Hashtag Recommendation for Multimodal Data and Short Description Generation for Images

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Problem Definition

- Developing a multimodal deep learning model to recommend relevant hashtags and generate concise descriptions for images, aiming to enhance content understanding and organization in social media and image-based platforms.

Project Objective

- To develop automated hashtag recommendation system for multimodal data and further create a short-description for images using latest deep learning techniques.

Novelty of Idea and Scope of Implementation

- Build a simple model for Hashtag recommendation of multimodal data with limited resources and computational capabilities while maintaining comparable performance.
- Users can benefit from improved searchability and discoverability of content, creating a more engaging and organized social media experience.
- Aims for a recommendation system adaptable to diverse social media platforms.
- Extends applications to content-based image retrieval, multimedia content management, image cataloging.

Modules

- Data Preprocessing
- Hashtag Recommendation
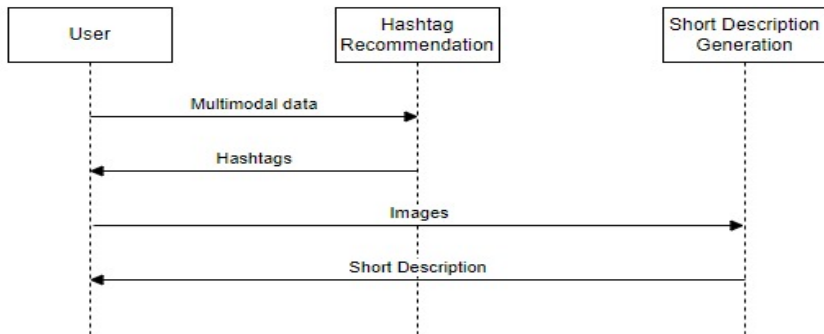- Short Description Generation
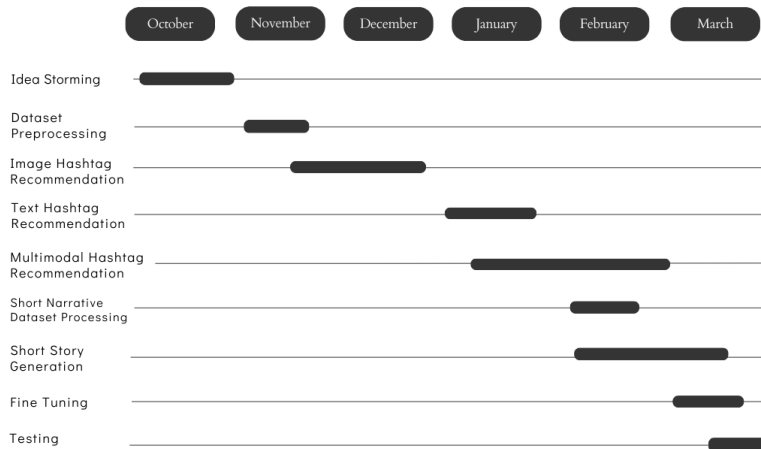
Hashtag Recommendation Module
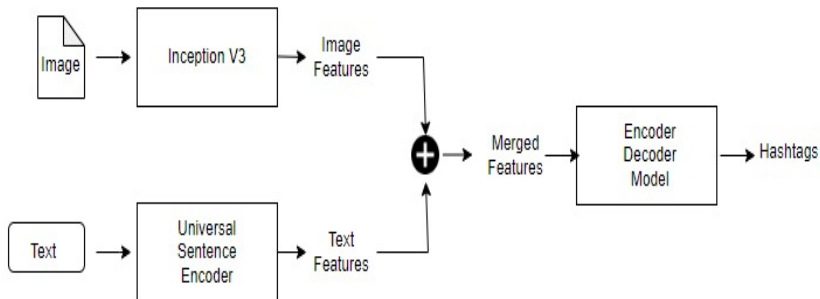
Short Description Generation Module

Sequence Diagram

Gantt Chart

	October	November	December	January	February	March
Idea Storming	▬▬					
Dataset Preprocessing		▬				
Image Hashtag Recommendation		▬▬▬				
Text Hashtag Recommendation			▬▬			
Multimodal Hashtag Recommendation			▬▬▬			
Short Narrative Dataset Processing				▬		
Short Story Generation				▬▬▬		
Fine Tuning					▬	
Testing						▬

Work done during 30% Evaluation

- Selection of dataset.
- Dataset Preprocessing
- Integrate image features with the LSTM architecture.
- Integrate text features with the Bi-LSTM architecture.
- Applied attention layer.
- Concatenate the features.
- Model generation for hashtag recommendation using image and text.
- Training of the model.

Work done during 60% Evaluation

- Image Feature extraction using InceptionV3.
- Text feature extraction using Universal Sentence Encoder.
- Merge extracted features
- Encoder-Decoder model generation.
- Training of model with MM-INS dataset.
- Testing of the model.

Work done during 100% Evaluation

- Customized Nuswide Dataset.
- Train the Encoder Decoder model with Nuswide dataset.
- Test the model for hashtag recommendation.
- Short Description Generation dataset selection.
- Encoder Decoder based Short description generation model for images.
- Training of model with Stanford dataset
- Testing of the model.

Hashtag Recommendation on MM-INS Dataset Results

Enter some text: happy drawing
#art #artist #edit #draw #drawing

Hashtag Recommendation on MM-INS Dataset Results

Enter some text: cutest cat ever
#animallover #animal #cat #cute #cutecat

Hashtag Recommendation on MM-INS Dataset Results

Enter some text: cute baby
#amazing #holidayseason #pajamaparty #family #yay

Hashtag Recommendation on Nuswide Dataset Results

Enter some text: happy day
#beachlove #beachwalk #coastalliving #wavesfordays #sunsetbeach

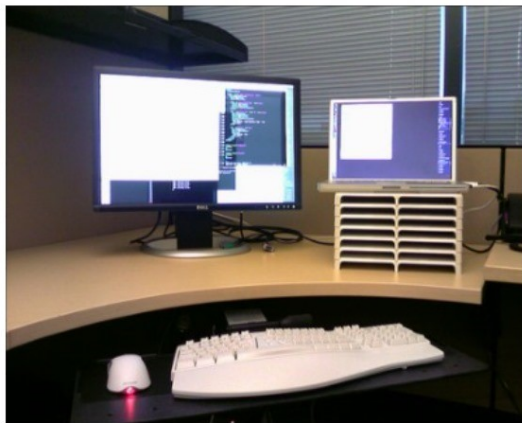# Hashtag Recommendation on Nuswide Dataset Results


```
Enter some text: new car new life
WARNING:tensorflow:5 out of the last 162 calls to <function Model.make_predict_func
#carsland #carshows #carsoflondon #carsgram #carsvideos
```

Short Description Results on Test Data

the desk has a black keyboard and mouse pad and keyboard. the monitor is on a wooden desk. the desk is brown. a small desk hutch is on the right.

Short Description Results on Test Data

a large elephant is walking on a dirt ground. the elephant has a long trunk. the trunk is grey and grey, and has a harness on the top. the trunk is white with a little point of water.

Short Description Results on Unseen Data

a white and white house is on the side of a street. there is a white stripe on the side of the bus. there is a white car parked on the street next to the car. there is a white van on the street in front of the building.

Hashtag Recommendation Model Comparison

Metric	Proposed Model	Base Paper Model
Accuracy	68	65
Recall	17.1	13.4
Precision	16.7	35.7
No:of Trainable parameters	9169492	112154125
Training time	35ms/step	50ms/step

Figure: Comparison Table

Challenges

- To find an appropriate and unbiased multimodal dataset for hashtag recommendation.
- Customization of Nuswide dataset for our purpose.

Future Scope

- Incorporate mechanisms for user interaction and feedback.

- Develop standard multimodal dataset containing different domains.

- Include mechanism for personalization.

Task Distribution

FATHIMA SAHLIYA K.S

- Hashtag Recommendation using MMINS Dataset
- Nuswide Dataset Customization
- Short Description Generation

KHADEEJA C.R

- Dataset Preprocessing
- Hashtag Recommendation using Nuswide Dataset
- Short Description Generation

JIYA JOY

- Hashtag Recommendation using MMINS Dataset
- Nuswide Dataset Customization
- Stanford Dataset Processing

IVA SONY

- Dataset Preprocessing
- Hashtag Recommendation using Nuswide Dataset
- Stanford Dataset Processing

Conclusion

- Developed a simple model for hashtag recommendation, yielding comparable results to the base paper's model.

- The project introduces an easy approach to multimodal data analysis by integrating image and text inputs, leveraging machine learning technologies.

- Utilizing deep learning techniques, concise and meaningful short descriptions for images are further generated.

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Status of Paper Publication

The paper is based on our research Hashtag Recommendation for Multimodal Data and Short Description for Images. The study introduces an innovative approach to multimodal data analysis, integrating image and text inputs using machine learning technologies for hashtag recommendation. Also, concise and meaningful short descriptions for images are generated by utilizing deep learning techniques.

The paper has been communicated with our guide.

THANK YOU