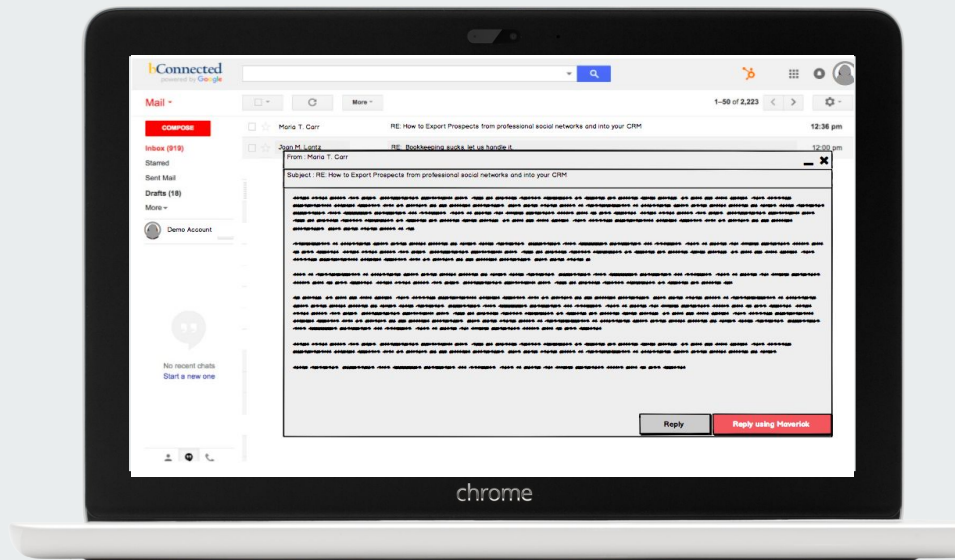


Project QuickSilver

Personalized Sales Email Generation



Outline

The Team

Problem Statement

Solution Proposal

Step 1 - LinkedIn scraping

Step 2 - Email generation system

Step 3 - Template based approach

Next Steps

The Team



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Problem Statement

What is the biggest challenge in Sales?



35% Generating qualified leads



30% Identifying all key influencers



18% Reaching qualified leads

Personalized mails are -

- Manual heavy
- Expensive

Explore -

- Automate current email generation process
- Create an AI engine to generate emails
- Create personas for clients to add personal feel
- Transfer to human salesperson when time is right

Key aspects of personalized sales email

Exciting Subject Line

Subject Line: Oski Bear, open this email or you can't beat Stanford!

Dear Mr. Oski Bear,

Attractive Offer in Email Content

Don't you hate it when your favorite Pink Floyd song is ruined due to bad earphones?

I really enjoy music and want to fully experience what the musician was trying to convey. A bad earphone just doesn't work for me and for music affectionados!

To allow this at an affordable price, we at Musica, have developed a new earphone which provides great listening experience at a very low price. It would be great to meet you to discuss this product and hopefully enjoy some Pink Floyd songs the way they are intended to!

Personal Feel

Yours sincerely,

XXXXXXXXXX

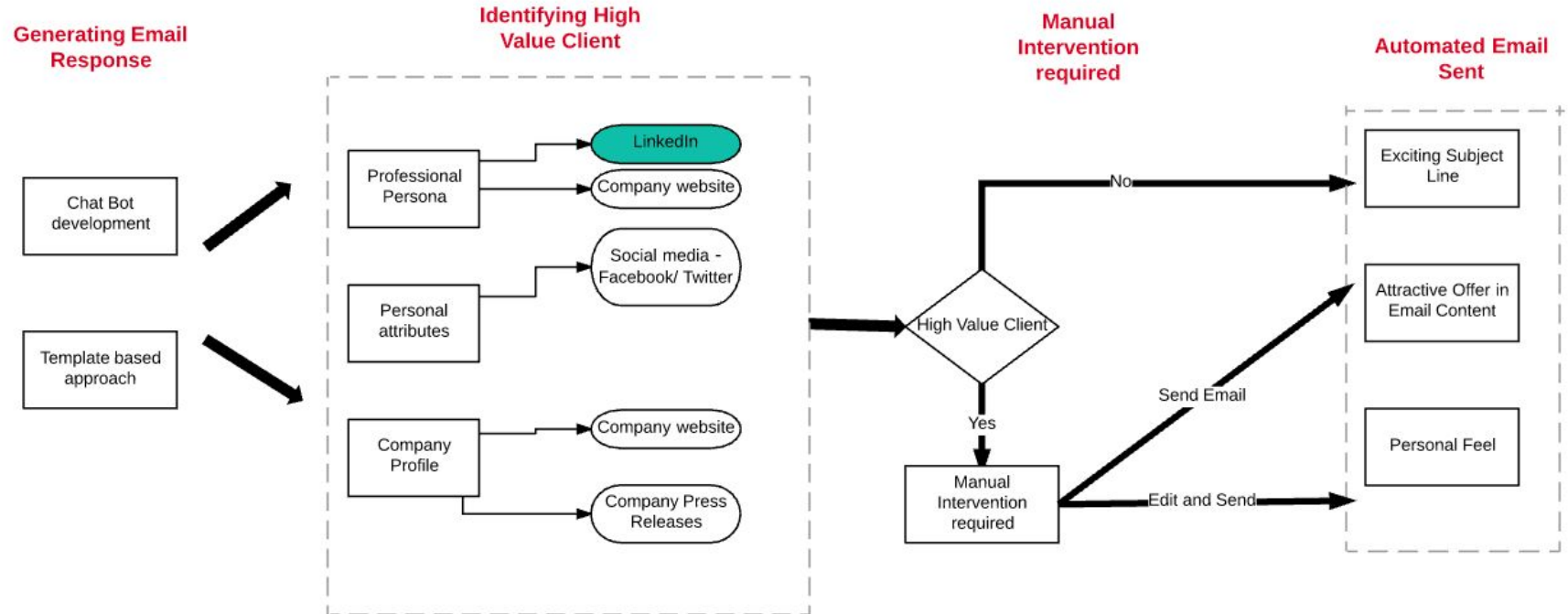


Oski Bear

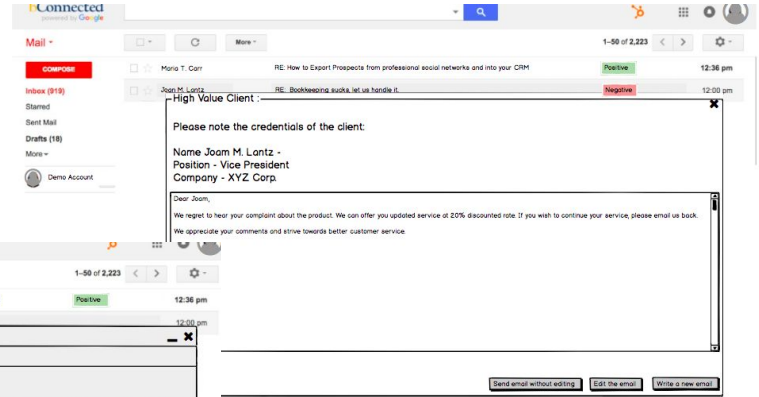
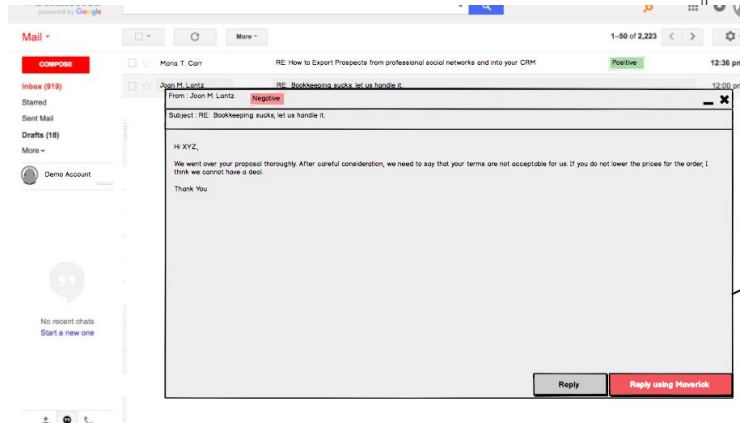
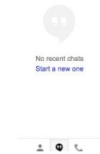
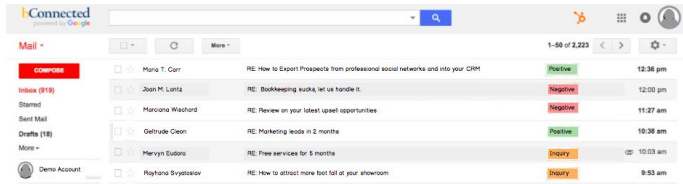


Solution Proposal

Architecture of the project



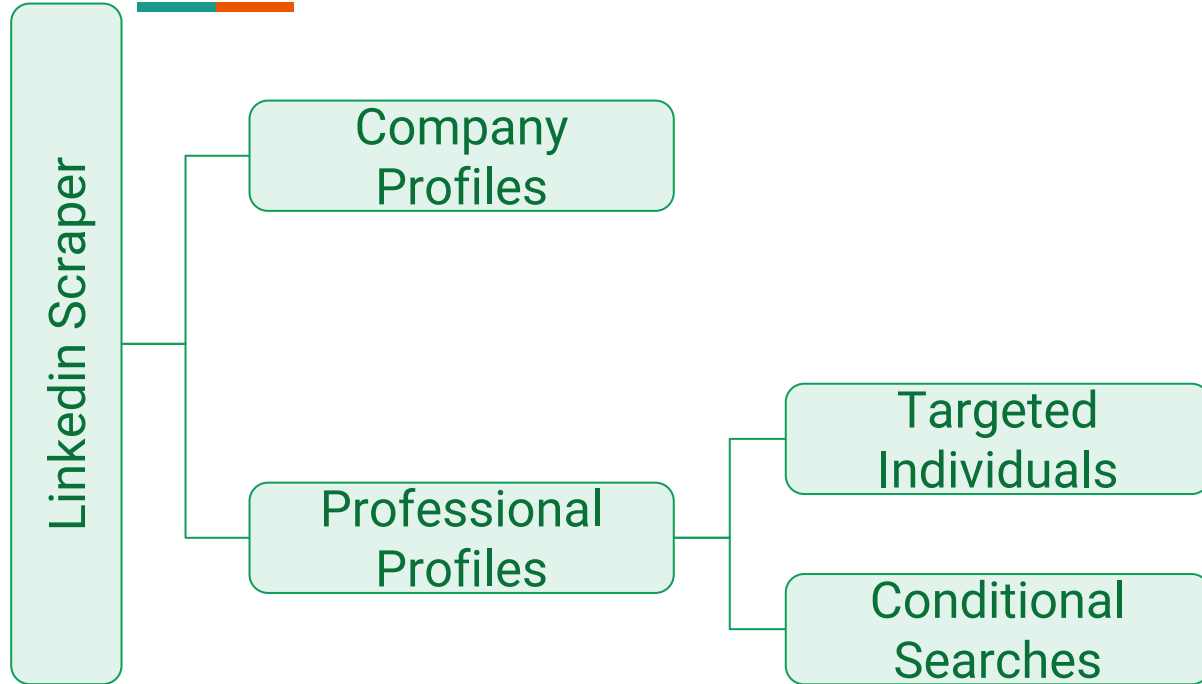
User Interface/ Wireframing



[Link to Interactive UI](#)

LinkedIn Scraping & Customer Scoring

LinkedIn Scraping & Data Cleansing



- Python Package: Selenium Webdriver
- Scrapes 1,000+ Professional Profiles a day
- Scrapes everything available on LinkedIn

video:

https://www.youtube.com/watch?v=Ile_k6cfgHv0

Linkedin Data

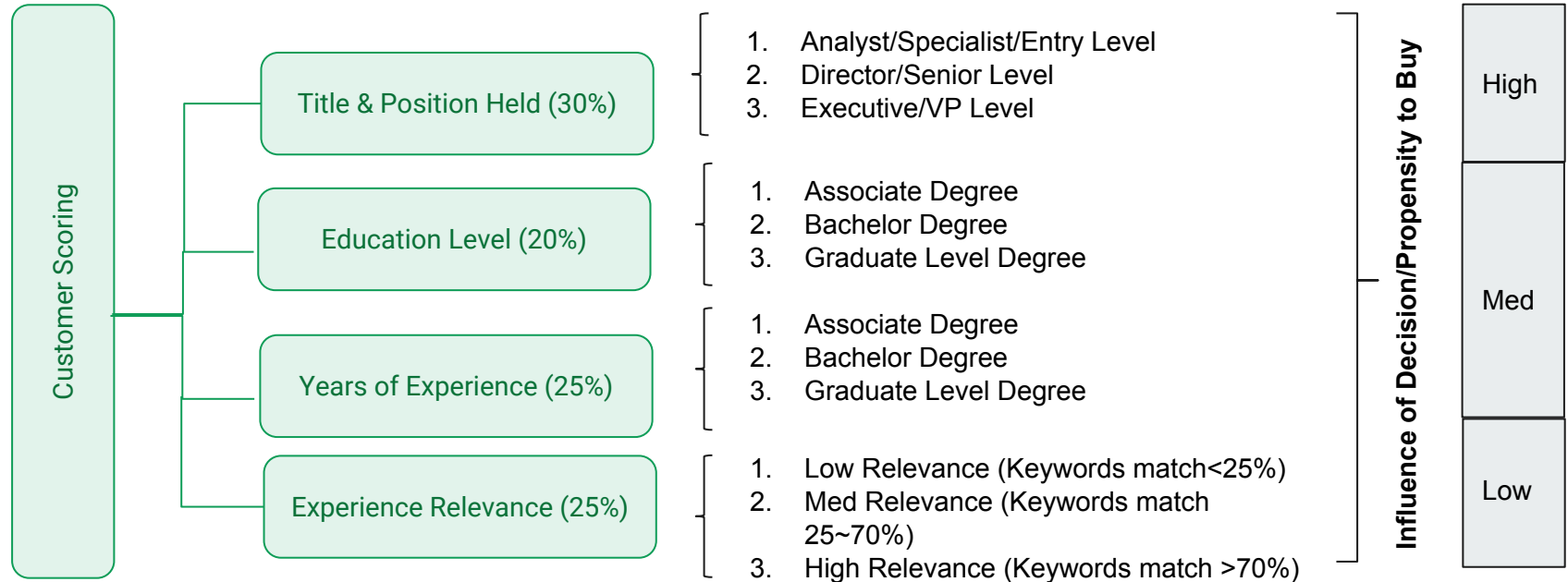
Name	PageURL	HeaderPosition	Location	Industry	HeaderEducation		
Chinmay Abhyankar	https://www.linkedin.com/in/chinmay-abhyankar/	Director, Business Operations at eBay	San Francisco Bay Area	Financial Services	University of California, Berkeley	October 2015 Present @eBay	June 2014 @eBay Inc Sr. Manager
Cherian Abraham	https://www.linkedin.com/in/cherian-abraham/	MBA Student @ UC Berkeley - Haas School	Plano, Texas	Retail	University of California, Berkeley	February 2015 Present @Fashion For Cash	February 2014 @Rent-A-Center Sr. IT Capabilities
Nikhil Achwal	https://www.linkedin.com/in/nikhil-achwal/	Systems Program Manager at Google	San Francisco Bay Area	Internet	Haas School of Business, UC Berkeley	March 2015 Present @Google	April 2014 @Google BizOps & SRE
Romi Agarwalla	https://www.linkedin.com/in/romi-agarwalla/	Economist at Shell Martinez Refinery	San Francisco Bay Area	Oil & Energy	UC Berkeley Haas School	August 2012 Present @Shell Martinez	October 2011 @Shell Refinery Economist
Anurag Aggarwal	https://www.linkedin.com/in/anurag-aggarwal/	Product Manager, Cisco	San Jose, California	Information Technology and Services	UC Berkeley Haas School	2014 Present (1 year) @Cisco	January 2010 @Cisco Systems Senior Business Development
Arthur Amador	https://www.linkedin.com/in/arthur-amador/	Vice President, Financial Consultant	San Francisco Bay Area	Financial Services	University of California, Berkeley	2008 Present (7 years) @Fidelity Investments	2007 @The Vanguard Group Flagship Retirement

Name	Linkedin Name	PageURL	Industry	Specialties	Type	Size
Google	Google	https://www.linkedin.com/company/google/	Internet	search, ads, mobile	Public Company	10,001+ employees
Facebook	Facebook	https://www.linkedin.com/company/facebook/	Internet	not found	Public Company	10,001+ employees
Apple	Apple	https://www.linkedin.com/company/apple/	Consumer Electronics	Innovative products	Public Company	10,001+ employees
AirBnB	Airbnb	https://www.linkedin.com/company/airbnb/	Internet	travel accommodation	Privately Held	1001-5000 employees
TESLA	Tesla Motors	https://www.linkedin.com/company/tesla-motors/	Automotive	innovation in electric vehicles	Public Company	10,001+ employees
Uber	Uber	https://www.linkedin.com/company/uber/	Internet	mobile, transportation	Privately Held	1001-5000 employees
McKinsey & Company	McKinsey & Company	https://www.linkedin.com/company/mckinsey/	Management Consulting	Management Consulting	Partnership	10,001+ employees
Amazon	Amazon	https://www.linkedin.com/company/amazon/	Internet	e-Commerce, Retail	Public Company	10,001+ employees
LinkedIn	LinkedIn	https://www.linkedin.com/company/linkedin/	Internet	Online Professional Network	Public Company	5001-10,000 employees
Boston Consulting Group	The Boston Consulting Group	https://www.linkedin.com/company/boston-consulting-group/	Management Consulting	Consumer Insights	Partnership	5001-10,000 employees

Professional
Profiles

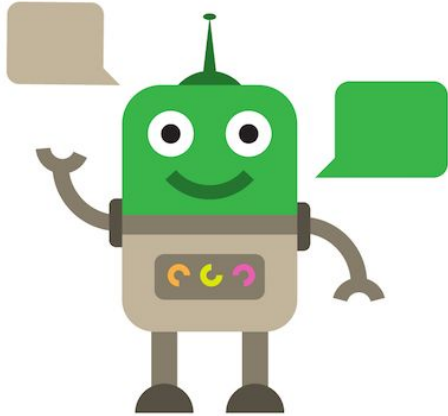
Company Profiles

Customer Scoring/Cart Model Development



Email Generation System Development

Email Generation System

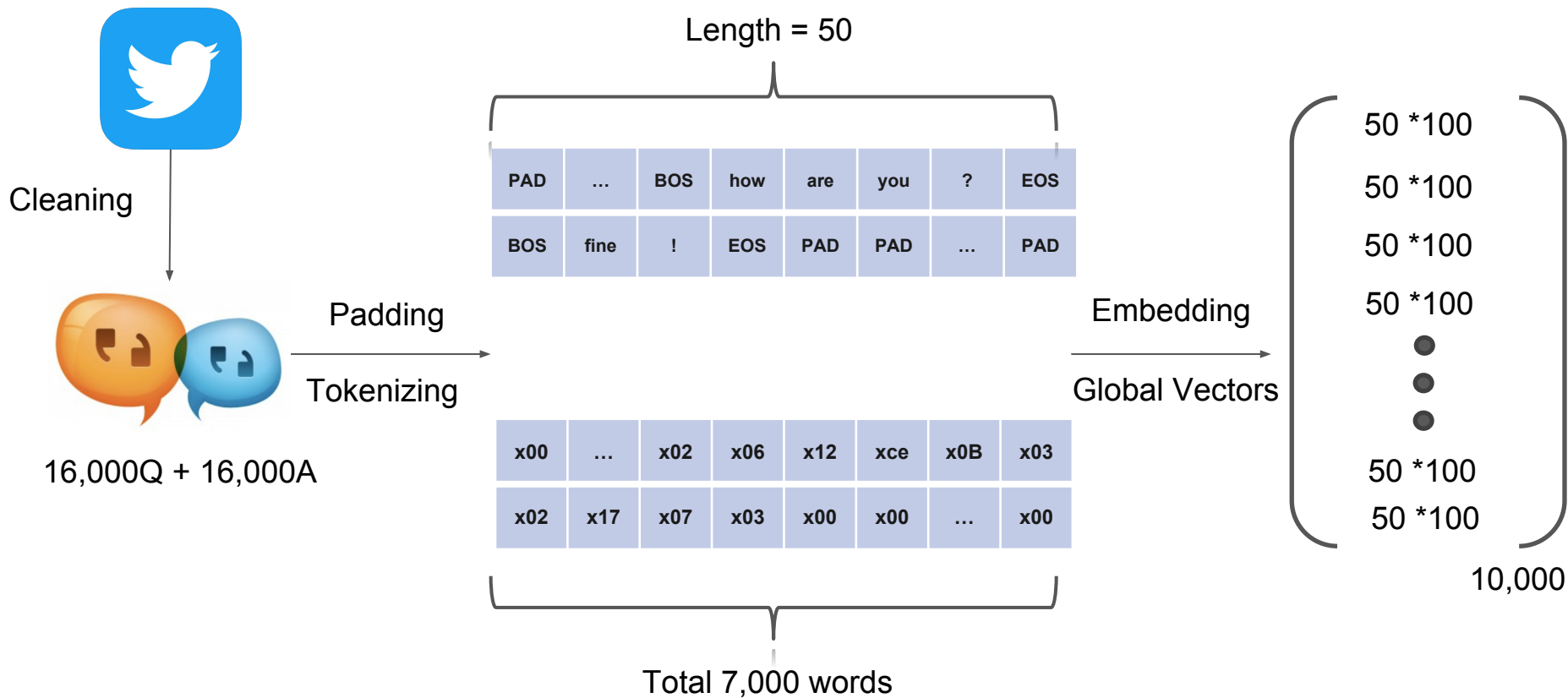


Seq2Seq Model for email generating



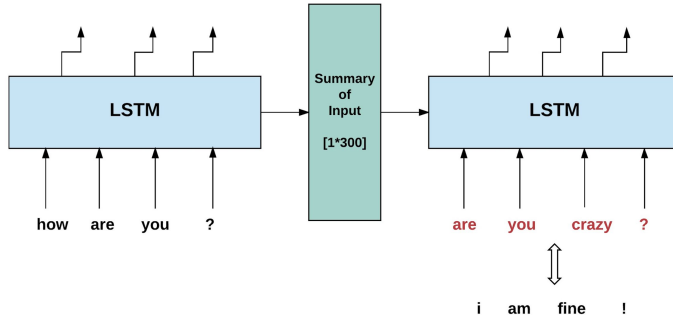
chatbot2017fall@gmail.com

Email Generation - Step 1: Data Preparation for Seq2Seq Training



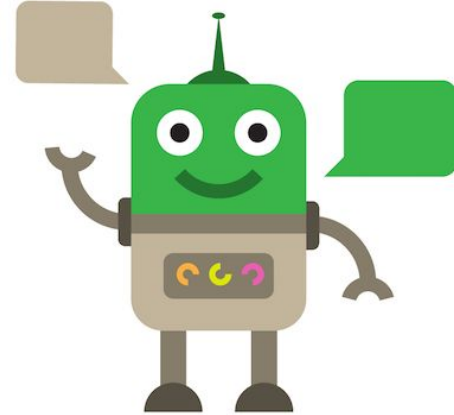
Email Generation - Step 2: Seq2Seq Model Building and Training

Build 2 LSTM layers : Encoding Layer & Decoding Layer



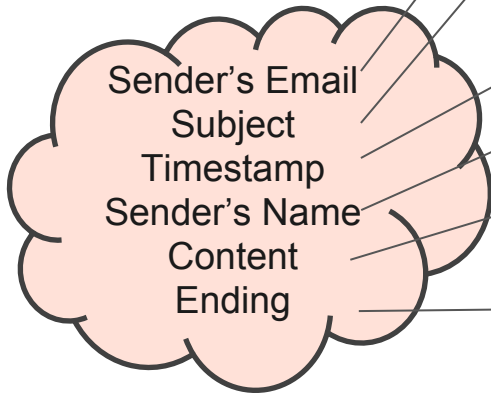
Training With GPU (Titan X) for 160 epochs

- 1 hour / epoch
- Loss: 0.03



Email Generation - Step 3: Fetch Email

chatbot2017fall@gmail.com



Reply to: Sender's Email

Subject: Re: Subject

Good Morning, Sender's Name,

Cheers,

Ting

API to Seq2seq Model:

- clean email, tokenize
- generate reply to each sentence

DEMO

Template-based approach

The Dataset

- Since sales email datasets are confidential/unavailable, we used the Enron email dataset (which consists of over 500,000 emails) for template based follow up approach.

```
df = pd.read_csv('originalemails.csv')
print(df.shape)
df.head()
```

(517401, 2)

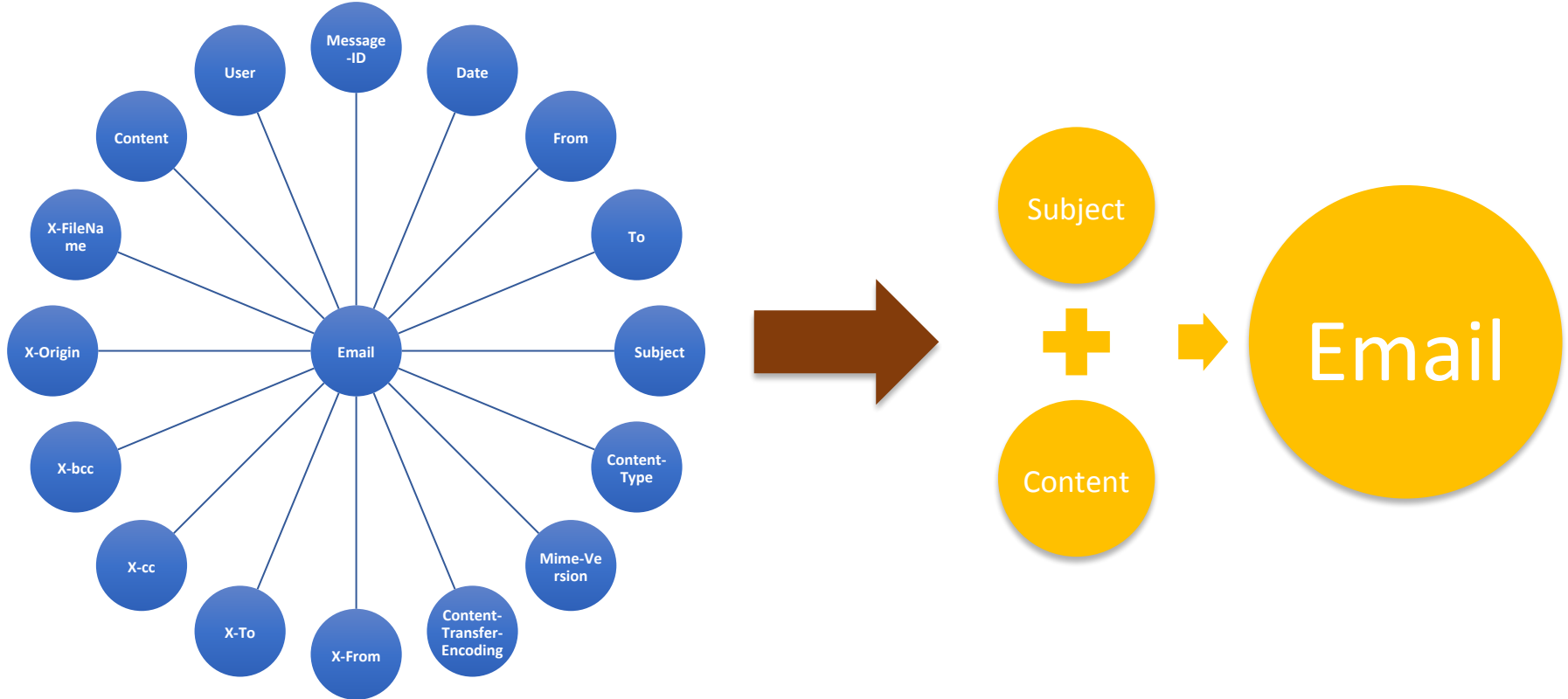
	file	message
0	allen-p/_sent_mail/1.	Message-ID: <18782981.1075855378110.JavaMail.e...
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4	allen-p/_sent_mail/1001.	Message-ID: <30922949.1075863688243.JavaMail.e...



Sneak peak into Enron Dataset

Extracting data

- Python libraries OS, Email, sys and pandas were used for data extraction.



Data cleaning and sorting

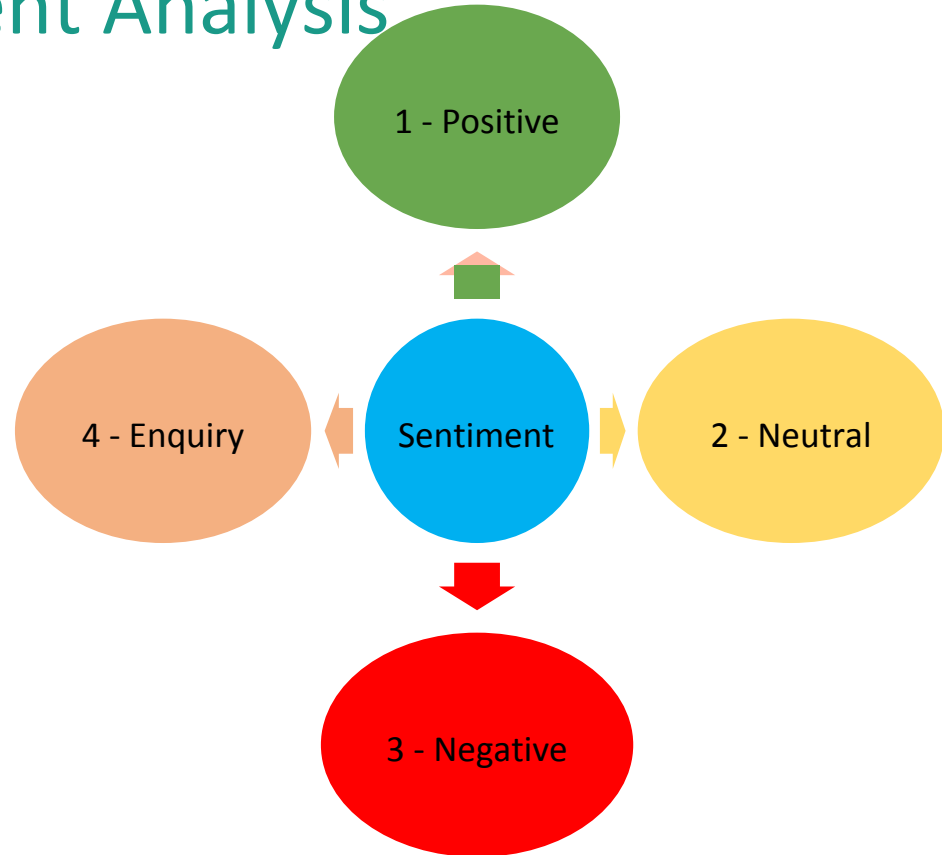
- The emails were sorted chronologically
- Rows with NaN values were removed
- Subject and Content data was kept.
- The special characters, labels, and other irrelevant data removed from the content.



Classification & Sentiment Analysis

The 'content' data was classified into 4 categories as follows:

1. Positive: The emails with an overall positive connotation.
2. Neutral: Generic emails like information, notices, etc
3. Negative: The emails with an overall negative connotation
4. Enquiry: The emails which 'ask' for details and information



Template-Based approach

- Based on the sentiment of the incoming email, pre-drafted templates are chosen to be replied by the program
- Optionally a human can intervene for high-value clients

Hi Maverick,
We are interested in your
product. Kindly send us a quote
so that we can proceed further.
Thank You

Positive

Hi Maria,
It's great to hear about your interest.
Please find the quotes attached with the
email.
Looking forward to hearing back from you
Thank You

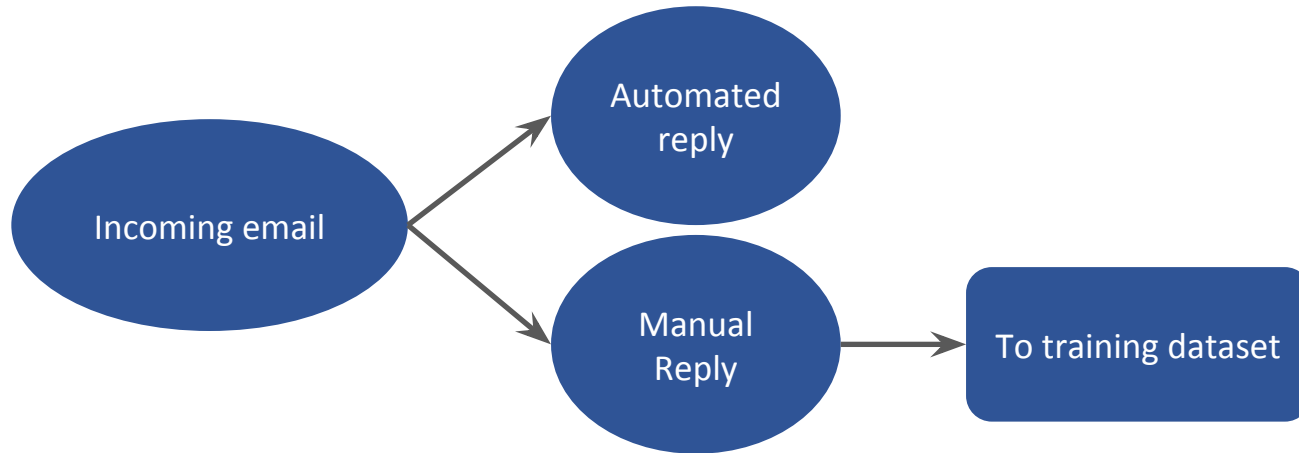
Send

Edit

What's Next

What Next?

- Combination of all features into a marketable package
- Use of a genuine sales dataset to increase accuracy of the model
- Introducing feedback mechanism for manually generated/edited replies to enhance agility of automated replies over time



Feedback Mechanism to improve automated replies

References



References

1. <http://www.seleniumhq.org/docs/>
2. Global word vector: <https://nlp.stanford.edu/projects/glove/>
3. https://github.com/suriyadeepan/easy_seq2seq
4. <https://github.com/Currie32/Chatbot-from-Movie-Dialogue>
5. <https://www.kaggle.com/zichen/explore-enron/notebook>

Questions?

