

Image Clustering App

This Streamlit app is designed to cluster uploaded images using KMeans clustering. The app extracts the Histogram of Oriented Gradients (HOG) features from a set of pre-loaded images, and then uses KMeans to cluster new images based on their HOG features.

Dependencies

This app requires the following dependencies:

Streamlit
NumPy
OpenCV (cv2)
zipfile
scikit-learn (sklearn)

These dependencies can be installed by running the following command:

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```
pip install streamlit numpy opencv-python-headless zipfile scikit-learn
```

Running the App

To run the app, save the code in a file named app.py and execute the following command in your terminal:

Copy code

```
streamlit run app.py
```

Once the app is running, you can upload an image using the file uploader in the sidebar. The app will display the uploaded image, along with the cluster it has been assigned to based on its HOG features. The app is set to use 16 clusters by default.

The pre-loaded images are stored in a ZIP file named images.zip, which is extracted and loaded into memory when the app starts. The HOG features are computed for each pre-loaded image and used to fit the KMeans model. When a new image is uploaded, its HOG features are computed and used to assign it to a cluster.

Acknowledgements

This app was created using the following resources:

Streamlit
NumPy
OpenCV
scikit-learn
The CIFAR-10 Dataset (used to train the KMeans model on HOG features)