CoverGenie

Cover Letter generation using Fine-tuned T5

Seasalt.ai Team: Hari, Jaya, Meiyu, Sara
MDS-CL, Class of 2023

Slides layout credit to: Jian
Special thanks: Weirui

Motivation

- **A fine-grained model to generate cover letters based on job descriptions**

- **Automated procedure for job-seekers**

- **Tailor-made cover letters**

Definition

ME, AFTER SUBMITTING MY RESUME
AND REALIZED THERE'S NO COVER LETTER

- Text generation task by nature
- Input: job descriptions and resumes
- Output: cover letters

Prompt: "give me a cover letter based on a job description and a resume."

Previous work

- **Scaling Instruction-Finetuned Language Models (Flan fine-tuning)**

- **Large Language Models Are Human-Level Prompt Engineers (prompt engineering)**
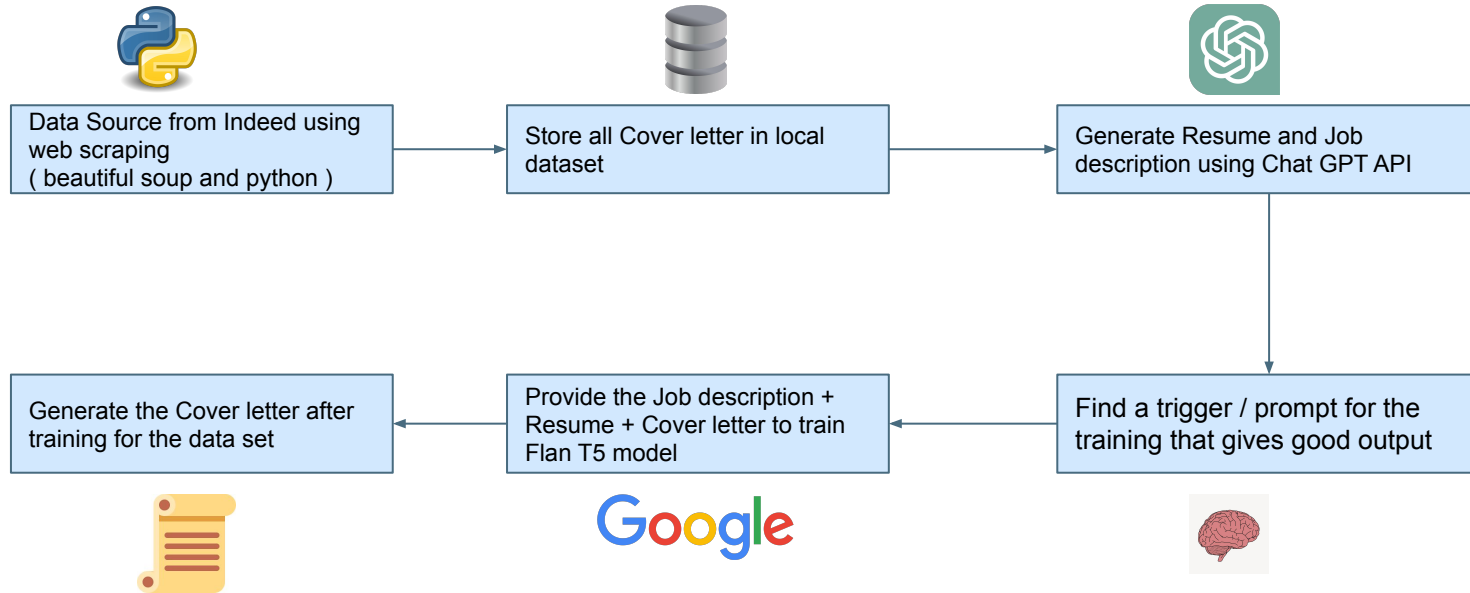
- **Coverletter T5 base project from Huggingface**

https://arxiv.org/pdf/2210.11416.pdf
https://arxiv.org/pdf/2211.01910.pdf
https://huggingface.co/nouamanetazi/cover-letter-t5-base

Data and Model Architecture

Data Source from Indeed using web scraping
(beautiful soup and python) → Store all Cover letter in local dataset → Generate Resume and Job description using Chat GPT API

↓

Find a trigger / prompt for the training that gives good output

↓

Provide the Job description + Resume + Cover letter to train Flan T5 model

↓

Generate the Cover letter after training for the data set

Model Fine Tuning (Hyperparameter Tuning)

- Model:Flan T5(large) -> finalized

Train test split: 80/20

Training Parameter:

1. per_device_train_batch_size=8
2. gradient_accumulation_steps=8
3. max_steps=100 (Flan T5 small) 50 steps (Flan T5 large)
4. optimizer= 'adam'

Generation Parameters:

1. *Temperature =2.0*
2. *num_beams=3*

Experiments & Results

- Evaluation: Rouge score Flan T5 base model

	Step	Training Loss	Validation Loss	Rouge1	Rouge2	Rougel	Rougelsum	Gen Len
1.	Step	Training Loss	Validation Loss	Rouge1	Rouge2	Rougel	Rougelsum	Gen Len
2.	50	2.065400	1.617432	4.993300	4.175800	4.932800	4.975000	19.000000
3.	100	1.910300	1.591844	4.906300	4.072000	4.888400	4.897300	19.000000

Generated Output:

```
Amy Chan
(212) 667-5656
amy.chan@email.com
February 1, 2018

Dear Hiring Manager,
I want to apply for the job of Medical Records Clerk at a hospital in Charlotte.
```

- Evaluation: Rouge score Flan T5 Large model with 50 steps

Step	Training Loss	Validation Loss	Rouge1	Rouge2	Rougel	Rougelsum	Gen Len
25	1.845800	1.472070	4.991800	4.126700	4.928300	4.937300	19.000000
50	1.693600	1.450809	5.040200	4.180700	4.971200	4.985700	19.000000

Output generated:

Amy Chan

(212) 370-7910 <- phone number from the previous data of Amy chan

adamchan@email.com <- made up email id from the name

28-Aug-19 <- made up date but able to have a proper format

Dear Hiring Manager, <- understands the greeting part in the cover letter

As an individual with a desire to work at a hospital where the health of the patients is top priority, I am eager to begin working at the hospital that will best serve your patients. I am excited to be employed at Saint Mary's Health System, and I look forward to fulfilling this need for a medical records clerk. I work in medical records departments in hospitals and have worked in other departments. I am capable of working with both doctors and other staff members to ensure that the medical records are up to date and that they are completely complete. I have an interest in helping to keep our patients as safe and secure as I can. I have a desire to continue my career at the hospital. I have spent five years in medical records departments in several hospitals, so I will bring some of my knowledge and skill that I gained from that time. I enjoy working with the nursing staff to ensure that the records of patients are accurate and up to date and will always do my best to help the other staff members that I work with. This experience allows me to help doctors and other medical staff when necessary. The hospital is looking to hire someone who will take a team approach as a means of ensuring the success of the hospital, as a whole and a particular department within the hospital. I am a student at *St. Helena University, and have a nursing degree*. As such, although my education is not directly related to the medical records office, I have gained some knowledge that may benefit the hospital and the staff. I believe I can bring a great deal of experience and knowledge to the job. I am confident that the hospital is a great place to live and a great place for me to find employment. Thank you so much for your consideration of my application and would love to learn more about Saint Mary's Health System. I look forward to meeting with you and discussing more about the position and what it will be like for my future at the hospital. As a new and dedicated member of the hospital team, I hope to see you in person soon to begin the journey of becoming a great part of the team.

Thanks again for your time.

I look forward to hearing from you soon,

Take care!

Amy Chan,

212-370-7910.

Conclusion

- **Model is able to come up with coherent and consistent cover letter format given a resume and job description.**

- **Fine-tuning model with more parameters increased the quality of the generated cover letter.**

- **Model is able to understand the trigger sentence provided by us .**

- **Model stopped hallucinating after tuning hyper parameters.**

Future work

- **Trying to go on board with larger Model - T5 Large for more steps than 100 steps , using the same model in higher machines could yield better results.**

- **Model needs to be trained with more dataset.**

Thank you!

Q & A