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Data Science and Python Virtual Environment (File: data_science_and_python_env.pdf)

Penjelasan & Penyelesaian Latihan:

- Membahas langkah-langkah dalam workflow data science.
- Memperkenalkan Anaconda dan virtual environments untuk manajemen dependencies.

Paket Python: numpy, pandas, scikit-learn, matplotlib.

Latihan:

Membuat dan mengaktifkan virtual environment, dan menginstal paket-paket yang diperlukan.

Diselesaikan:

Menginstal paket: pandas, numpy, matplotlib, scikit-learn.

Membuat dan mengaktifkan virtual environment

1. Ilmu data (data science) adalah bidang yang menggabungkan statistik, pemrograman, dan pengetahuan bidang tertentu untuk mengolah dan menganalisis data, dengan tujuan mendapatkan informasi atau insight yang berguna bagi pengambilan keputusan.
2. Perbedaan antara data, data science, dan data scientist:
    - Data adalah fakta atau informasi mentah, seperti angka atau teks, yang belum dianalisis.
    - Data science adalah proses atau ilmu untuk menganalisis data agar menghasilkan informasi bermanfaat.
    - Data scientist adalah orang yang melakukan proses tersebut, menggunakan teknik analisis dan alat bantu teknologi.
3. Empat aspek dasar dalam data science adalah:

a Pengumpulan dan Pengelolaan Data

Mengumpulkan data dari berbagai sumber, membersihkan, dan menyimpannya agar siap dianalisis.

b Statistika dan Matematika

Dasar teoritis untuk menganalisis data, menemukan pola, dan menarik kesimpulan.

c Pemrograman dan Teknologi

Kemampuan teknis untuk mengolah data dan membangun model dengan bahasa seperti Python atau R.

d Pengetahuan Domain dan Komunikasi

Memahami konteks bidang yang dianalisis dan mampu menyampaikan hasil secara jelas.

e Keempat aspek ini saling mendukung untuk mengubah data mentah menjadi wawasan yang berguna.

4. **Jupyter Notebook**

   Aplikasi notebook interaktif yang mendukung berbagai bahasa pemrograman.

   https://pypi.org/project/notebook/

   Matplotlib

   Pustaka komprehensif untuk membuat visualisasi data statis, animasi, dan interaktif di Python.

   https://pypi.org/project/matplotlib/

   NumPy

   Paket fundamental untuk komputasi ilmiah dengan Python, menyediakan objek array N-dimensional yang kuat dan berbagai fungsi matematika.

   https://pypi.org/project/numpy/

Select Command Prompt

```
C:\Users\xarma>-m venv my_venv_1
'-m' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\xarma>python -m venv my_venv_1

C:\Users\xarma>python -m venv env1

C:\Users\xarma>env1\Scripts\activate

(env1) C:\Users\xarma>pip install numpy matplotlib notebook
Collecting numpy
  Downloading numpy-2.2.5-cp312-cp312-win_amd64.whl.metadata (60 kB)
Collecting matplotlib
  Downloading matplotlib-3.10.1-cp312-cp312-win_amd64.whl.metadata (11 kB)
Collecting notebook
  Downloading notebook-7.4.1-py3-none-any.whl.metadata (10 kB)
Collecting contourpy>=1.0.1 (from matplotlib)
  Downloading contourpy-1.3.2-cp312-cp312-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)
  Downloading fonttools-4.57.0-cp312-cp312-win_amd64.whl.metadata (104 kB)
Collecting kiwisolver>=1.3.1 (from matplotlib)
  Downloading kiwisolver-1.4.8-cp312-cp312-win_amd64.whl.metadata (6.3 kB)
Collecting packaging>=20.0 (from matplotlib)
  Downloading packaging-25.0-py3-none-any.whl.metadata (3.3 kB)
Collecting pillow>=8 (from matplotlib)
  Downloading pillow-11.2.1-cp312-cp312-win_amd64.whl.metadata (9.1 kB)
Collecting pyparsing>=2.3.1 (from matplotlib)
  Downloading 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 jupyter-server<3,>=2.4.0 (from notebook)
  Using cached jupyter_server-2.15.0-py3-none-any.whl.metadata (8.4 kB)
Collecting jupyterlab-server<3,>=2.27.1 (from notebook)
  Using cached jupyterlab_server-2.27.3-py3-none-any.whl.metadata (5.9 kB)
Collecting jupyterlab<4.5,>=4.4.0rc0 (from notebook)
  Downloading jupyterlab-4.4.1-py3-none-any.whl.metadata (16 kB)
Collecting notebook-shim<0.3,>=0.2 (from notebook)
  Using cached notebook_shim-0.2.4-py3-none-any.whl.metadata (4.0 kB)
Collecting tornado>=6.2.0 (from notebook)
  Using cached tornado-6.4.2-cp38-abi3-win_amd64.whl.metadata (2.6 kB)
Collecting anyio>=3.1.0 (from jupyter-server<3,>=2.4.0->notebook)
  Using cached anyio-4.9.0-py3-none-any.whl.metadata (4.7 kB)
```

Select Command Prompt

```
[notice] A new release of pip is available: 24.3.1 -> 25.1.1
[notice] To update, run: python.exe -m pip install --upgrade pip

(env1) C:\Users\xarma>pip freeze > requirements.txt

(env1) C:\Users\xarma>python -m venv env2

(env1) C:\Users\xarma>env2\Scripts\activate

(env2) C:\Users\xarma>pip install -r requirements.txt
Collecting anyio==4.9.0 (from -r requirements.txt (line 1))
  Using cached anyio-4.9.0-py3-none-any.whl.metadata (4.7 kB)
Collecting argon2-cffi==23.1.0 (from -r requirements.txt (line 2))
  Using cached argon2_cffi-23.1.0-py3-none-any.whl.metadata (5.2 kB)
Collecting argon2-cffi-bindings==21.2.0 (from -r requirements.txt (line 3))
  Using cached argon2_cffi_bindings-21.2.0-cp36-abi3-win_amd64.whl.metadata (6.7 kB)
Collecting arrow==1.3.0 (from -r requirements.txt (line 4))
  Using cached arrow-1.3.0-py3-none-any.whl.metadata (7.5 kB)
Collecting asttokens==3.0.0 (from -r requirements.txt (line 5))
  Using cached asttokens-3.0.0-py3-none-any.whl.metadata (4.7 kB)
Collecting async-lru==2.0.5 (from -r requirements.txt (line 6))
  Using cached async_lru-2.0.5-py3-none-any.whl.metadata (4.5 kB)
Collecting attrs==25.3.0 (from -r requirements.txt (line 7))
  Using cached attrs-25.3.0-py3-none-any.whl.metadata (10 kB)
Collecting babel==2.17.0 (from -r requirements.txt (line 8))
  Using cached babel-2.17.0-py3-none-any.whl.metadata (2.0 kB)
Collecting beautifulsoup4==4.13.4 (from -r requirements.txt (line 9))
  Using cached beautifulsoup4-4.13.4-py3-none-any.whl.metadata (3.8 kB)
Collecting bleach==6.2.0 (from -r requirements.txt (line 10))
  Using cached bleach-6.2.0-py3-none-any.whl.metadata (30 kB)
Collecting certifi==2025.4.26 (from -r requirements.txt (line 11))
  Using cached certifi-2025.4.26-py3-none-any.whl.metadata (2.5 kB)
Collecting cffi==1.17.1 (from -r requirements.txt (line 12))
  Using cached cffi-1.17.1-cp312-cp312-win_amd64.whl.metadata (1.6 kB)
Collecting charset-normalizer==3.4.2 (from -r requirements.txt (line 13))
  Using cached charset_normalizer-3.4.2-cp312-cp312-win_amd64.whl.metadata (36 kB)
Collecting colorama==0.4.6 (from -r requirements.txt (line 14))
  Using cached colorama-0.4.6-py2.py3-none-any.whl.metadata (17 kB)
Collecting comm==0.2.2 (from -r requirements.txt (line 15))
  Using cached comm-0.2.2-py3-none-any.whl.metadata (3.7 kB)
Collecting contourpy==1.3.2 (from -r requirements.txt (line 16))
  Using cached contourpy-1.3.2-cp312-cp312-win_amd64.whl.metadata (5.5 kB)
Collecting cycler==0.12.1 (from -r requirements.txt (line 17))
  Using cached cycler-0.12.1-py3-none-any.whl.metadata (3.8 kB)
Collecting debugpy==1.8.14 (from -r requirements.txt (line 18))
```