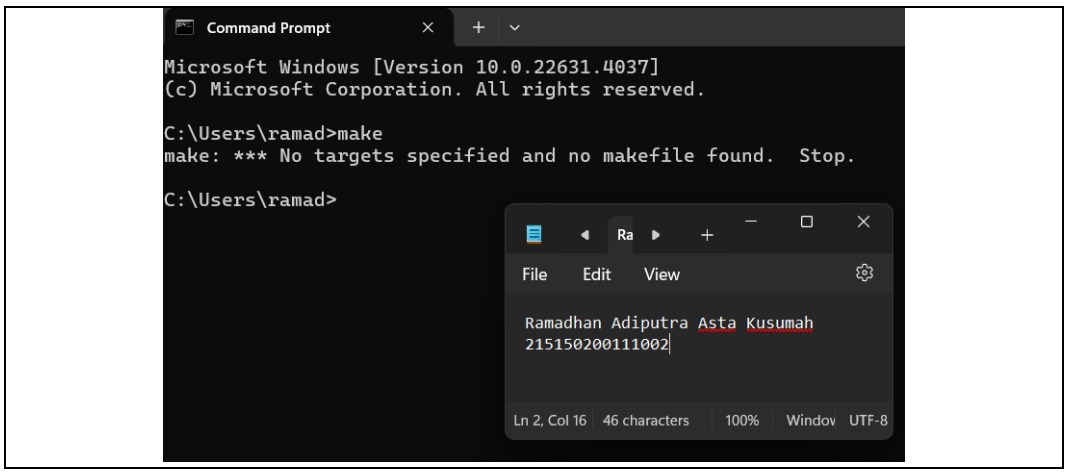


9. Jalankan *command*

```
choco install make
```

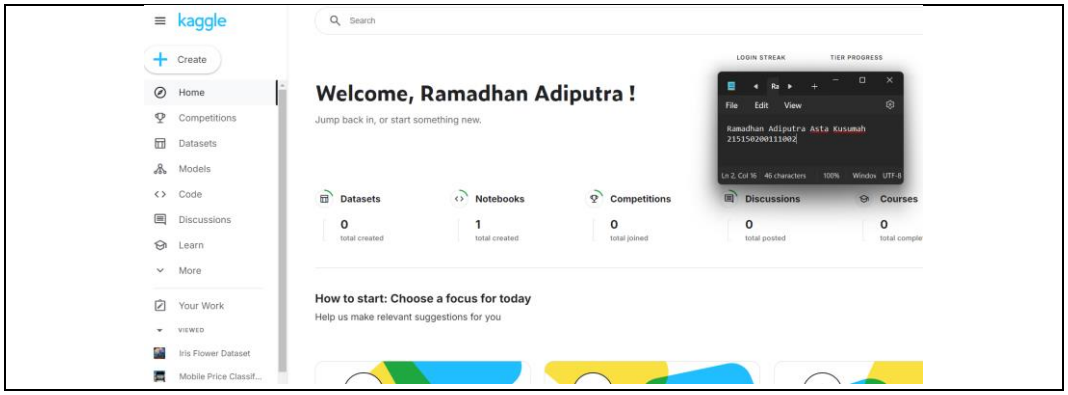


10. *Make* sudah bisa digunakan

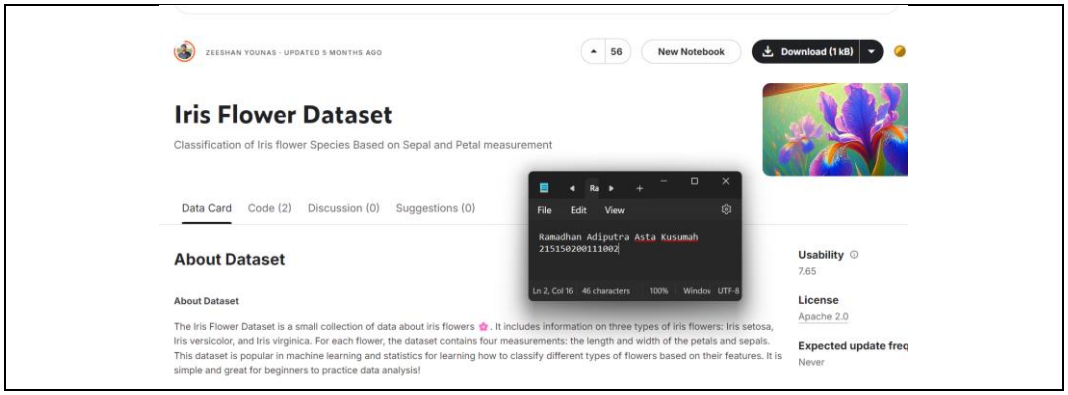


1.2 Download dataset Iris

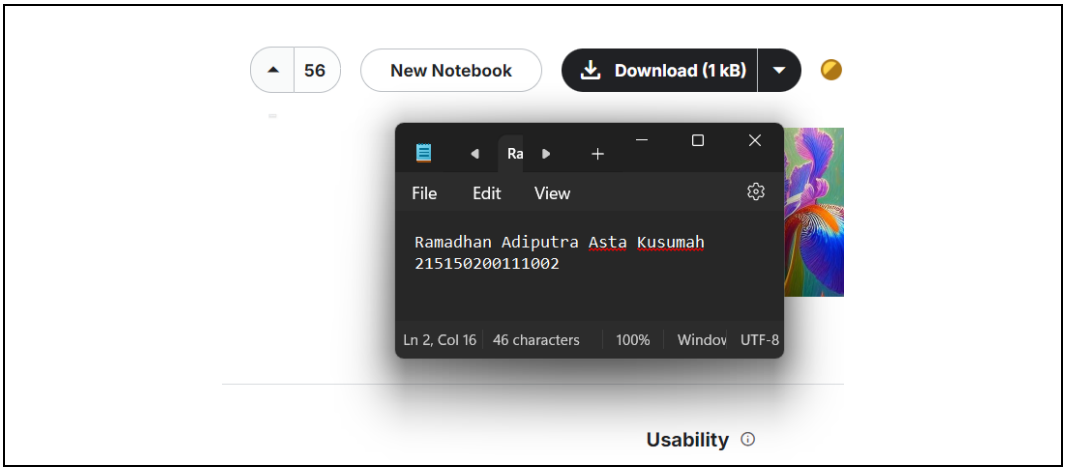
1. Buka kaggle



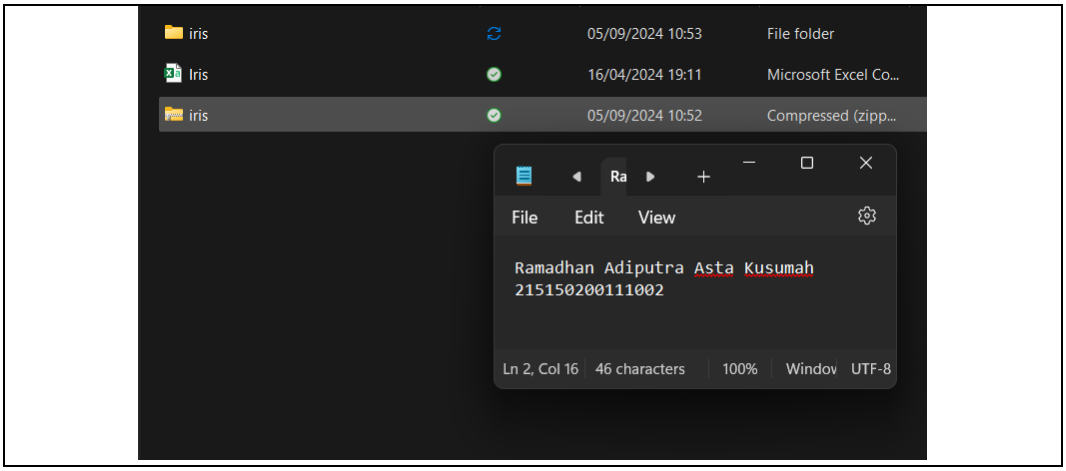
2. Cari dataset bernama *Iris Flower Dataset*



3. Klik *Download*



4. Unzip dataset dan tempatkan di folder data



1.3 Scripting Python dan Makefile

1. Python *script* untuk persiapan data

```
import pandas as pd
import sklearn
from sklearn.model_selection import train_test_split
import joblib

def prepare_data():
    file_path = 'data/iris.csv'
    df = pd.read_csv(file_path)

    feature_names = [col for col in df.columns if col != 'Species']
```

```
    target_name = 'Species'

    X = df[feature_names]
    y = df[target_name]

    y = pd.Categorical(y).codes

    X_train, X_test, y_train, y_test = train_test_split(
        X, y, test_size=0.3, random_state=42
    )

    joblib.dump((X_train, y_train), 'data/X_train.pkl')
    joblib.dump((X_test, y_test), 'data/X_test.pkl')
    print("Data preparation complete and data saved to
disk.")

if __name__ == "__main__":
    prepare_data()
```

2. Python *script* untuk melatih model

```
from sklearn.linear_model import LogisticRegression
import joblib

def train_model():
    X_train, y_train = joblib.load('data/X_train.pkl')

    model = LogisticRegression(max_iter=200)
    model.fit(X_train, y_train)

    print("Model training complete.")

    return model

if __name__ == "__main__":
    train_model()
```

3. Python *script* untuk evaluasi model

```
from sklearn.metrics import classification_report
import joblib
from train_model import train_model
```

```
def evaluate_model():
    model = train_model()
    X_test, y_test = joblib.load('data/X_test.pkl')
    y_pred = model.predict(X_test)


    report = classification_report(y_test, y_pred,
target_names=['setosa', 'versicolor', 'virginica'])

    print("Model Evaluation Report:")
    print(report)


if __name__ == "__main__":
    evaluate_model()
```

4. Python *script* untuk deploy model

```
import joblib
from train_model import train_model

def deploy_model():
    model = train_model()
    joblib.dump(model,
'models/logistic_regression_model.pkl')

if __name__ == "__main__":
    deploy_model()
```

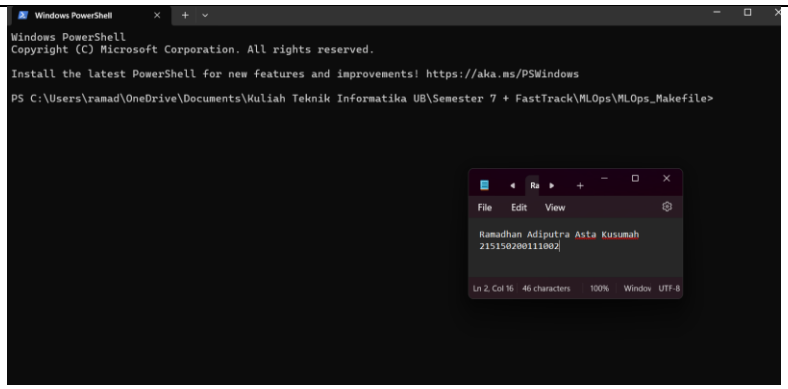
5. *Makefile script* untuk otomasi

```
DATA_PREP_SCRIPT = scripts/data_prep.py
TRAIN_MODEL_SCRIPT = scripts/train_model.py
EVALUATE_MODEL_SCRIPT = scripts/evaluate_model.py
DEPLOY_MODEL_SCRIPT = scripts/deploy_model.py
REQUIREMENTS_FILE = requirements.txt

all: install data train evaluate deploy

install:
    @echo "Installing dependencies"
    pip install -r $(REQUIREMENTS_FILE)
```

```
data:
    @echo "Preparing data..."
    python $(DATA_PREP_SCRIPT)

train:
    @echo "Training model..."
    python $(TRAIN_MODEL_SCRIPT)

evaluate:
    @echo "Evaluating model..."
    python $(EVALUATE_MODEL_SCRIPT)

deploy:
    @echo "Deploying model..."
    python $(DEPLOY_MODEL_SCRIPT)

.PHONY: all install data train evaluate deploy clean
```

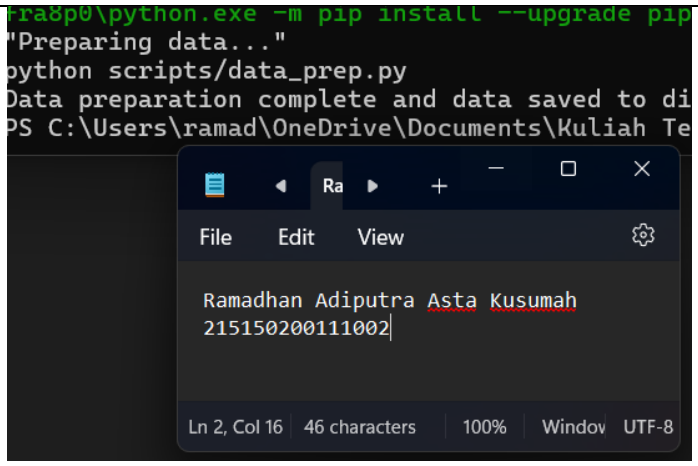
1.4 Running Make

1. Buka Terminal



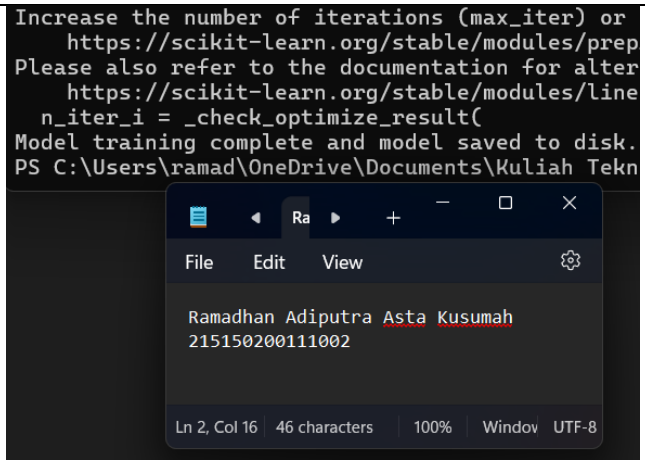
2. Jalankan perintah

```
make data
```



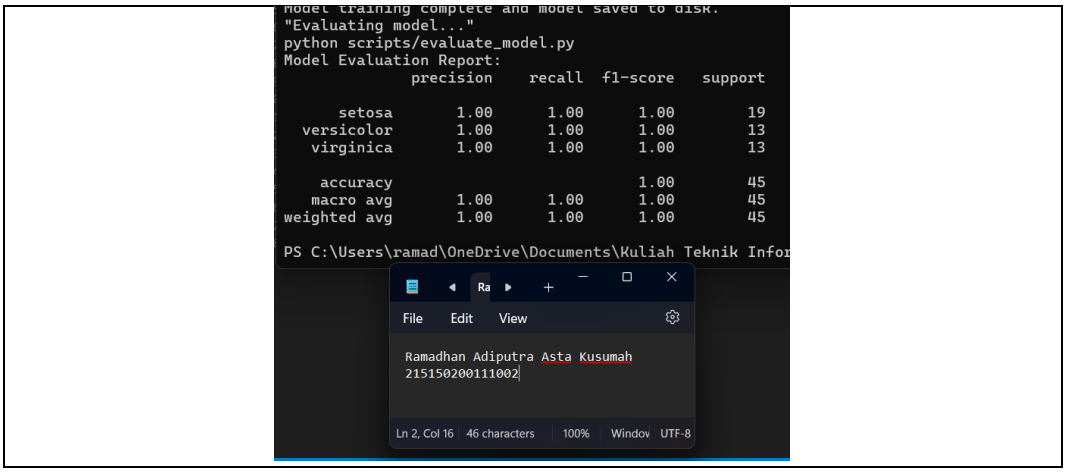
3. Jalankan perintah

```
make train
```



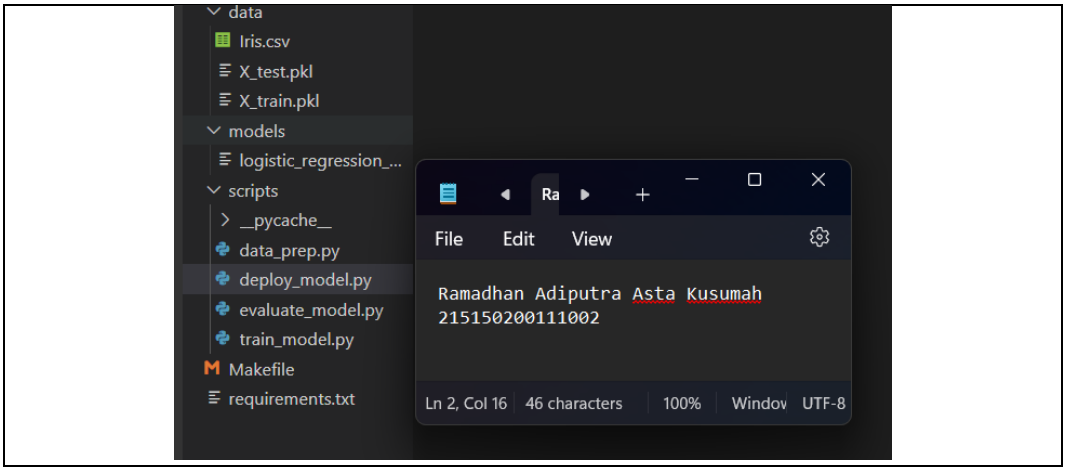
4. Jalankan perintah

```
make evaluate
```



5. Jalankan perintah

```
make deploy
```



1.5 Laporan Akhir

1. Kendala dan penyelesaian dalam pembuatan tugas

No	Kendala	Solusi
1	Perlu instalasi package manager sebelum install make	Mengikuti tutorial di internet
2	Running make sempat error karena library python	Menambahkan requirements.txt dan mengunduhnya dengan command make install
3	Waktu yang terbatas	-

2. Link GitHub Jupyter Notebook

https://github.com/RamaAsta/MLOps_Makefile