MP6 Overview Session

CS 340 - Introduction to Computer Systems

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Slides Inspiration: Eunice Zhou

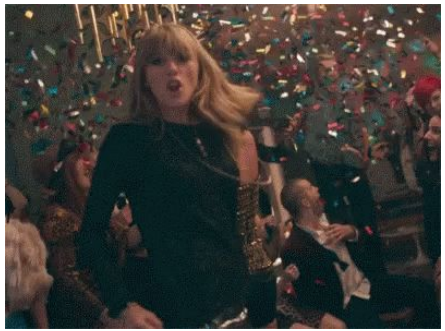
Goals

In this MP:

- Create a web-based microservice using your MP2 code
- Build a Flask application that extracts hidden GIFs and maintains the state of all the hidden GIFs the application has extracted
- Package the application into a Docker container (extra credit)

Microservice Overview

- **Extract GIF:** If there is a POST request on the route /extract, return the extracted GIF from the PNG file, else return error code 500 with some message if not uiuc chunk is found

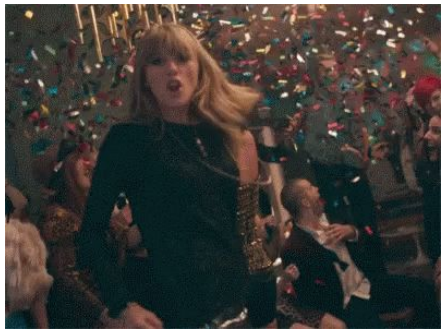


No Hidden GIF Found!, 500

Microservice Overview Cont

- **Return Nth GIF:** If there is a GET request on the route /extract/<image_num>, return the nth extracted GIF, else return error code 500 with some message if the nth GIF doesn't exist

/extract/1



/extract/100

GIF 100 Not Found!, 500

Flask Overview

- **Provided Code:** The provided code can be found in app.py and will get give you the two routes you need to define

```python
from flask import Flask, render_template, send_file, request
import os

app = Flask(__name__)

# Route for "/" for a web-based interface to this micro-service:
@app.route('/')
def index():
  return render_template("index.html")


# Extract a hidden "uiuc" GIF from a PNG image:
@app.route('/extract', methods=["POST"])
def extract_hidden_gif():
  # ...your code here...

# Get the nth saved "uiuc" GIF:
@app.route('/extract/<int:image_num>', methods=['GET'])
def extract_image(image_num):
  # ...your code here...
```

- Found the app using python -m flask run
  - Set the FLASK_DEBUG environment variable to 1 to run in debug mode
- Visit https://127.0.0.1:5000/ to the application

Helpful Functions & Modules

Programming in Python

- os.makedirs: Creates a directory
- request.files['png']: Access the PNG from the POST request
- os.system: Can be used to run the MP2 extractGIF function
- send_file: Send the contents of a file as a response
- return "error message", error code: Can send an error message and error code if GIF is not found

MP6 Extra Credit

Packaging Application into Docker Container

Package as a Docker Container

- **Dockerfile:** contains the instructions for building the Docker image
- **.env:** contains the commands to build the Docker image
- **docker/entrypoint.sh:** contains the instructions that will be run when the container is initiated

Useful Dockerfile Instructions

- FROM: initialize the build stage/base image of the Docker image
- RUN: executes commands and commits the results to the Docker image
- CMD: command the container executes by default when launching the built image
- COPY: copies files from src to dest path in the container
- ENV: sets the environment variables
- ENTRYPOINT: used to set the executables that will always run when the container is initiated
- WORKDIR: sets the working directory for the Docker image

MP6 Testing

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- Run the tests by using pytest
  - You can specify a file after pytest to only run the tests for the Flask app or for Docker
- Use **Docker container ls** to list all the Docker containers
- Use Docker stop <container_name> to stop the container