SK5004 Pembelajaran Mesin dan Kecerdasan Buatan

Tugas 3 (Minggu 10)

Support Vector Machine

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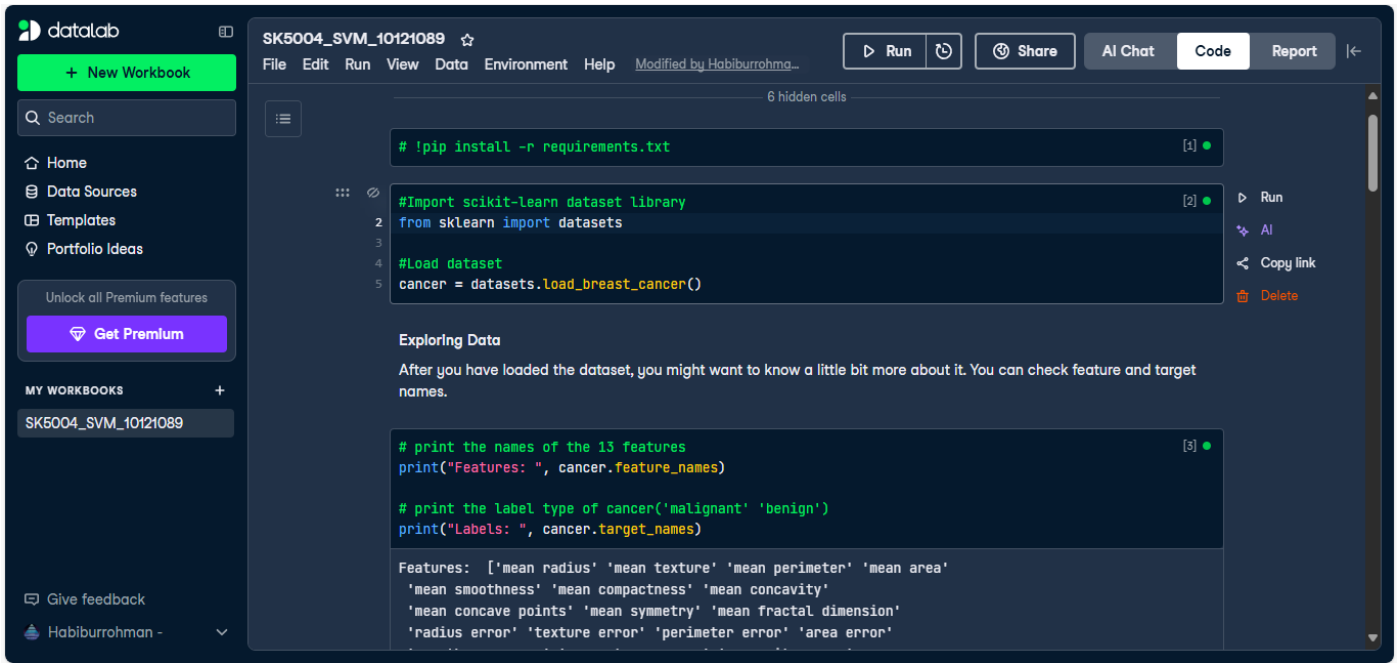
1. Eksekusi Program pada Platform DataCamp

Program bersumber dari website DataCamp (https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python). Setelah dicoba, kode program dapat dijalankan tanpa *error* (https://www.datacamp.com/datalab/w/bf4d0cd0-c6ca-4a7f-a8e3-7ce76f4a575c/edit).



2. Eksekusi Program pada Komputer Lokal

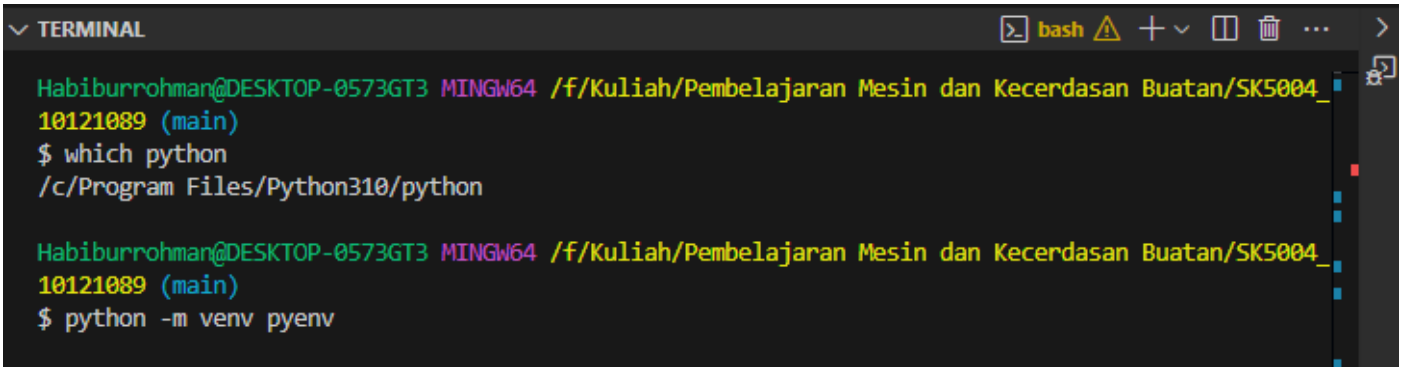
Program pada bagian sebelumnya akan dijalankan pada komputer lokal. Dalam hal ini, digunakan *code editor* berupa Visual Studio Code yang menyediakan ekstensi Jupyter Notebook. Setelah memasang *library* yang diperlukan, yakni 'scikit-learn', kode program dapat dijalankan tanpa *error*.

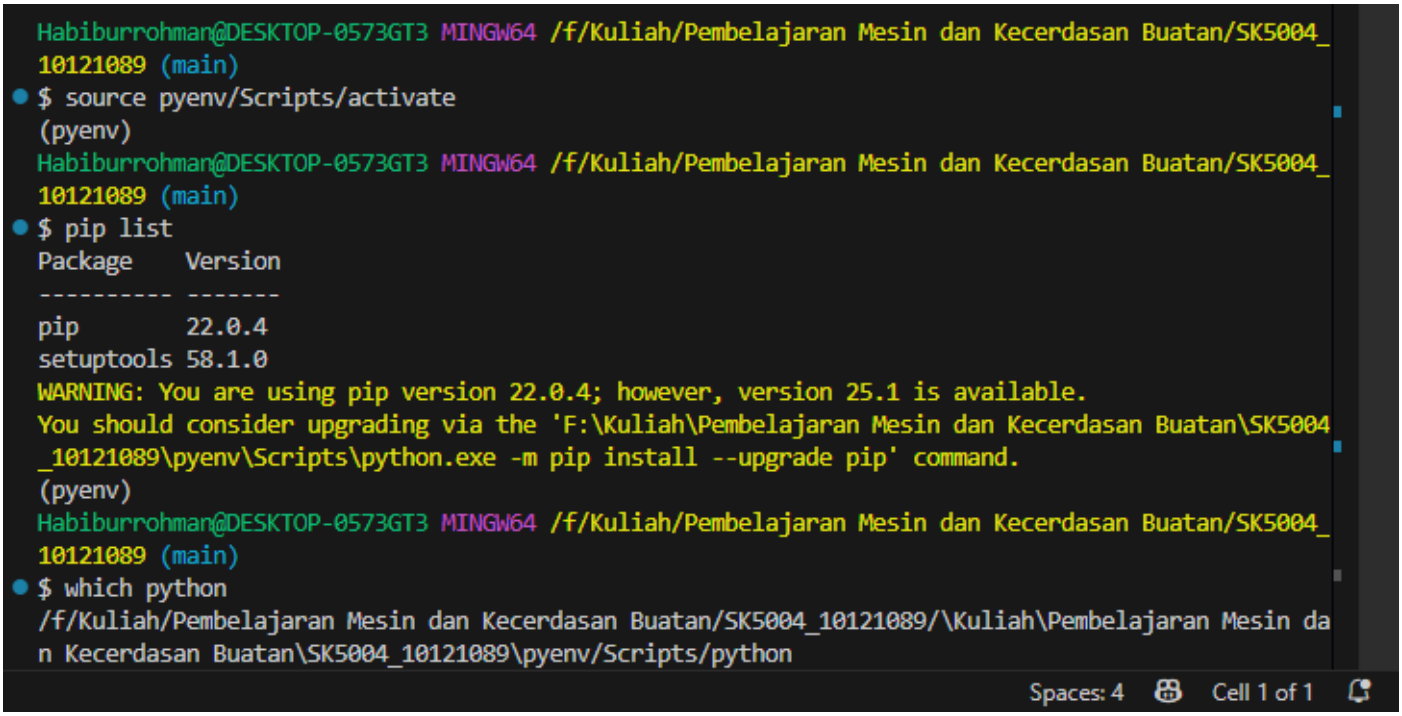
```
# Import scikit-learn dataset library
from sklearn import datasets

# Import train_test_split function
from sklearn.model_selection import train_test_split
```

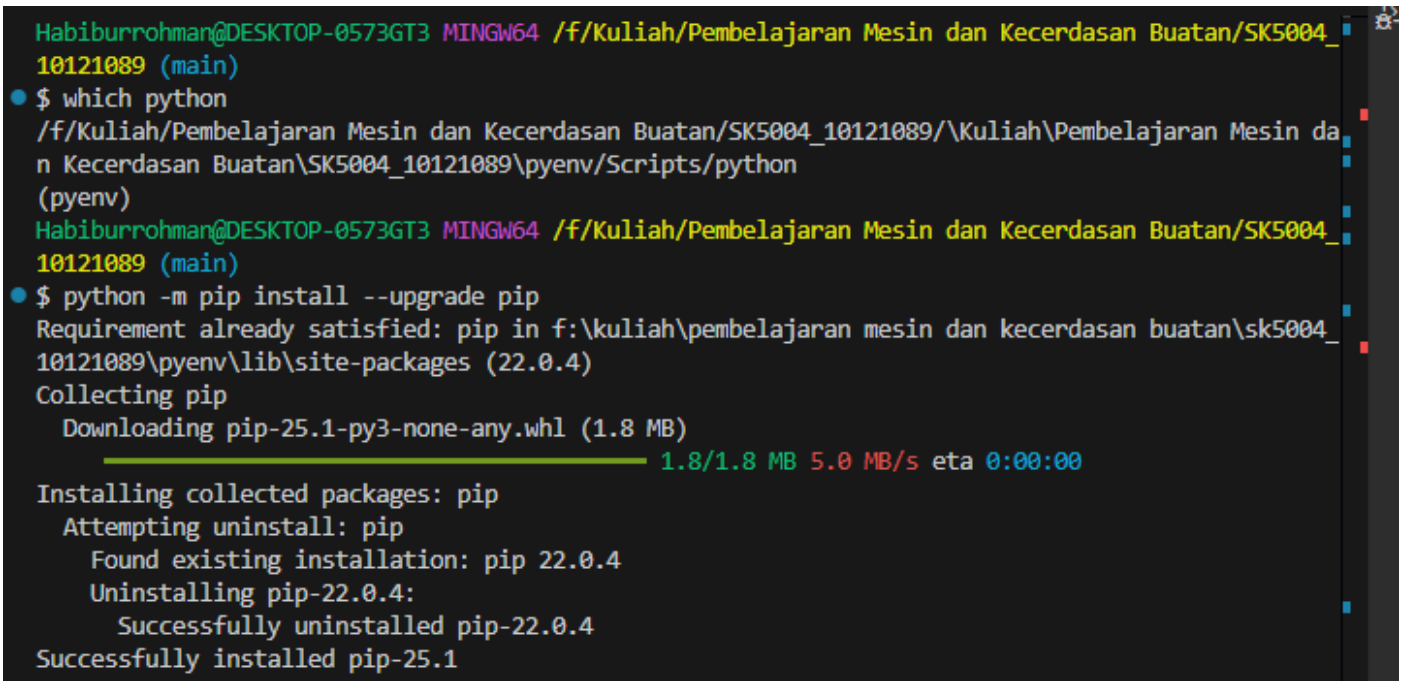
```
# Import svm model
from sklearn import svm

# Import scikit-learn metrics module for accuracy calculation
from sklearn import metrics

# Load dataset
cancer = datasets.load_breast_cancer()

# print the names of the 13 features
print("Features: ", cancer.feature_names)

# print the label type of cancer('malignant' 'benign')
print("Labels: ", cancer.target_names)

# print data(feature)shape
print(cancer.data.shape)

# print the cancer data features (top 5 records)
print(cancer.data[0:5])

# print the cancer labels (0:malignant, 1:benign)
print(cancer.target)

# Split dataset into training set and test set
X_train, X_test, y_train, y_test = train_test_split(cancer.data, cancer.target,
test_size=0.3, random_state=109) # 70% training and 30% test

# Create a svm Classifier
clf = svm.SVC(kernel='linear') # Linear Kernel

# Train the model using the training sets
clf.fit(X_train, y_train)

# Predict the response for test dataset
y_pred = clf.predict(X_test)

# Model Accuracy: how often is the classifier correct?
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))

# Model Precision: what percentage of positive tuples are labeled as such?
print("Precision:",metrics.precision_score(y_test, y_pred))

# Model Recall: what percentage of positive tuples are labelled as such?
print("Recall:",metrics.recall_score(y_test, y_pred))
```

3. Pembuatan Lingkungan Virtual Python pada Komputer Lokal

Dengan menggunakan terminal Bash pada *code editor* yang sama, dibuat sebuah *virtual environment* untuk bahasa Python.







```
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$ pip list
Package    Version
---------- -------
pip        25.1
setuptools 58.1.0
```

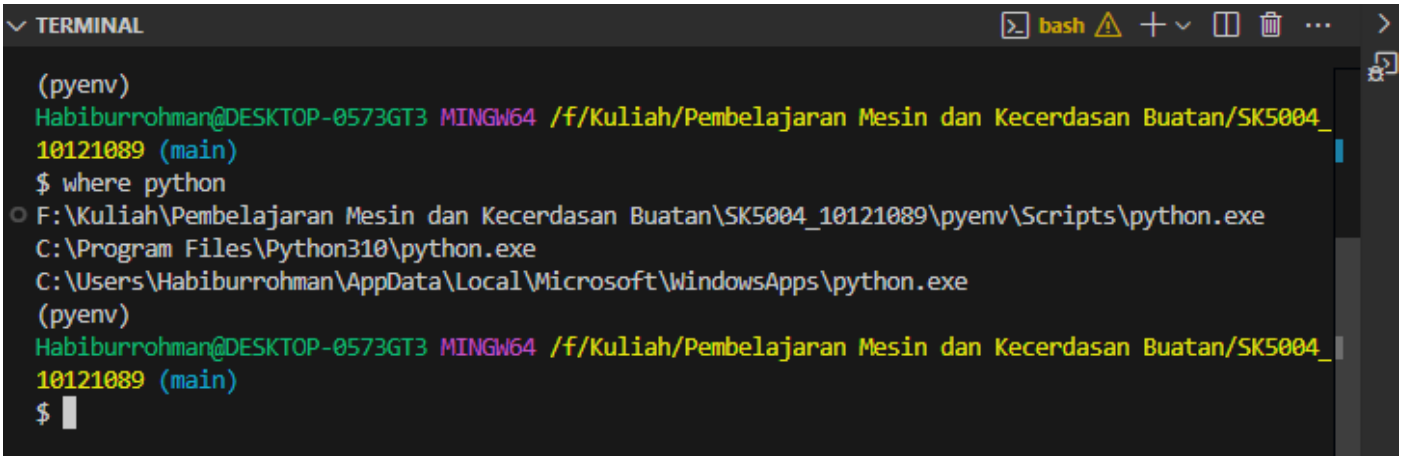
```
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$ pip install numpy matplotlib pandas seaborn scikit-learn
Collecting numpy
  Using cached numpy-2.2.5-cp310-cp310-win_amd64.whl.metadata (60 kB)
Collecting matplotlib
  Using cached matplotlib-3.10.1-cp310-cp310-win_amd64.whl.metadata (11 kB)
Collecting pandas
  Using cached pandas-2.2.3-cp310-cp310-win_amd64.whl.metadata (19 kB)
Collecting seaborn
  Using cached seaborn-0.13.2-py3-none-any.whl.metadata (5.4 kB)
Collecting scikit-learn
  Using cached scikit_learn-1.6.1-cp310-cp310-win_amd64.whl.metadata (15 kB)
Collecting contourpy>=1.0.1 (from matplotlib)
  Using cached contourpy-1.3.2-cp310-cp310-win_amd64.whl.metadata (5.5 kB)
Collecting cycler>=0.10 (from matplotlib)
  Using cached cycler-0.12.1-py3-none-any.whl.metadata (3.8 kB)
Collecting fonttools>=4.22.0 (from matplotlib)
  Using cached fonttools-4.57.0-cp310-cp310-win_amd64.whl.metadata (104 kB)
Collecting kiwisolver>=1.3.1 (from matplotlib)
  Using cached kiwisolver-1.4.8-cp310-cp310-win_amd64.whl.metadata (6.3 kB)
Collecting packaging>=20.0 (from matplotlib)
  Using cached packaging-25.0-py3-none-any.whl.metadata (3.3 kB)
Collecting pillow>=8 (from matplotlib)
  Using cached pillow-11.2.1-cp310-cp310-win_amd64.whl.metadata (9.1 kB)
Collecting pyparsing>=2.3.1 (from matplotlib)
  Using cached pyparsing-3.2.3-py3-none-any.whl.metadata (5.0 kB)
Collecting python-dateutil>=2.7 (from matplotlib)
  Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl.metadata (8.4 kB)
Collecting pytz>=2020.1 (from pandas)
  Using cached pytz-2025.2-py2.py3-none-any.whl.metadata (22 kB)
Collecting tzdata>=2022.7 (from pandas)
  Using cached tzdata-2025.2-py2.py3-none-any.whl.metadata (1.4 kB)
Collecting scipy>=1.6.0 (from scikit-learn)
  Using cached scipy-1.15.2-cp310-cp310-win_amd64.whl.metadata (60 kB)
```



```
  Using cached joblib-1.4.2-py3-none-any.whl.metadata (5.4 kB)
Collecting threadpoolctl>=3.1.0 (from scikit-learn)
  Using cached threadpoolctl-3.6.0-py3-none-any.whl.metadata (13 kB)
Collecting six>=1.5 (from python-dateutil>=2.7->matplotlib)
  Using cached six-1.17.0-py2.py3-none-any.whl.metadata (1.7 kB)
Using cached numpy-2.2.5-cp310-cp310-win_amd64.whl (12.9 MB)
Using cached matplotlib-3.10.1-cp310-cp310-win_amd64.whl (8.1 MB)
Using cached pandas-2.2.3-cp310-cp310-win_amd64.whl (11.6 MB)
Using cached seaborn-0.13.2-py3-none-any.whl (294 kB)
```

```
Downloading scikit_learn-1.6.1-cp310-cp310-win_amd64.whl (11.1 MB)
   ---------------------------------------- 11.1/11.1 MB 650.4 kB/s eta 0:00:00
Downloading contourpy-1.3.2-cp310-cp310-win_amd64.whl (221 kB)
Using cached cycler-0.12.1-py3-none-any.whl (8.3 kB)
Downloading fonttools-4.57.0-cp310-cp310-win_amd64.whl (2.2 MB)
   ---------------------------------------- 2.2/2.2 MB 1.1 MB/s eta 0:00:00
Downloading joblib-1.4.2-py3-none-any.whl (301 kB)
Downloading kiwisolver-1.4.8-cp310-cp310-win_amd64.whl (71 kB)
Downloading packaging-25.0-py3-none-any.whl (66 kB)
Downloading pillow-11.2.1-cp310-cp310-win_amd64.whl (2.7 MB)
   ---------------------------------------- 2.7/2.7 MB 2.3 MB/s eta 0:00:00
Downloading pyparsing-3.2.3-py3-none-any.whl (111 kB)
Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Downloading pytz-2025.2-py2.py3-none-any.whl (509 kB)
Downloading scipy-1.15.2-cp310-cp310-win_amd64.whl (41.2 MB)
   ---------------------------------------- 41.2/41.2 MB 2.5 MB/s eta 0:00:00
Downloading six-1.17.0-py2.py3-none-any.whl (11 kB)
Downloading threadpoolctl-3.6.0-py3-none-any.whl (18 kB)
Downloading tzdata-2025.2-py2.py3-none-any.whl (347 kB)
Installing collected packages: pytz, tzdata, threadpoolctl, six, pyparsing, pillow, packaging, n
umpy, kiwisolver, joblib, fonttools, cycler, scipy, python-dateutil, contourpy, scikit-learn, pa
ndas, matplotlib, seaborn
Successfully installed contourpy-1.3.2 cycler-0.12.1 fonttools-4.57.0 joblib-1.4.2 kiwisolver-1.
4.8 matplotlib-3.10.1 numpy-2.2.5 packaging-25.0 pandas-2.2.3 pillow-11.2.1 pyparsing-3.2.3 pyth
on-dateutil-2.9.0.post0 pytz-2025.2 scikit-learn-1.6.1 scipy-1.15.2 seaborn-0.13.2 six-1.17.0 th
readpoolctl-3.6.0 tzdata-2025.2
```

```
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$ pip list
Package         Version
--------------- -----------
contourpy       1.3.2
cycler          0.12.1
fonttools       4.57.0
joblib          1.4.2
kiwisolver      1.4.8
matplotlib      3.10.1
numpy           2.2.5
packaging       25.0
pandas          2.2.3
pillow          11.2.1
pillow          11.2.1
pip             25.1
pyparsing       3.2.3
python-dateutil 2.9.0.post0
pytz            2025.2
scikit-learn    1.6.1
scipy           1.15.2
seaborn         0.13.2
setuptools      58.1.0
six             1.17.0
threadpoolctl   3.6.0
tzdata          2025.2
(pyenv)
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$
```


TERMINAL
bash
(pyenv)
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$ where python
F:\Kuliah\Pembelajaran Mesin dan Kecerdasan Buatan\SK5004_10121089\pyenv\Scripts\python.exe
C:\Program Files\Python310\python.exe
C:\Users\Habiburrohman\AppData\Local\Microsoft\WindowsApps\python.exe
(pyenv)
Habiburrohman@DESKTOP-0573GT3 MINGW64 /f/Kuliah/Pembelajaran Mesin dan Kecerdasan Buatan/SK5004_
10121089 (main)
$