



Project 258: Image Captioning

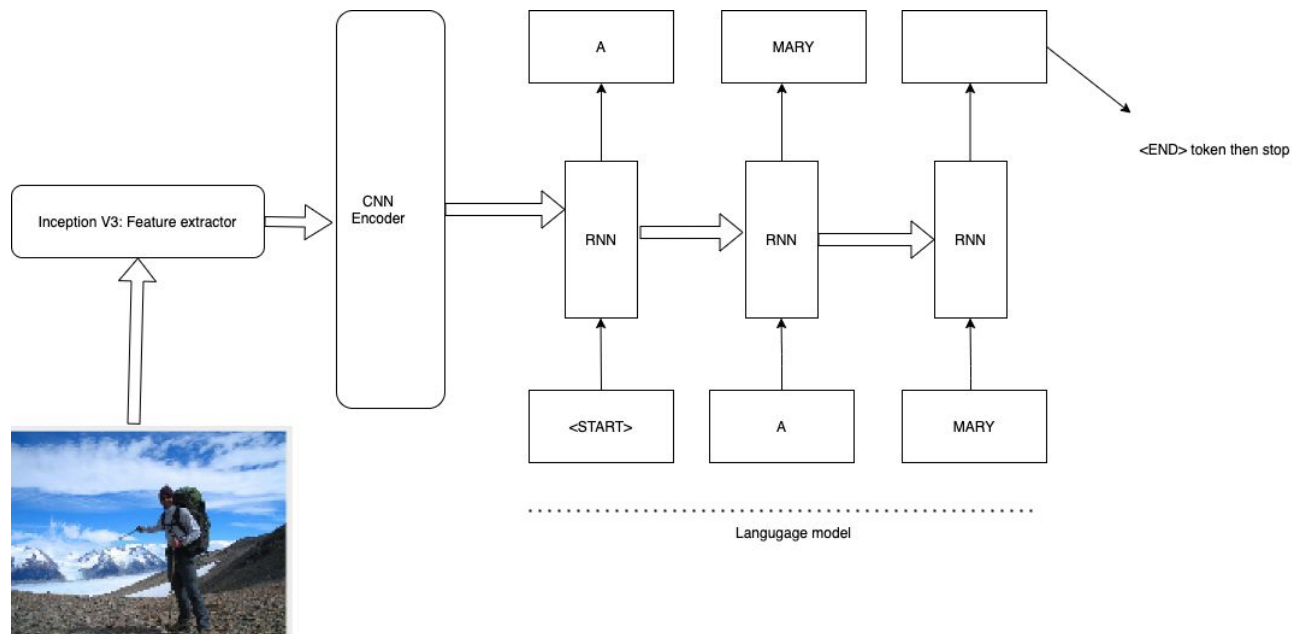
Team Ninjas

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Architecture





Dataset

MSCOCO Dataset

The dataset contains over 82,000 images, each of which has at least 5 different caption annotations



Configurations

Optimizer	Adam
Attention	Bahdanau Attention
Loss function	Sparse Categorical Entropy
Batch size	128
Units	512
Epoch	20
Dropout	0.5

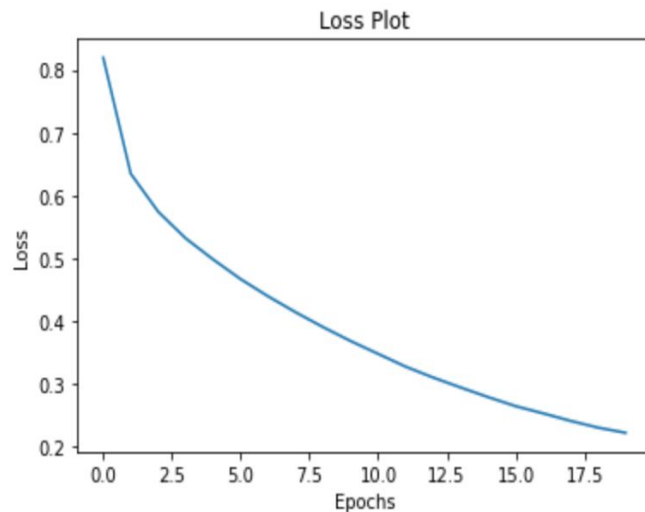


Implementation

- Used Teacher forcing technique which is method for quickly and efficiently training recurrent neural network models that use the ground truth from a prior time step as input.
- Attention based RNN to improve the performance of encoder decoder model for long captions.
- Used checkpoints to save best model.
- Created Flask application using saved checkpoint.

Training

```
plt.plot(loss_plot)
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.title('Loss Plot')
plt.show()
```





TF2 colab:

https://colab.research.google.com/drive/1tA15NyR_7R3Q3Wnd3-QAyuHa4vSnTka8?usp=sharing

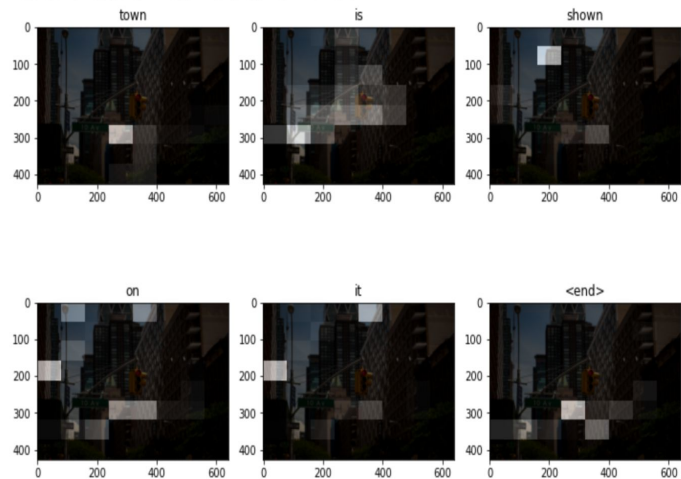
TFX colab:

<https://colab.research.google.com/drive/1999BDrsJNlbV-kEq9iNC4ToEm86eZK3D?usp=sharing>

Prediction:

```
▶ result, attention_plot = caption(image_path)
print('Prediction Caption:', ' '.join(result))
plot_attention(image_path, result, attention_plot)
```

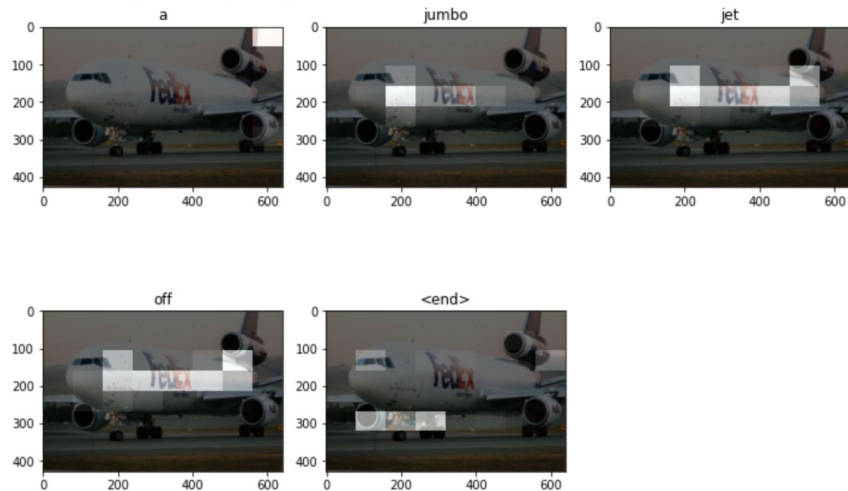
☐ Prediction Caption: town is shown on it <end>



Prediction:

```
[46] result, attention_plot = caption(image_path)
     print('Prediction Caption:', ' '.join(result))
     plot_attention(image_path, result, attention_plot)
```

Prediction Caption: a jumbo jet off <end>



TFX Airflow



Airflow

DAGs

Security

Browse

Admin

Docs

17:37 UTC

AA

Triggered image_captioning, it should start any moment now.

DAGs

All 2		Active 1		Paused 1		Filter DAGs by tag		Search DAGs	
DAG	Owner	Runs	Schedule	Last Run	Recent Tasks	Actions	Links		
<input checked="" type="checkbox"/> image_captioning	airflow	<input type="radio"/> 1 <input checked="" type="radio"/> 5	None	2021-05-12, 17:37:34	<input type="radio"/> <input type="radio"/> 1 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> 5 <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="button" value="▶"/> <input type="button" value="↺"/> <input type="button" value="🗑️"/>	...		

TFX Airflow

localhost:8080/graph?dag_id=image_captioning

Apps Save All Images gopinathsjsu/tea... 258 short story TFX Airflow Tutori... How Does Attenti... Reading List

Airflow DAGs Security Browse Admin Docs 17:39 UTC AA

DAG: image_captioning running schedule: None

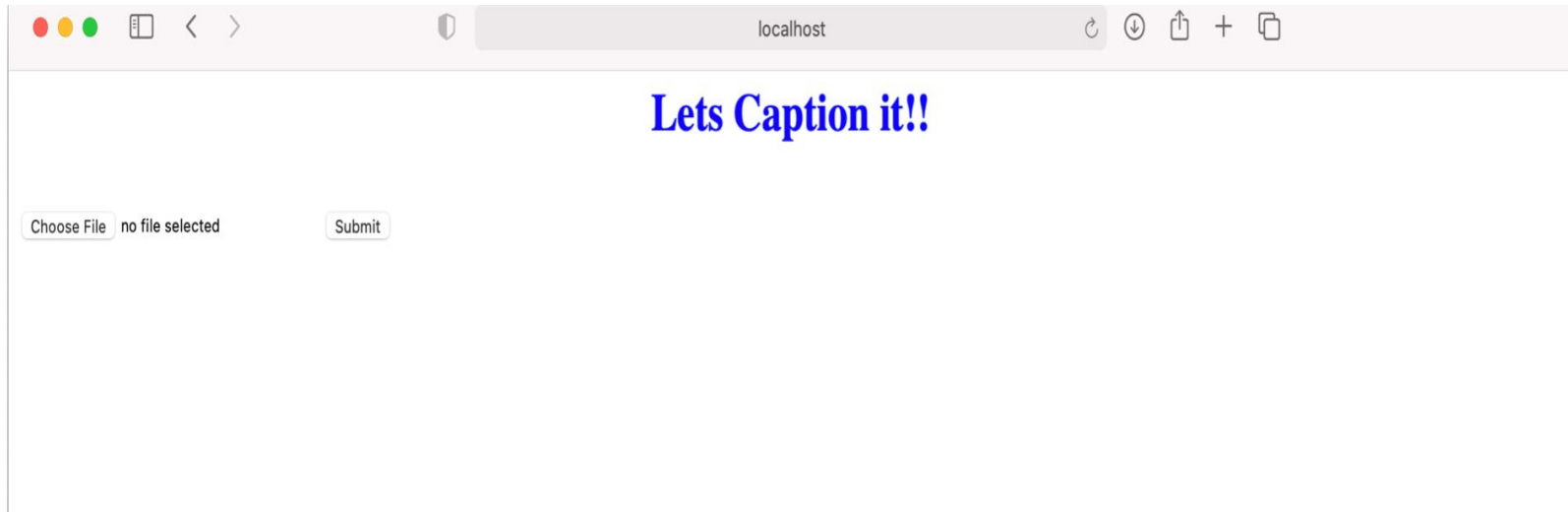
Tree View **Graph View** Task Duration Task Tries Landing Times Gantt Details <> Code

2021-05-12T17:37:35Z Runs 25 Run manual__2021-05-12T17:37:34.131065+00:00 Layout Left > Right Update Find Task...

AirflowComponent queued running success failed up_for_retry up_for_reschedule upstream_failed skipped scheduled no_status

Auto-refresh

```
graph LR; ImportExampleGen[ImportExampleGen] --> StatisticsGen[StatisticsGen]; ImportExampleGen --> Trainer[Trainer]; StatisticsGen --> SchemaGen[SchemaGen]; SchemaGen --> ExampleValidator[ExampleValidator];
```



Lets Caption it!!

Choose File no file selected

Submit



localhost



Here Comes the caption!!

Prediction Caption : a large air jet on the tarmac near several things at an airplane outside <end>



Here Comes the caption!!

Prediction Caption : this is a laptop on the desk <end>





Collaboration/Responsibility

Collaboration	Responsibility
Rishitha	Webapp/ Flask model deployment
Shreya,Rishitha	TFX
Shreya	Airflow, Model evaluation,Architecture experiments