Flask Framework Introduction Notes

Overview of Flask Framework

Definition: Flask is a complete web framework created using the Python programming language. It is primarily used for developing end-to-end web applications.

Purpose: Flask is particularly useful for data scientists and machine learning engineers who need to showcase their models through web applications.
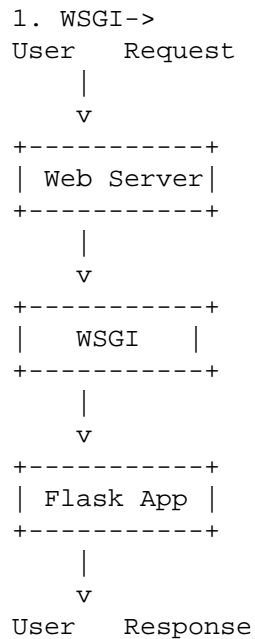
Key Components of Flask

WSGI (Web Server Gateway Interface)

Definition: WSGI is a protocol that facilitates communication between the web server and the web application.

Functionality:

1. When a user sends a request (e.g., accessing a homepage), the request is received by the web server.

2. The web server uses WSGI to redirect the request to the Flask web application.

3. The web application processes the request and sends a response back to the web server, which then delivers it to the user.

Diagram: WSGI Communication Flow

```
1. WSGI->
User   Request
    |
    v
+-----------+
| Web Server|
+-----------+
    |
    v
+-----------+
|   WSGI    |
+-----------+
    |
    v
+-----------+
| Flask App |
+-----------+
    |
    v
User   Response
```
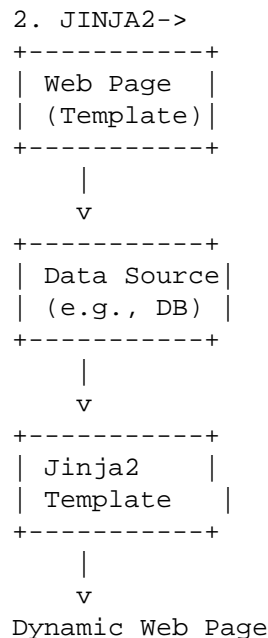
Jinja2 Template Engine

Definition: Jinja2 is a web template engine that combines web templates with data sources to create dynamic web pages.

Functionality:

1. Jinja2 allows developers to create templates that can be populated with data from various sources (e.g., SQL databases, CSV files, machine learning models).

2. This enables the creation of dynamic web pages that can change based on user input or data retrieved from a data source.

Diagram: Jinja2 Template Engine Flow

```
2. JINJA2->
+-----------+
| Web Page  |
| (Template)|
+-----------+
     |
     v
+-----------+
| Data Source|
| (e.g., DB) |
+-----------+
     |
     v
+-----------+
| Jinja2    |
| Template  |
+-----------+
     |
     v
Dynamic Web Page
```

Practical Applications

Flask is essential for creating web applications that interact with machine learning models. For example:

- Image Classification: A web page with an upload button allows users to upload images, which are then processed by a machine learning model to classify the image (e.g., dog or cat).

- User Authentication: A login form that authenticates users against a database.

Conclusion

Flask is a powerful framework for building web applications, especially for those in data science and machine learning. Understanding WSGI and Jinja2 is crucial for effectively using Flask to create dynamic and interactive web applications.