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# Hashtag recommendation

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# Abstract

We recommend user corresponding hashtags according to the input images.

The system can predict the hashtag according to user's previous choice

That is, different choice would result different hashtag recommended from system

# Dataset

The dataset was self-collected from Instagram.

It contains 57000 images with a few hashtags as a pair.

There are roughly 1000 different hashtags.



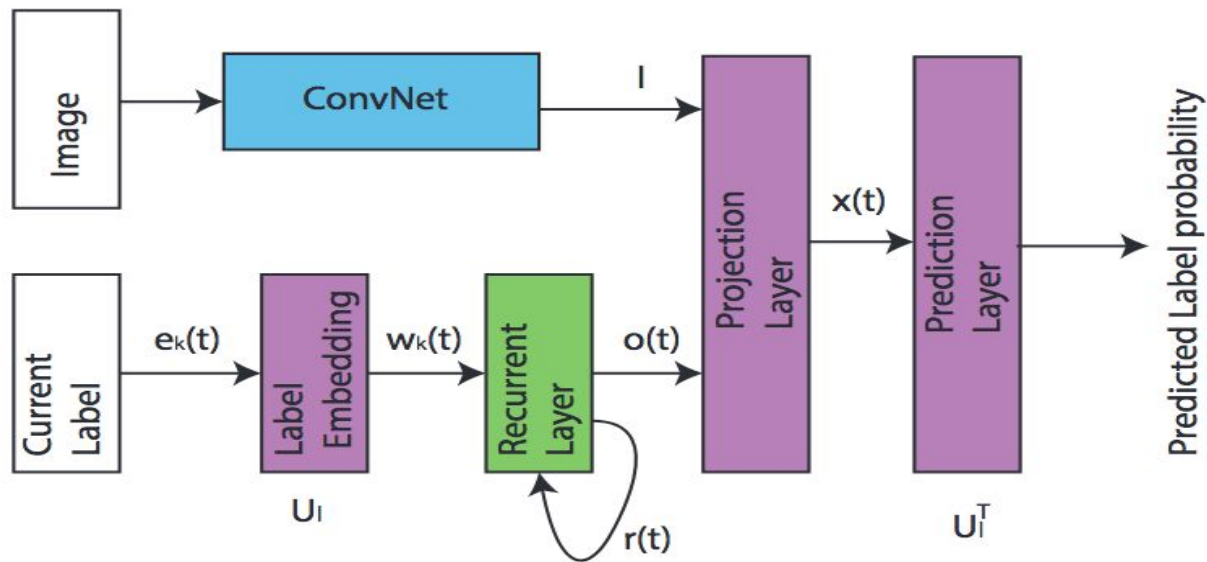
# Model structure

We implement the model structure from the following paper

**CNN-RNN: A Unified Framework for Multi-label Image Classification**

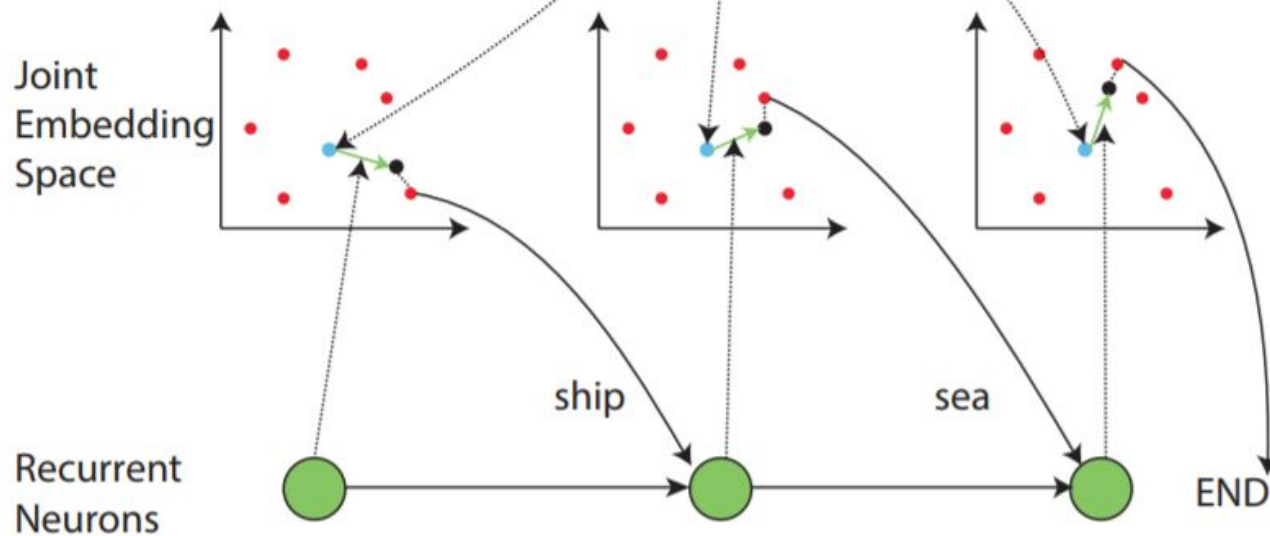
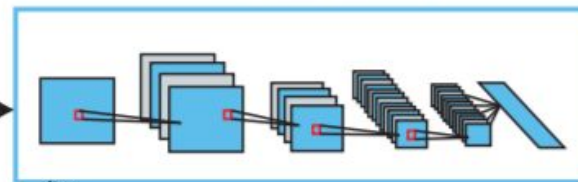
Images and tags were projected to a shared latent space

# Model structure



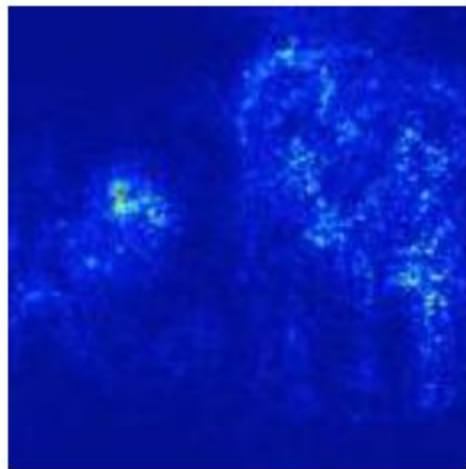


VGG ConvNet

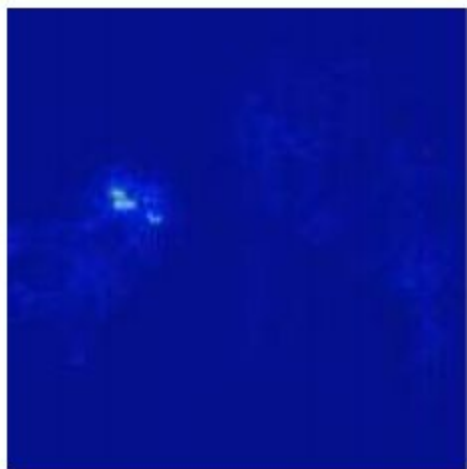




Original Image



Initial Attention



Attention after first word

Figure 10. The attentional visualization for the RNN multi-label framework. This image has two ground-truth labels: “elephant” and “zebra”. The bottom-left image shows the framework’s attention in the beginning, and the bottom-right image shows its attention after predicting “elephant”.

# Advantages

By adapting this model structure, an user interactive system can be implemented

RNN stores the previous information so that all hashtag recommended will be correlated



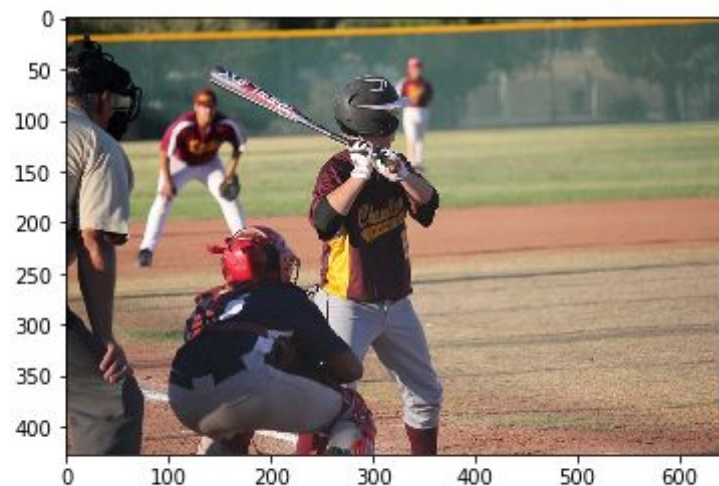
# Result

('chair', 'furniture')  
( 'baseball glove', 'sports')  
( 'bench', 'outdoor')  
( 'airplane', 'vehicle')  
( 'kite', 'sports')  
( 'bird', 'animal')  
( 'boat', 'vehicle')  
( 'baseball bat', 'sports')  
( 'umbrella', 'accessory')

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('person', 'person')  
( 'boat', 'vehicle')  
( 'chair', 'furniture')  
( 'surfboard', 'sports')  
( 'kite', 'sports')  
( 'handbag', 'accessory')  
( 'bird', 'animal')  
( 'dining table', 'furniture')  
( 'bottle', 'kitchen')  
( 'baseball glove', 'sports')

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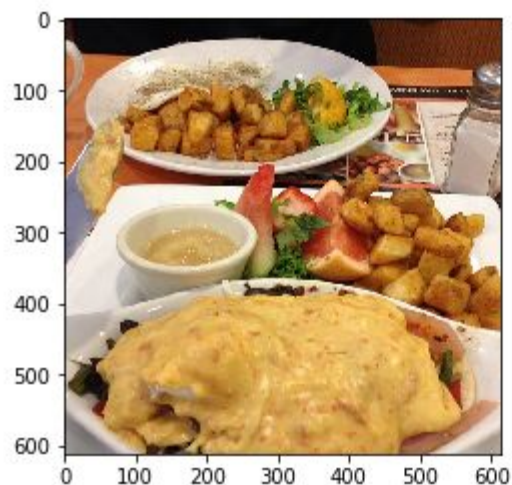
('car', 'vehicle')  
('chair', 'furniture')  
('traffic light', 'outdoor')  
('<END>', '<END>')  
('truck', 'vehicle')  
('handbag', 'accessory')  
('motorcycle', 'vehicle')  
('kite', 'sports')  
('bus', 'vehicle')  
('backpack', 'accessory')

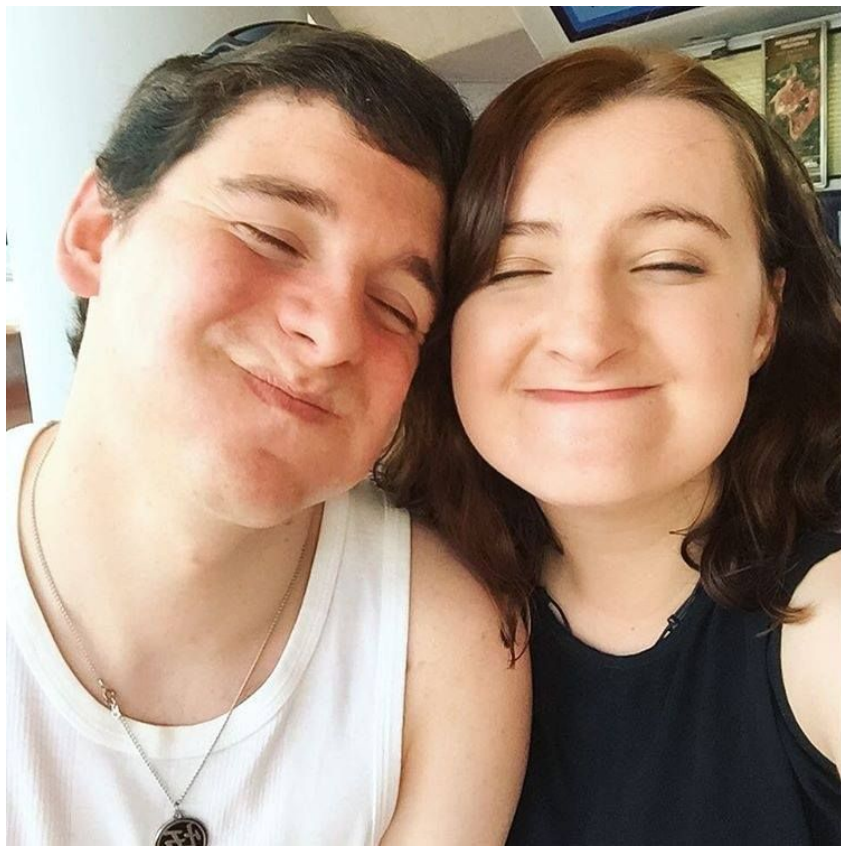
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('dining table', 'furniture')  
('fork', 'kitchen')  
('chair', 'furniture')  
('carrot', 'food')  
('cup', 'kitchen')  
('broccoli', 'food')  
('knife', 'kitchen')  
('person', 'person')  
('cake', 'food')  
('apple', 'food')

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family  
dog  
girl  
love  
life  
smile  
beautiful  
happy  
followme  
instadaily  
instagood



upload image

predict image



#summer  
#vscocam  
#photooftheday  
#beach  
#exercise  
#happiness



Add

# Future Works

- Fully reproduce the paper
- Data augmentation
  - Hashtag clustering
  - Add similar hashtags
- Data imbalance
  - Focal loss