

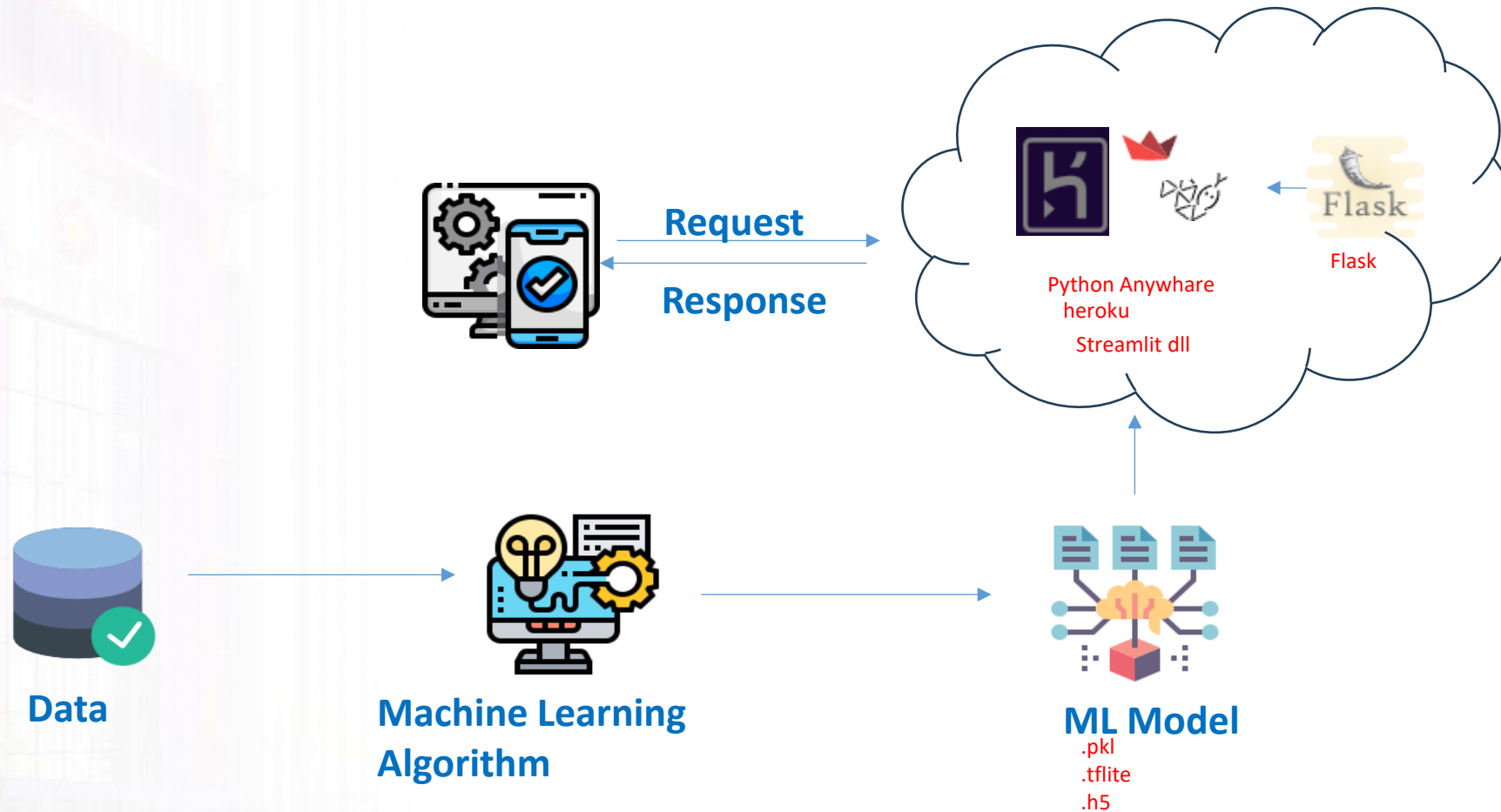
Machine learning Deployment

Proyek Data Mining- ST



Anna Baita, M.Kom.

How to Deploy??



- Model .pkl
- Flask Untuk men-generate end point
- Web server: pythonanywhere

Data

- Menggunakan dataset, yang telah embedded pada scikit learn

```
# load data dari database/dataset iris
from sklearn.datasets import load_iris

iris = load_iris()
```

iris setosa



petal sepal

iris versicolor



petal sepal

iris virginica

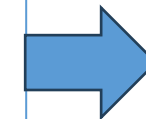


petal sepal



- Modelling dilakukan dengan menggunakan algoritma SVM
- <https://colab.research.google.com/drive/13hmJMeiBqW2vKouBsSen9N8SeGBO5W30?usp=sharing>

	precision	recall	f1-score	support
0	1.00	1.00	1.00	12
1	0.88	0.78	0.82	9
2	0.80	0.89	0.84	9
accuracy			0.90	30
macro avg	0.89	0.89	0.89	30
weighted avg	0.90	0.90	0.90	30



Hasil testing/pengujian

- Model harus disimpan menjadi format **binary** file, sehingga bisa di buat api dan bisa di hubungkan dengan berbagai platform. Bisa dengan ekstensi .pkl, .tflite, .h5 dll

```
# simpan model  
with open("model_numpy.pkl", "wb") as model_file:  
    pickle.dump(model_numpy, model_file)
```

Nama file model

Pastikan ini **wb** (write binary)

Nama variable model nya

- Pastikan bahwa model yang anda simpan sudah benar-benar bisa digunakan untuk melakukan analitic sesuai tujuan anda

Pastikan disini modenya **rb**: read binnary

```
# load model
with open("model_pandas.pkl", "rb") as model_file:
    model = pickle.load(model_file)

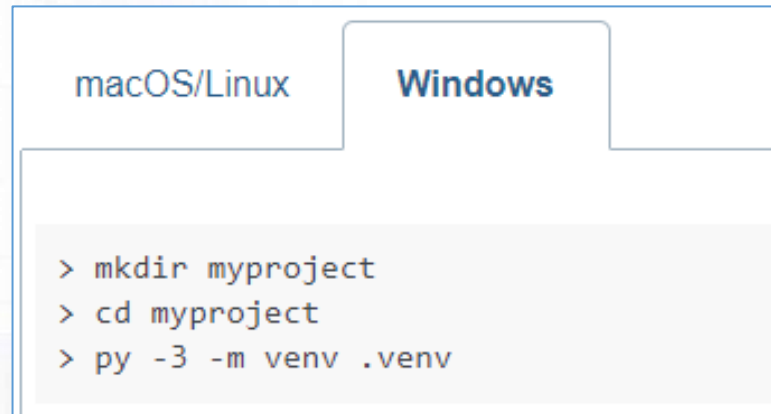
# inference model
new_data = [1, 2, 3, 4]
new_data = pd.DataFrame([new_data], columns=iris.feature_names)

model.predict(new_data)

array([2])
```

API End Point menggunakan Flask

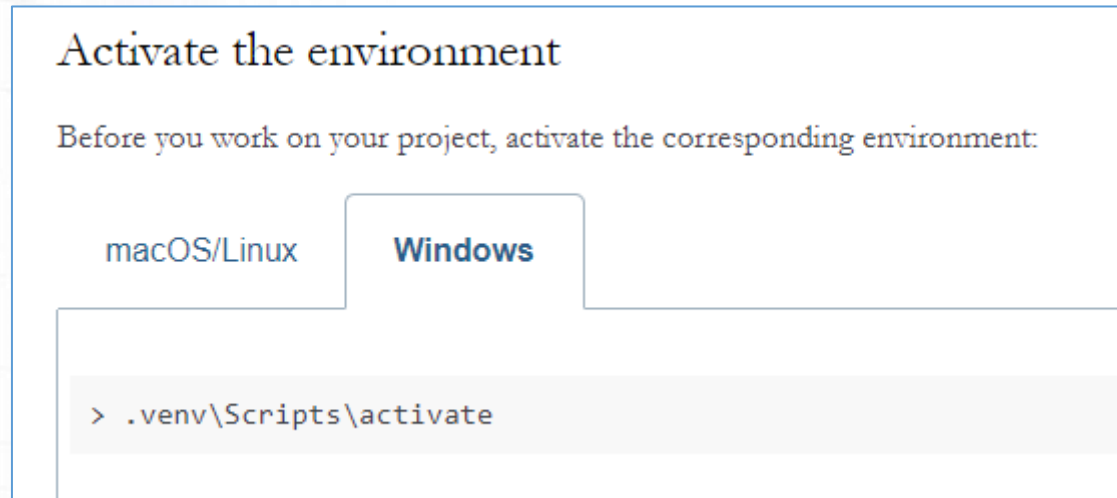
- Silakan baca lebih lanjut dokumentasi dari flask di: <https://flask.palletsprojects.com/en/3.0.x/>
- Untuk mencoba menjalankan flask di **computer local** kita, maka kita perlu **membuat** terlebih dahulu **virtual environment** nya. Dokumentasi lengkap cek di : <https://flask.palletsprojects.com/en/3.0.x/installation/#virtual-environments>



```
> mkdir myproject
> cd myproject
> py -3 -m venv .venv
```


API End Point menggunakan Flask

- Mengaktifkan virtual environment



API End Point menggunakan Flask

- Lakukan instalasi flask di virtual environment kita. Masuk ke command prompt/terminal. Gunakan perintah **pip install Flask**

```
PS D:\ANNA\2023-2024\genap 2023-2024\PDM(PROYEK DATA MINING\deployment> pip install flask
Requirement already satisfied: flask in c:\users\amikom\anaconda3\lib\site-packages (2.2.2)
Requirement already satisfied: Werkzeug>=2.2.2 in c:\users\amikom\anaconda3\lib\site-packages (from flask) (2.2.2)
Requirement already satisfied: itsdangerous>=2.0 in c:\users\amikom\anaconda3\lib\site-packages (from flask) (2.0.1)
Requirement already satisfied: Jinja2>=3.0 in c:\users\amikom\anaconda3\lib\site-packages (from flask) (3.1.2)
Requirement already satisfied: click>=8.0 in c:\users\amikom\anaconda3\lib\site-packages (from flask) (8.0.4)
Requirement already satisfied: colorama in c:\users\amikom\anaconda3\lib\site-packages (from click>=8.0->flask) (0.4.6)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\amikom\anaconda3\lib\site-packages (from Jinja2>=3.0->flask) (2.1.1)
PS D:\ANNA\2023-2024\genap 2023-2024\PDM(PROYEK DATA MINING\deployment>
```

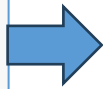
API End Point menggunakan Flask

- Kita coba membuat hello world. Copas saja dari dokumentasi flask
- <https://flask.palletsprojects.com/en/3.0.x/quickstart/>

```
from flask import Flask

app = Flask(__name__)

@app.route("/")
def hello_world():
    return "<p>Hello, World!</p>"
```



Misal kita beri nama file nya: **app.py**

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS D:\ANNA\2023-2024\genap 2023-2024\PDM(PROYEK DATA MINING\deployment> flask --app app run

* Ignoring a call to 'app.run()' that would block the current 'flask' CLI command.

Only call 'app.run()' in an 'if __name__ == "__main__"' guard.

* Serving Flask app 'app'

* Debug mode: off

WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.

* Running on http://127.0.0.1:5000

Press CTRL+C to quit

127.0.0.1 - - [04/Apr/2024 09:54:01] "GET / HTTP/1.1" 200 -

127.0.0.1 - - [04/Apr/2024 09:54:01] "GET /favicon.ico HTTP/1.1" 404 -

API End Point menggunakan Flask

- Kita running di terminal, program app.py(hello world), yang tadi sudah kita buat. Ketikkan perintah: `flask --app app run`

Nama file python kita(app.py)

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\ANNA\2023-2024\genap 2023-2024\PDM(PROYEK DATA MINING\deployment> flask --app app run
* Ignoring a call to 'app.run()' that would block the current 'flask' CLI command.
  Only call 'app.run()' in an 'if __name__ == "__main__" guard.
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
127.0.0.1 - - [04/Apr/2024 09:54:01] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [04/Apr/2024 09:54:01] "GET /favicon.ico HTTP/1.1" 404 -
```

API End Point menggunakan Flask

- Cek tampilannya/interface nya di browses, melalui link yang tadi di berikan oleh output program: <http://127.0.0.1:5000>

localhost





- API (Application Programming Interface) merupakan mekanisme yang memungkinkan dua komponen perangkat lunak untuk saling berkomunikasi menggunakan serangkaian definisi dan protokol
- Method pada API: **Get, Post**, Put, Delete, patch, head
- Readmore: <https://aws.amazon.com/id/what-is/api/>

Buat template interface nya

- Kalau anda advance di front end web programming, silakan buat sendiri, tapi kalau masih newbi, bisa cari template gratis, contoh:
- <https://freefrontend.com/css-forms/>
- Karna tampilan butuh inputan sehingga saya perlu tampilan form. Ini form yang saya pilih
- <https://codepen.io/rickyeckhardt/pen/oNXeoZp>
- Kita copas ke dalam file template.html
- Kemudian customize code nya sesuai kebutuhan

Template awal

**PUPASSURE**



Yay, puppies! Ensure your pup gets the best care!

Name

Breed

Gender

☒ Female ☐ Male

Weight

☒ 0-25 lbs ☐ 25-50 lbs ☐ 50-100 lbs ☐ 100+ lbs

Upload a photo

Spayed or Neutered

☒ Spayed ☐ Neutered


Birthday

Back

Next

Tampilan template, setelah di customize

Bunga Iris



Mau Tau Jenis Iris Kamu???

Sepal Length

Sepal Length

Sepal Width

Sepal Width

Petal Length

Petal Length

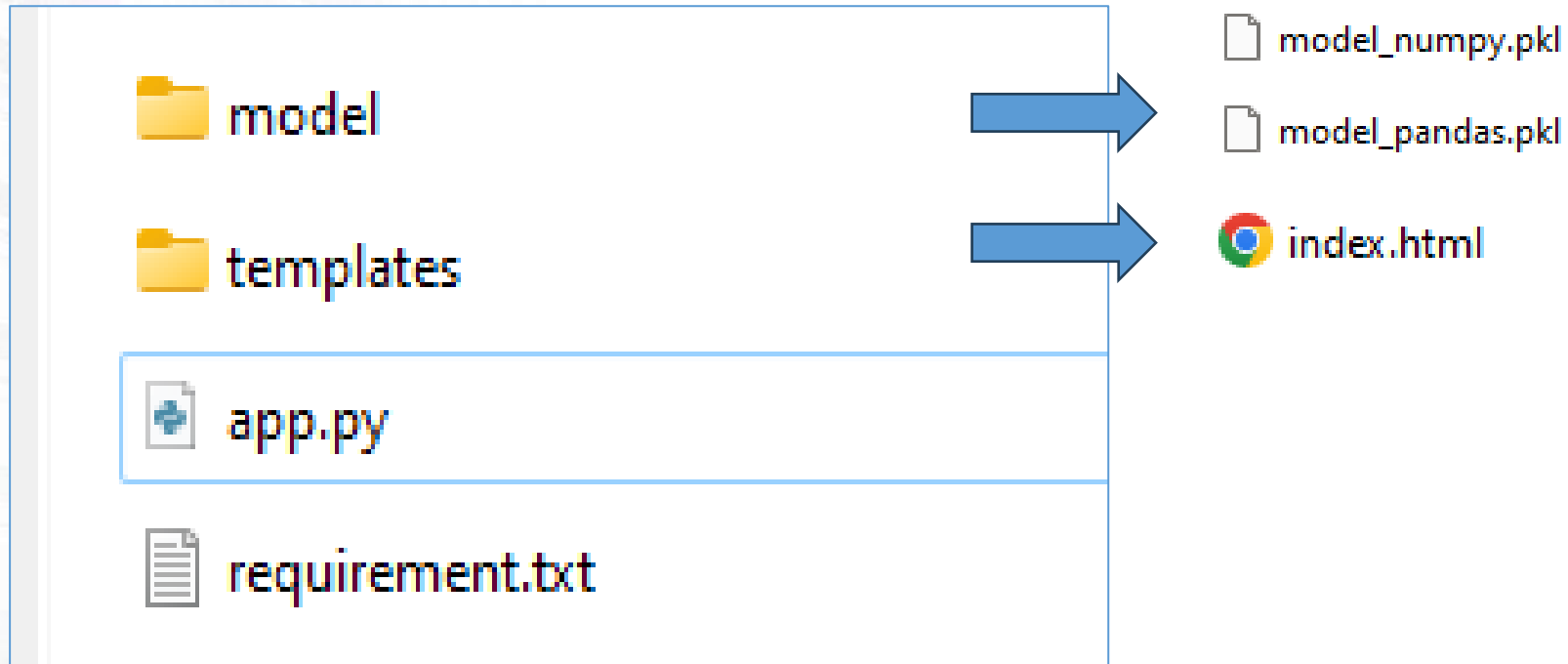
Petal Width

Petal Width

Back

Predict

Struktur Directory Local



```
import numpy as np
import pickle
from flask import Flask
from flask import render_template
from flask import request
app = Flask(__name__)
# read model
with open("model/model_numpy.pkl", "rb") as model_file:
    model_numpy = pickle.load(model_file)
LABEL = ['Iris Setosa', 'Iris Versicolor', 'Iris Virginica']

@app.route("/")
def iris():
    return render_template("index.html")

@app.route("/predict", methods=['POST'])
def predict():
    # getting input with name in HTML form dan ubah dalam bentuk float
    sepal_length = float(request.form.get("sepal_length"))
    sepal_width = float(request.form.get("sepal_width"))
    petal_length = float(request.form.get("petal_length"))
    petal_width = float(request.form.get("petal_width"))
    # Print the text in terminal for verification
    # print(sepal_length)
    new_data = [[sepal_length, sepal_width, petal_length, petal_width]]
    result = model_numpy.predict(new_data)
    result = LABEL[result[0]]

    return render_template("index.html", prediction_result=result, sepal_length=sepal_length, sepal_width=sepal_width, petal_length=petal_length, petal_width=petal_width)

if __name__ == "__main__":
    app.run(debug=True)
```

```
<!DOCTYPE html>
<html>
<head>
  <title>IRIS</title>
  <!-- penulisan internal css dalam tag head -->
  <style type="text/css">
    @import url("https://fonts.googleapis.com/css?family=Montserrat:400,600&display=swap");
    * {
      box-sizing: border-box;
      margin: 0;
      padding: 0;
    }

    body {
      align-items: center;
      background: #d8aa96;
      color: rgba(0, 0, 0, 0.8);
      display: grid;
      font-family: "Montserrat", sans-serif;
```


Beberapa tempat hosting Free

- <https://www.pythonanywhere.com/>
- <https://thecodex.me/>



Create a Beginner account

Are you a teacher looking for a place your students can code Python? You're not alone. Click through to find out more about our [Education beta](#).

Up to 100,000 CPU-seconds per day
for consoles, scheduled tasks and
always on tasks



Create your account

Username:

irisproject

Email:

anna@amikom.ac.id

Password:

.....

Password (again):

.....

☒ I agree to the [Terms and Conditions](#) and the [Privacy and Cookies Policy](#), and confirm that I am at least 13 years old.

Register


We promise not to spam or pass your details on to anyone else.

Username akan jadi nama project

www.pythonanywhere.com/user/irisproject/

How to clear cookie... Microcredential Cer... (3) WhatsApp Pengumpulan Form... Cara Deploy Node J... List Data Bimbingan... English Tests: Test y... Digital Talent Schola... Aksiologiya: Jurnal... iMacros IAES Internation

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Dashboard Consoles Files Web Tasks Databases

Your email address has been confirmed. You can manage your email preferences from [this page](#).

Dashboard

Welcome, [irisproject](#)

CPU Usage: 0% used – 0.00s of 100s. Resets in 23 hours, 59 minutes [More Info](#)

File storage: 0% full – 60.0 KB of your 512.0 MB quota [More Info](#)

[Upgrade Account](#)

Recent Consoles + 5 -

You have no recent consoles.

New console:

[\\$ Bash](#) [>>> Python ▾](#) [More...](#)

Recent Files + 5 -

You have no recently edited files.

[+ Open another file](#) [Browse files](#)

Recent Notebooks + 5 -

Your account does not support Jupyter Notebooks. [Upgrade your account](#) to get access!

All Web apps

You don't have any web apps.

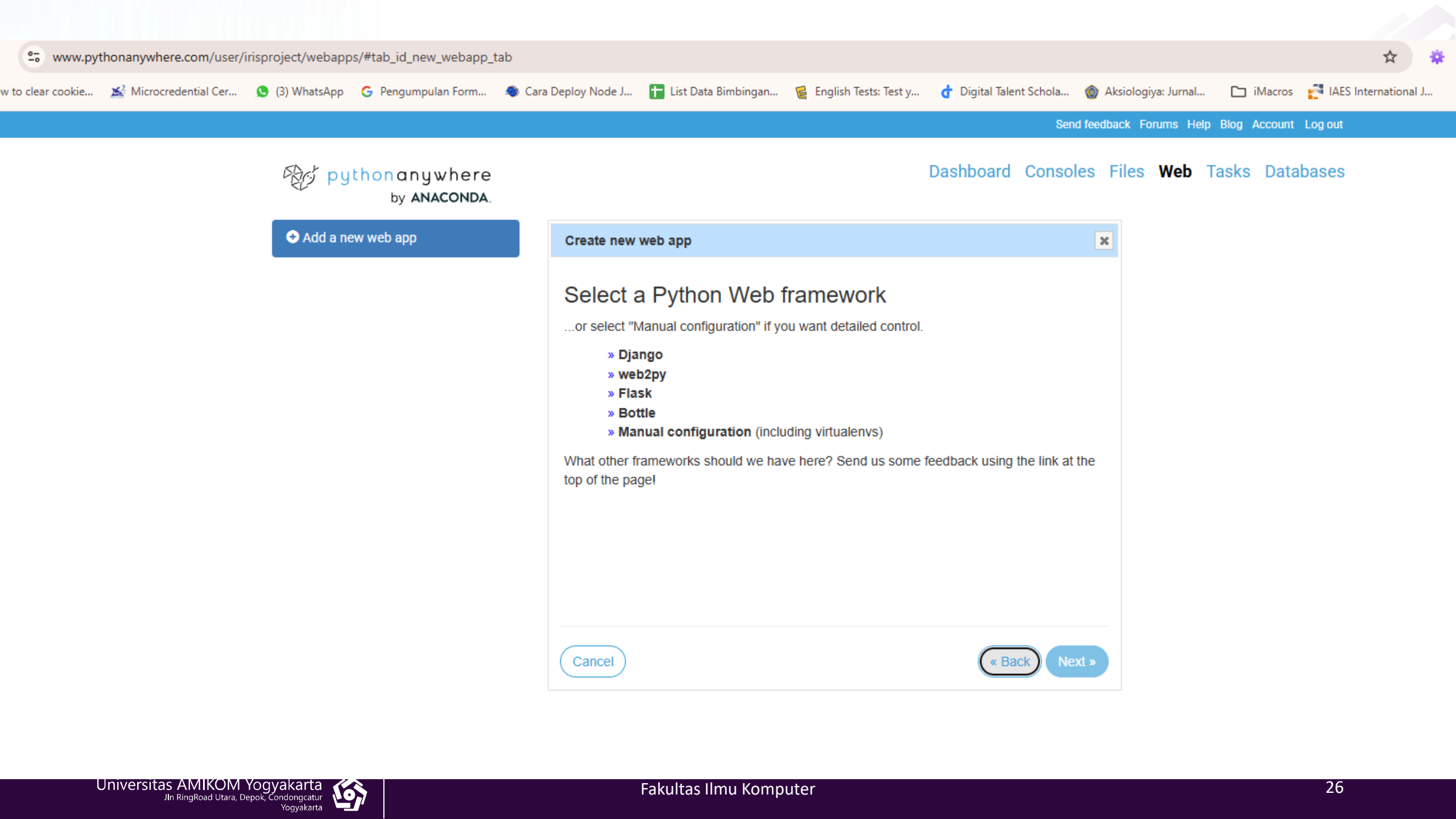
[Open Web tab](#)



[+ Add a new web app](#)

You have no web apps

To create a PythonAnywhere-hosted web app, click the "Add a new web app" button to the left.



+ Add a new web app

Create new web app

Select a Python Web framework

...or select "Manual configuration" if you want detailed control.

- » Django
- » web2py
- » Flask
- » Bottle
- » **Manual configuration** (including virtualenvs)

What other frameworks should we have here? Send us some feedback using the link at the top of the page!

Cancel

« Back

Next »



+ Add a new web app

Create new web app

Select a Python version

- » **Python 3.9** (Flask 3.0.3)
- » **Python 3.10** (Flask 3.0.3)
- » **Python 3.11** (Flask 3.0.3)
- » **Python 3.12** (Flask 3.0.3)
- » **Python 3.13** (Flask 3.0.3)

Note: If you'd like to use a different version of Flask to the default version, you can use a virtualenv for your web app. There are [instructions here](#).

Cancel

« Back

Next »





+ Add a new web app

Create new web app

Quickstart new Flask project

Enter a path for a Python file you wish to use to hold your Flask app. **If this file already exists, its contents will be overwritten with the new app.**



Path

/home/irisproject/mysite/flask_app.py

Cancel

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Next »





All done! Your web app is now set up. Details below.

irisproject.pythonanywhere.com

+ Add a new web app

Configuration for irisproject.pythonanywhere.com

Reload:

↻ Reload irisproject.pythonanywhere.com

Best before date:

We're happy to host your free website -- and keep it free -- for as long as you want to keep it running, but you'll need to log in at least once every three months and click the "Run until 3 months from today" button below. We'll send you an email a week before the site is disabled so that you don't forget to do that. [See here for more details.](#)

This site will be disabled on **Thursday 28 August 2025**

Run until 3 months from today

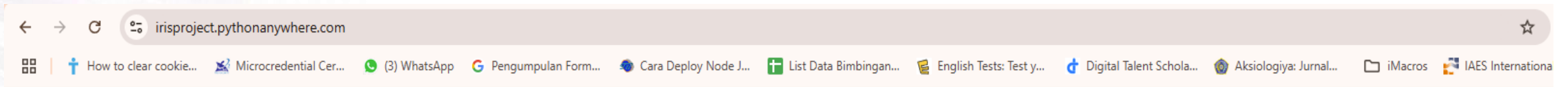
[Paying users'](#) sites stay up forever without any need to log in to keep them running.

Traffic:

How busy is your site?

This month (previous month)	0	(0)
Today (yesterday)	0	(0)
Hour (previous hour)	0	(0)

Applikasi sudah Running



- Masuk ke menu files untuk upload-upload file.
- Root ada di directory : **mysite**, silakan sesuaikan direktori dan file2 nya
- Sesuaikan direktorinya,
- Sesuaikan path pemanggilan modelnya

Create direktori model dan upload file

www.pythonanywhere.com/user/irisproject/files/home/irisproject/mysite/model

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/home/irisproject/mysite/ model

Dashboard Consoles **Files** Web Tasks Databases

[Open Bash console here](#) 0% full – 208.0 KB of your 512.0 MB quota [More Info](#)

Directories

Enter new directory name [New directory](#)

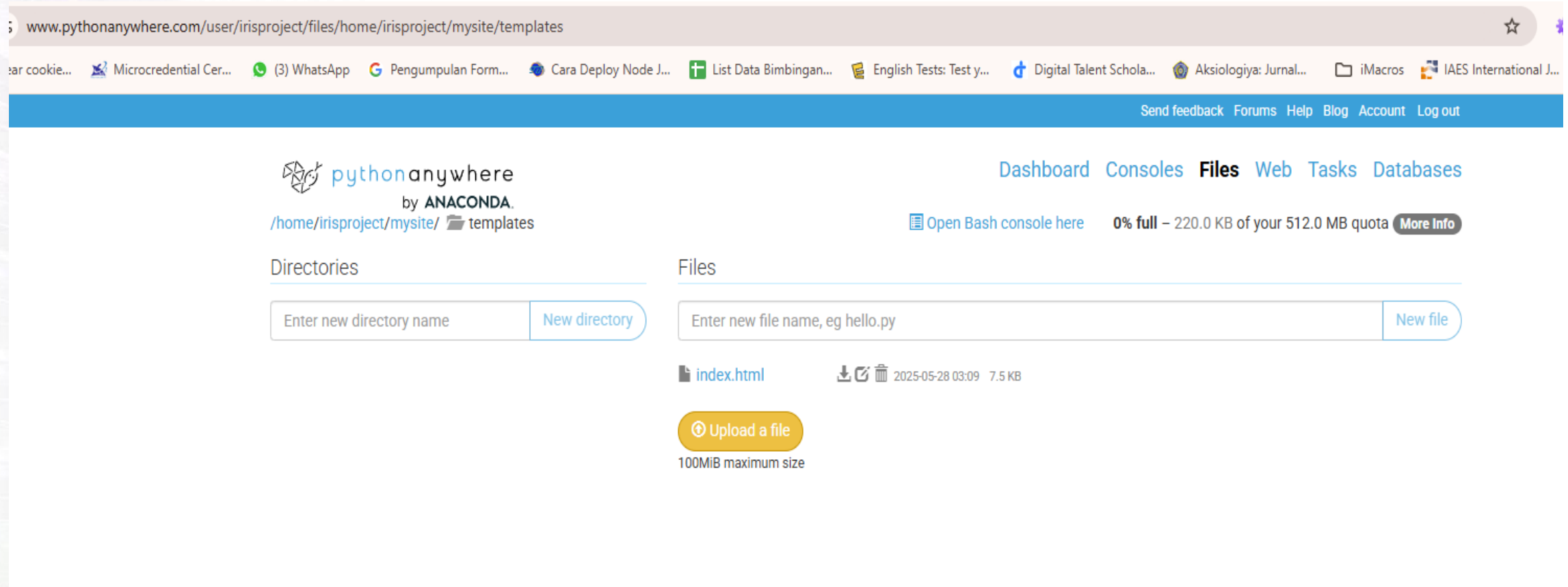
Files

Enter new file name, eg hello.py [New file](#)

model_numpy.pkl	2025-05-28 03:08	1.1 KB
model_pandas.pkl	2025-05-28 03:08	1.3 KB

[Upload a file](#)
100MiB maximum size

Create direktori templates dan upload file



The screenshot displays the PythonAnywhere user interface for the user 'irisproject'. The browser address bar shows the URL: `www.pythonanywhere.com/user/irisproject/files/home/irisproject/mysite/templates`. The page header includes navigation links: [Send feedback](#), [Forums](#), [Help](#), [Blog](#), [Account](#), and [Log out](#). The main content area features the PythonAnywhere logo and the text 'by ANACONDA.' Below this, the current path is shown as `/home/irisproject/mysite/` with a folder icon and the name 'templates'. On the right, there are tabs for [Dashboard](#), [Consoles](#), [Files](#) (which is active), [Web](#), [Tasks](#), and [Databases](#). Below the tabs, a status bar indicates '0% full – 220.0 KB of your 512.0 MB quota' with a [More Info](#) button. The 'Files' section has a header 'Files' and a form to 'Enter new file name, eg hello.py' with a [New file](#) button. Below the form, a file named `index.html` is listed with a download icon, a trash icon, a timestamp of '2025-05-28 03:09', and a size of '7.5 KB'. At the bottom of the file list, there is a yellow button labeled 'Upload a file' and a note '100MiB maximum size'. The 'Directories' section on the left has a form to 'Enter new directory name' and a [New directory](#) button.

Upload file app.py

www.pythonanywhere.com/user/irisproject/files/home/irisproject/mysite

clear cookie... Microcredential Cer... (3) WhatsApp Pengumpulan Form... Cara Deploy Node J... List Data Bimbingan... English Tests: Test y... Digital Talent Schola... Aksiologiya: Jurnal... iMacros IAES International

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/home/irisproject/ mysite

Dashboard Consoles **Files** Web Tasks Databases

Open Bash console here 0% full – 224.0 KB of your 512.0 MB quota [More Info](#)









Directories

Enter new directory name [New directory](#)

[__pycache__/](#) 
[model/](#) 
[templates/](#) 

Files

Enter new file name, eg hello.py [New file](#)

 [app.py](#)    2025-05-28 03:10 1.2 KB
 [flask_app.py](#)    2025-05-28 03:03 186 bytes

[Upload a file](#)
100MiB maximum size


Lakukan Konfigurasi file WSGI

www.pythonanywhere.com/user/irisproject/webapps/#tab_id_irisproject_pythonanywhere_com

Want some more data? [Paying accounts](#) get pretty charts ;-)

Code:

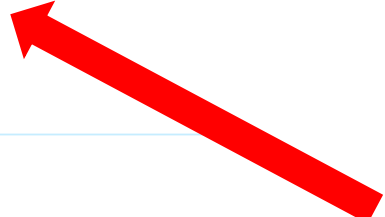
What your site is running.

Source code:	/home/irisproject/mysite	Go to directory
Working directory:	/home/irisproject/	Go to directory
WSGI configuration file:	/var/www/irisproject_pythonanywhere_com_wsgi.py	
Python version:	3.9 	

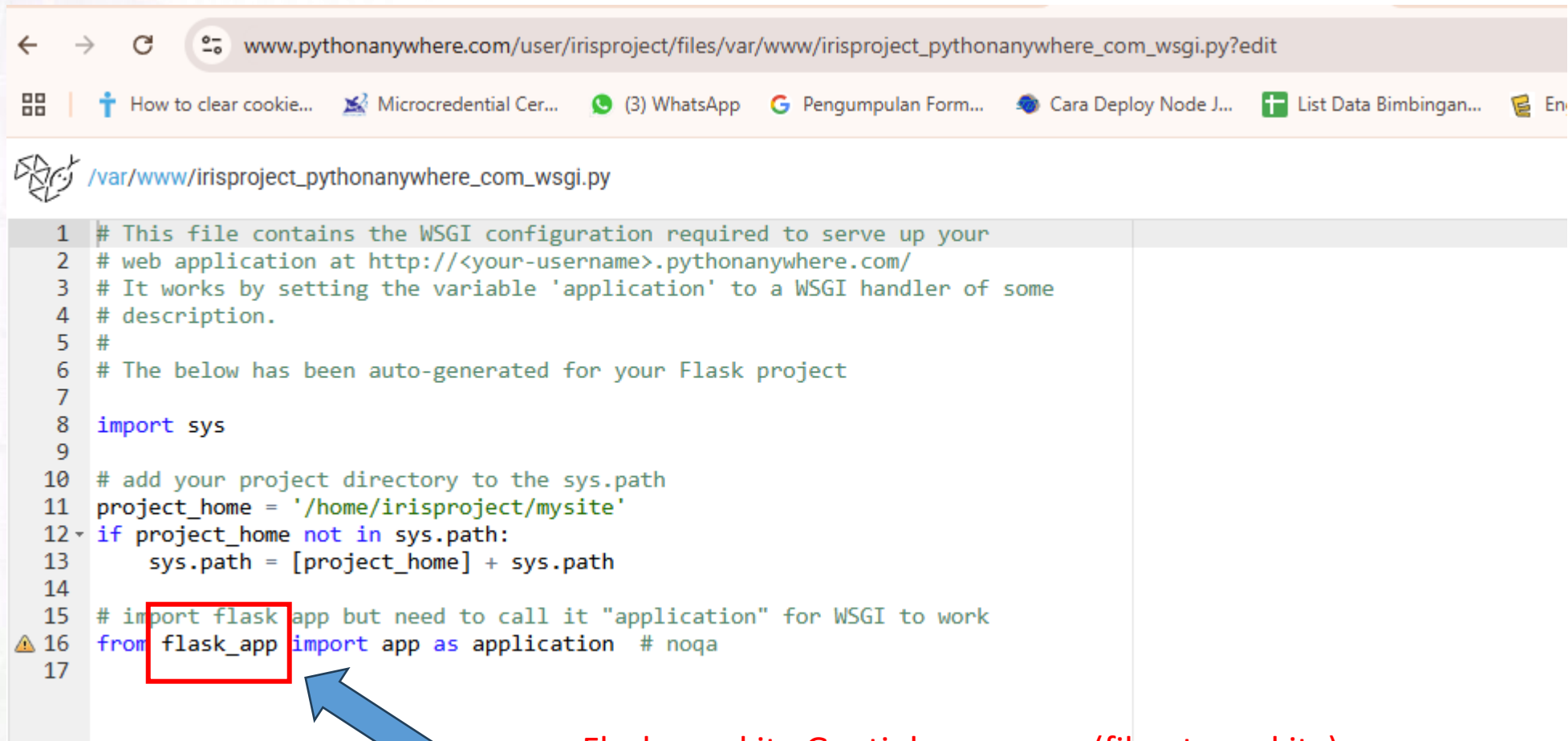
Virtualenv:

Use a virtualenv to get different versions of flask, django etc from our default system ones. [More info here](#). You need to **Reload your web app** to activate it; NB - will do nothing if the virtualenv does not exist.

[Enter path to a virtualenv, if desired](#)



Mengarahkan site anda ke **app.py** (file utama anda)



```
1 # This file contains the WSGI configuration required to serve up your
2 # web application at http://<your-username>.pythonanywhere.com/
3 # It works by setting the variable 'application' to a WSGI handler of some
4 # description.
5 #
6 # The below has been auto-generated for your Flask project
7
8 import sys
9
10 # add your project directory to the sys.path
11 project_home = '/home/irisproject/mysite'
12 if project_home not in sys.path:
13     sys.path = [project_home] + sys.path
14
15 # import flask app but need to call it "application" for WSGI to work
16 from flask_app import app as application # noqa
17
```

Flash app kita Ganti dengan **app** (file utama kita)

www.pythonanywhere.com/user/irisproject/webapps/#tab_id_irisproject_pythonanywhere_com

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Reload:

Reload irisproject.pythonanywhere.com

Best before date:

We're happy to host your free website -- and keep it free -- for as long as you want to keep it running, but you'll need to log in at least once every three months and click the "Run until 3 months from today" button below. We'll send you an email a week before the site is disabled so that you don't forget to do that. [See here for more details.](#)

This site will be disabled on **Thursday 28 August 2025**

Run until 3 months from today

Paying users' sites stay up forever without any need to log in to keep them running.

Traffic:

How busy is your site?

This month (previous month)	9	(0)
Today (yesterday)	9	(0)
Hour (previous hour)	9	(0)

Klik reload, agar konfigurasi kita terupdate di web server

Atur path model

 /home/irisproject/mysite/app.py

Keyboard shortcuts: Normal 

```
1 import numpy as np
2 import pickle
3 from flask import Flask
4 from flask import render_template
5 from flask import request
6 app = Flask(__name__)
7 # read model
8 #with open("model/model_numpy.pkl", "rb") as model_file:
9 with open("/home/irisproject/mysite/model/model_numpy.pkl", "rb") as model_file:
10     model_numpy = pickle.load(model_file)
11 LABEL = ['Iris Setosa', 'Iris Versicolor', 'Iris Virginica']
12
13 @app.route("/")
14 def iris():
15     return render_template("index.html")
16
17 @app.route("/predict", methods=['POST'])
18 def predict():
19     # getting input with name in HTML form dan ubah dalam bentuk float
20     sepal_length = float(request.form.get("sepal_length"))
21     sepal_width = float(request.form.get("sepal_width"))
22     petal_length = float(request.form.get("petal_length"))
23     petal_width = float(request.form.get("petal_width"))
24     # Print the text in terminal for verification
25     # print(sepal_length)
26     new_data = [[sepal_length, sepal_width, petal_length, petal_width]]
27     result = model_numpy.predict(new_data)
28     result = LABEL[result[0]]
29
30     return render_template("index.html", prediction result=result, sepal length=sepal length, sepal width=sepal width, petal length=petal length, petal width=petal width)
```

Sesuaikan path model dengan path model di server

www.pythonanywhere.com/user/irisproject/webapps/#tab_id_irisproject_pythonanywhere_com

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Run until 3 months from today

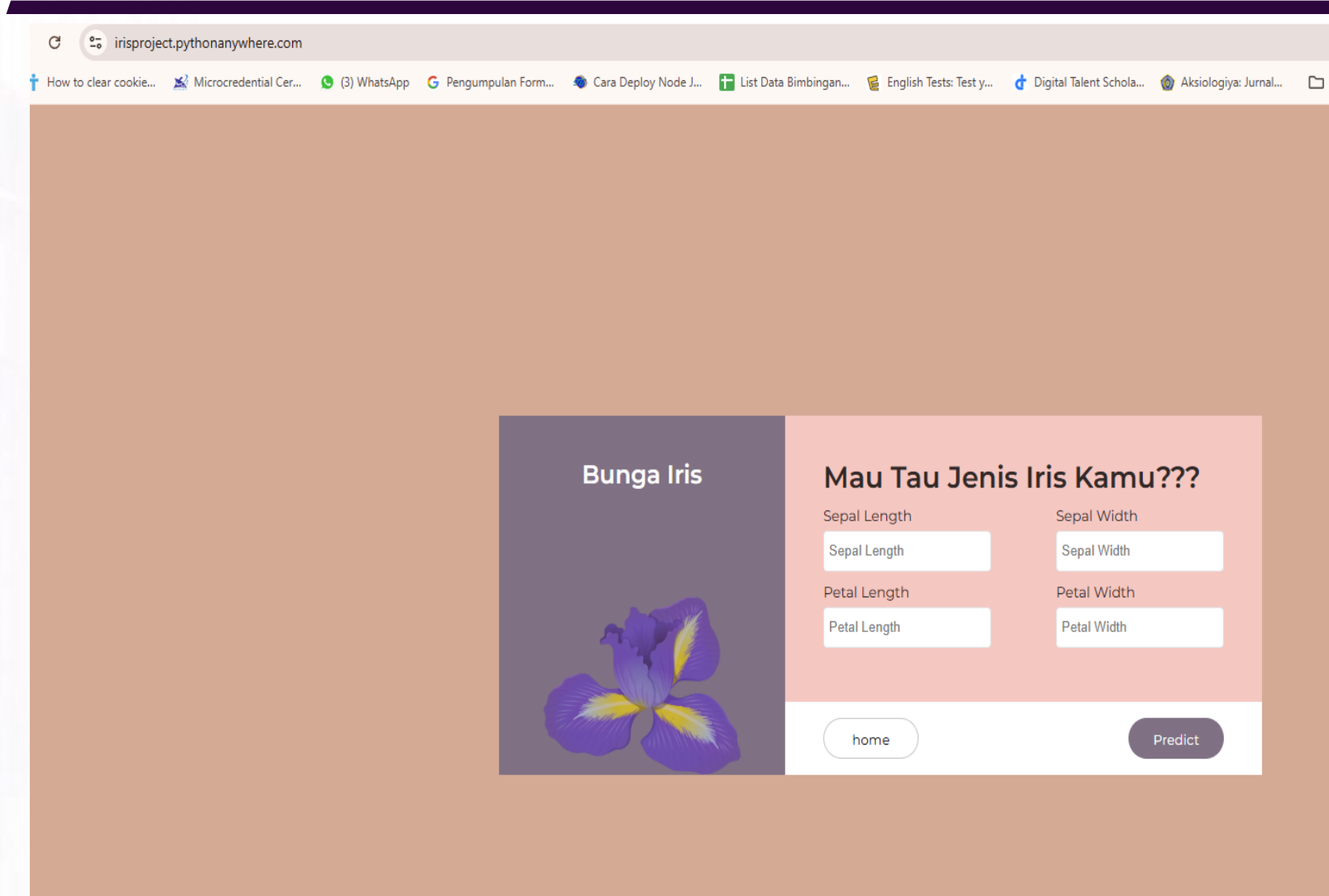
Paying users' sites stay up forever without any need to log in to keep them running.

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This month (previous month)	9	(0)
Today (yesterday)	9	(0)
Hour (previous hour)	9	(0)

Klik reload, agar konfigurasi kita terupdate di web server




Hasil prediksi

irisproject.pythonanywhere.com/predict

w to clear cookie... Microcredential Cer... (3) WhatsApp Pengumpulan Form... Cara Deploy Node J... List Data Bimbingan... English Tests: Test y... Digital Talent Schola... Aksiologi: Jurnal...

Bunga Iris

sepal length: 2.0
sepal width: 3.0
petal length: 2.0
petal width: 1.0
Iris Setosa



Mau Tau Jenis Iris Kamu???

Sepal Length	Sepal Width
<input type="text" value="Sepal Length"/>	<input type="text" value="Sepal Width"/>
Petal Length	Petal Width
<input type="text" value="Petal Length"/>	<input type="text" value="Petal Width"/>

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