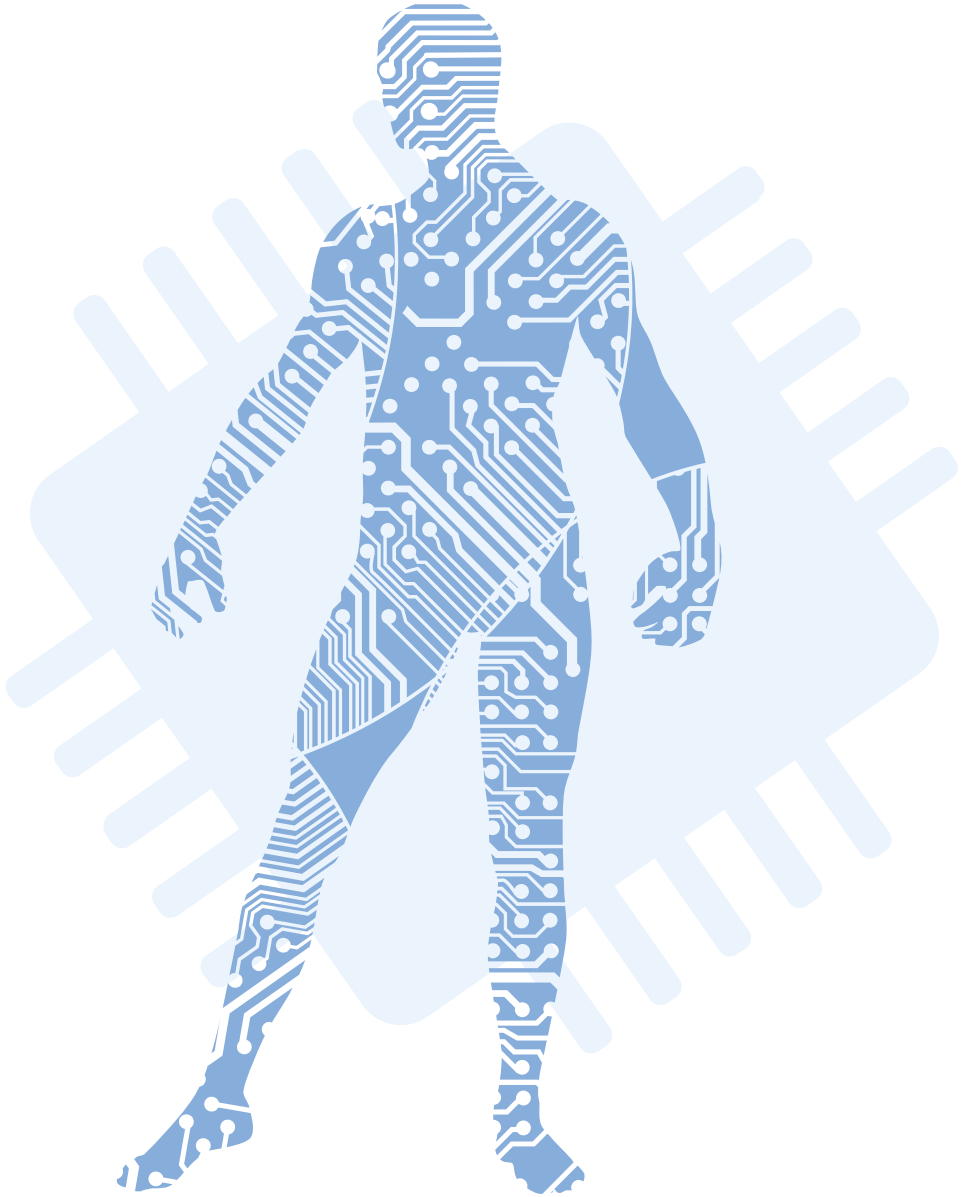
IT Services Chatbot

Prepared by:
Nawaf Almutairi
Ahmad Alharthi
Shoug Alkhathran
Surayyi Alqahtani
Faisal Alsufyani

Instructors :
Dr. Mejdal Alqahtani
Engr. Abdulbari Alghamdi

Content



INTRODUCTION

- Artificial Intelligence (AI) increasingly integrates our daily lives with the creation and analysis of intelligent software and hardware, called intelligent agents.
- Intelligent agents can do a variety of tasks ranging from labor work to sophisticated operations.
- A chatbot is a typical example of an AI system and one of the most elementary and widespread examples of intelligent Human-Computer Interaction (HCI)
- a chatbot is defined as “A computer program designed to simulate conversation with human users, especially over the Internet. Chatbots are also known as smart bots, interactive agents, digital assistants, or artificial conversation entities.
- Chatbots can mimic human conversation and entertain users but they are not built only for this. They are useful in applications such as education, information retrieval, business, and e-commerce.

Adamopoulou, E., & Moussiades, L. (2020, June). An overview of chatbot technology. In *IFIP International Conference on Artificial Intelligence Applications and Innovations* (pp. 373-383). Springer, Cham.

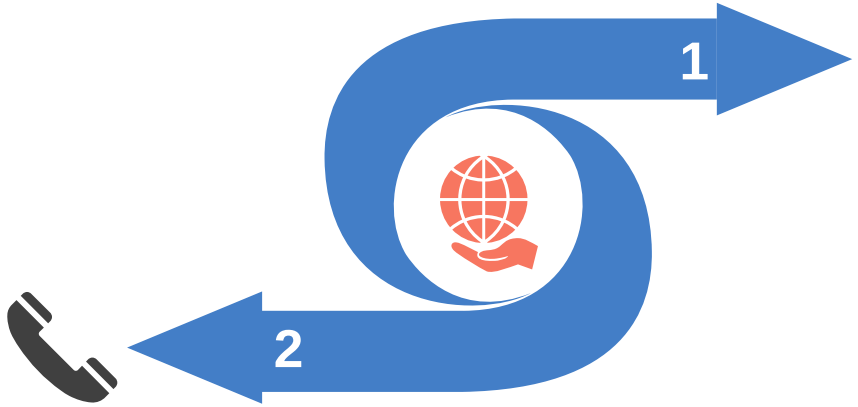
System Architecture

- Goal
- Data Acquisition
- Processing
- Modeling

Goal

Callbot

- Receiving employees voice requests over phone
- AI will response to the call by voice
- Integrating with the Help-Desk system



Chatbot

- Create a chatbot for Help-Desk system in Ministry of National Guard - Health Affairs
- Interact with the employees who requires IT services by text chatting
- Integrating with the Help-Desk system

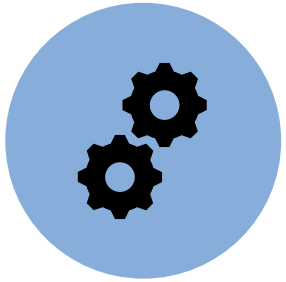
Help-Desk System: is a system used by IT department to log requested services by the organization employees

Data Acquisition

Requester details

- Badge Number
- Requester Name
- Contact Info
- Email Address

Service category



- Main Category
- Sub Category
- Service Type
- Item

Asset

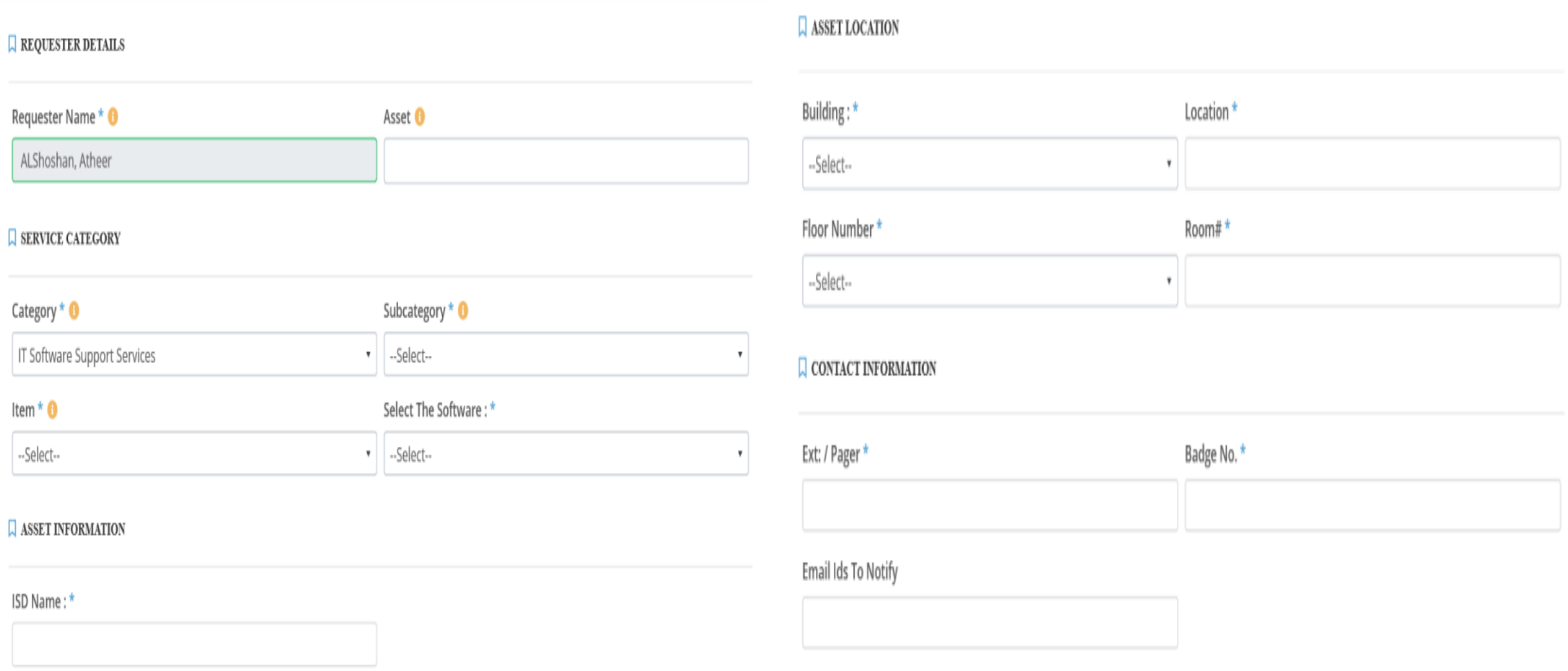
- Asset Name
- Asset Building
- Asset Floor
- Asset Room

Entity

- Words Tags
- Patterns
- Response

Data Acquisition

An example of a templet from the Help-Desk system



REQUESTER DETAILS

Requester Name *
ALShoshan, Atheer

Asset

SERVICE CATEGORY

Category *
IT Software Support Services

Subcategory *
--Select--

Item *
--Select--

Select The Software : *
--Select--

ASSET INFORMATION

ISD Name : *

ASSET LOCATION

Building : *
--Select--

Location *

Floor Number *
--Select--

Room# *

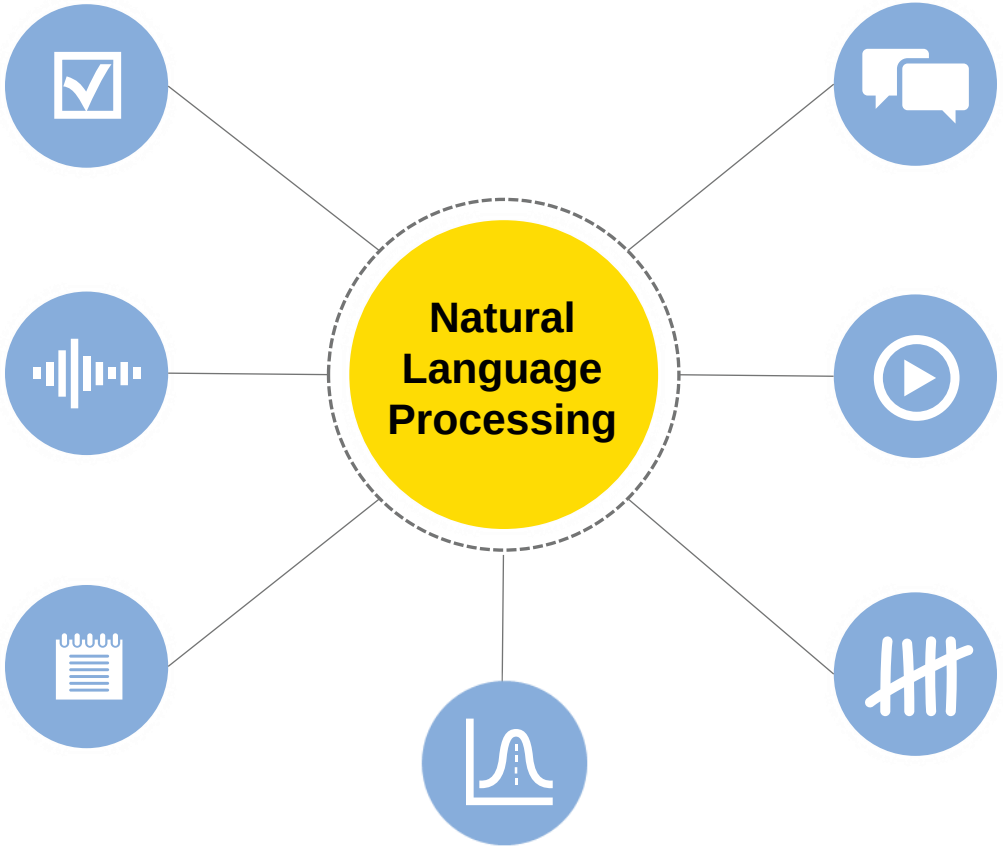
CONTACT INFORMATION

Ext: / Pager *

Badge No. *

Email Ids To Notify

Processing



Tokenization

Remove stopping word and punctuations

Steaming

chucking (NER)

Part of speech

Count vectorizer

Term Frequency — Inverse Document Frequency(TF-IDF)

Processing

An example of Removing the punctuation from the text:


```
n email I need an email I need a new email I want a new email can you create a new mail for m
e  Im a new employee and I dont have an email Im a new organizer and I dont have an email I h
ave been moved from one department to another and I need a new email I have not received an e
mail yet Department email user email email srevices My printer does not print papers I thank
the lnk is empty My printer does not have a toner My printer does not have a lnkMy ink is emp
tyMy toner is emptyI want to order new lnkI want to order new tonerI want to order new black
lnkI want to order new black tonerI want to request a new toner I want a black lnk I want a b
lack toner the color is black I need all colors I need a red and blue I need a black and blue
My ISD Name is  My printer model is  Nawaf AlmutairiAhmad AlharthiFaisal AlsufyaniSurayyi Alq
ahtaniShoug Alkhathran extension badge em building floor roomresponses Hellohow can I helpppp
pphiwhat is your problem Have a nice day Your welcome bye Happy to help Any time My pleasure
Sorry cant understand you Please give me more info Not sure I understand What kind of the sof
tware issue you havedo you need a medical application servicesdo you need mobile application
servicesdo you need non medical services Ok I need your contact information please what is yo
ur name ok sure what is your justification for ordering the printer ok May I know your justif
ication for requesting the printer ok no problem give me your information please what is your
name ok  Give me a description of your need to create a new mail please Fine What item do you
need is it Department email or user email or email srevices ok what is your name Ok You want
to order new toner or lnk What kind of color Sure i will do that You want to order new toner
```

Processing

Is this a steaming or lemmatization ?

```
greeting   :   greet
Thanks   :   thank
helping   :   help
information   :   inform
I   :   i
problem   :   problem
software   :   softwar
```

Processing

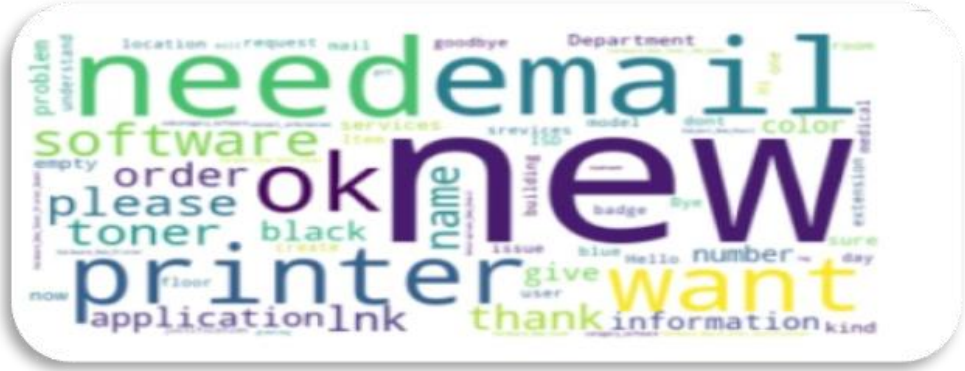
An example of Named Entity Recognition:

I need all colors, I need a red and blue, I need a black and blue My ISD Name ORG is ... My printer model is ..

Nawaf Almutairi PERSON , Ahmad Alharthi PERSON , Faisal Alsufyani PERSON , Surayyi Alqahtani PERSON

, Shoug Alkhathran PERSON extension badge em building floor room,,responses, Hello,how can I helpppppp?,hi,what

An example of Word cloud
Which is show the
Most Frequent words



Processing

An example of Count Vectorizer:

your building	your contact	your email	your extension	your information	your justification	your location	your name	your order	your printer
0	0	0	0	0	0	0	0	1	0
0	1	0	0	0	0	0	1	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0

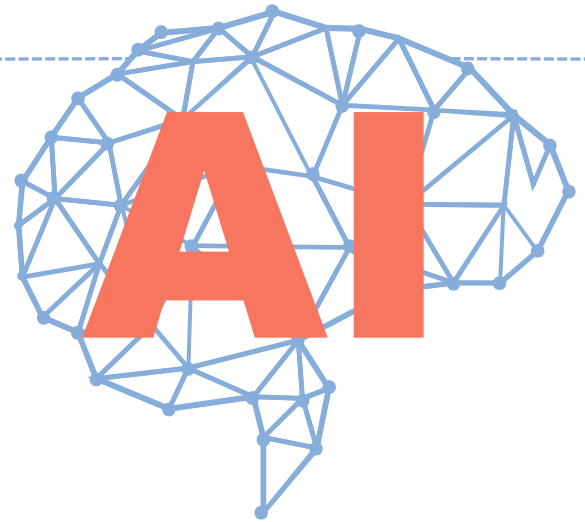
An example of TF-IDF:

aliright your	ask	ask you	badge	badge number	...	your building	your contact	your email	your extension
0.0	0.210675	0.210675	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.000000	0.000000	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.210675	0.210675	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.000000	0.000000	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.000000	0.000000	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.210675	0.210675	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.210675	0.210675	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.210675	0.210675	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.000000	0.000000	0.0	0.0	...	0.0	0.0	0.0	0.0
0.0	0.000000	0.000000	0.0	0.0	...	0.0	0.0	0.0	0.0

Unsupervised Learning Modeling

Latent Semantic Analysis (LSA)

- is a method of natural language processing to analyzing the relationships between terms within a set of documents.



K-Means

- Groups unlabeled dataset into different clusters, where each cluster share similar characteristics.

Latent Semantic Analysis (LSA)

In LSA we got a two cluster:

	access	account	address	ahmad	alharthi	alkhathran	all	almutairi	alqahtani	alsufyani	...	without	won	work	working	workplace	works
cluster_1	0.007	0.002	0.028	0.0	0.0	0.0	0.002	-0.0	-0.0	0.0	...	0.010	0.004	0.014	0.030	0.007	0.001
cluster_2	0.016	0.002	0.004	-0.0	-0.0	-0.0	0.006	-0.0	-0.0	-0.0	...	-0.004	0.020	0.017	0.084	0.001	0.004

2 rows × 221 columns

Display topics:
Fiend the hidden topics and uses a cosine measure of similarity to cluster it.

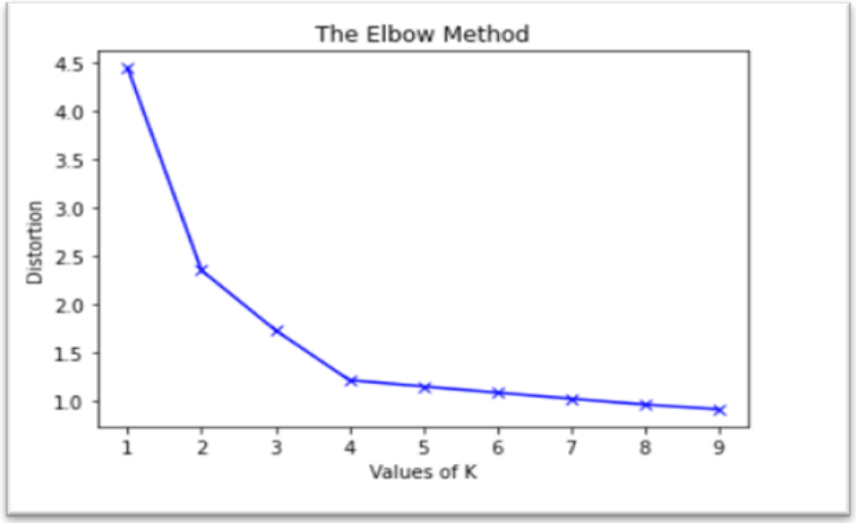
```
Topic  0
printer, office, new, software, need, order, application, broken, address, email, possiblet

Topic  1
software, problem, application, trouble, problems, issue, program, needs, install, experiencing
```

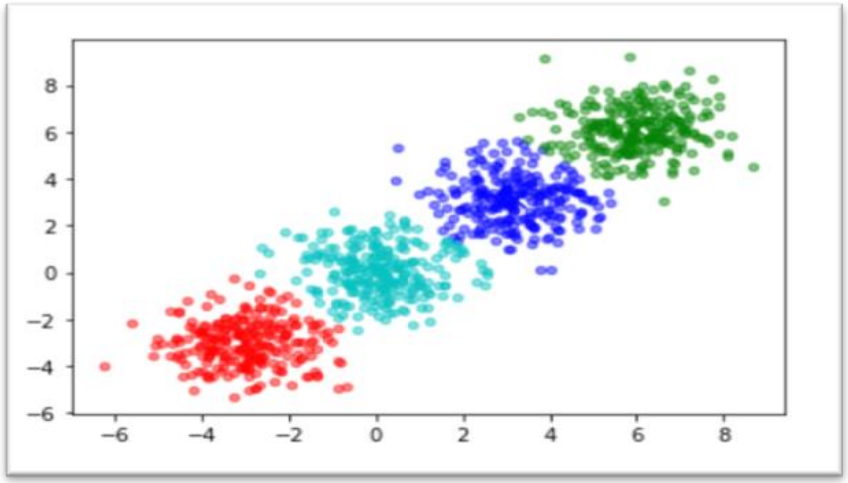
K-Means

First, we select range from 1 to 10 , to choose the No. of K

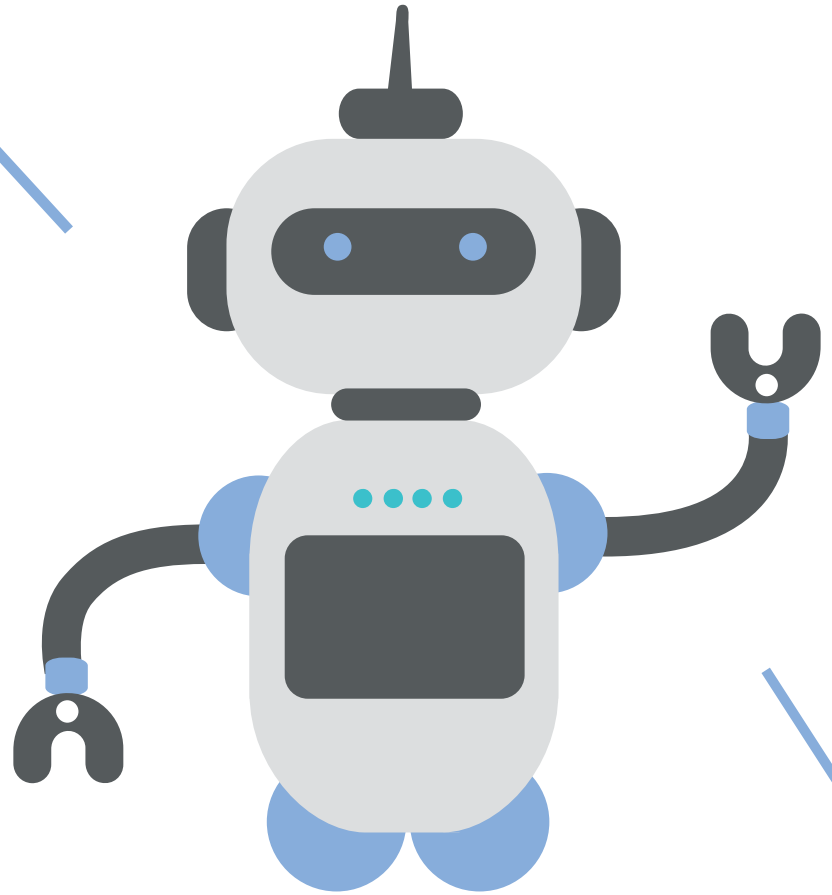
The optimum number of clustering is 4.



K-means result :



Live Chatbot Demonstration

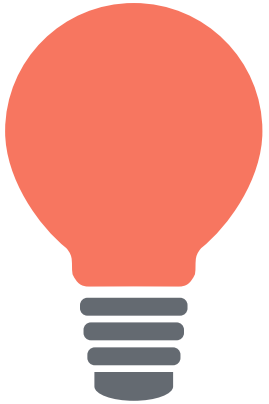


Conclusion

The topic models were LSA , K-means.

The best model is K-means.
Because it guaranteed to converge
and easy to implement.

The optimum number of clustering is 4.

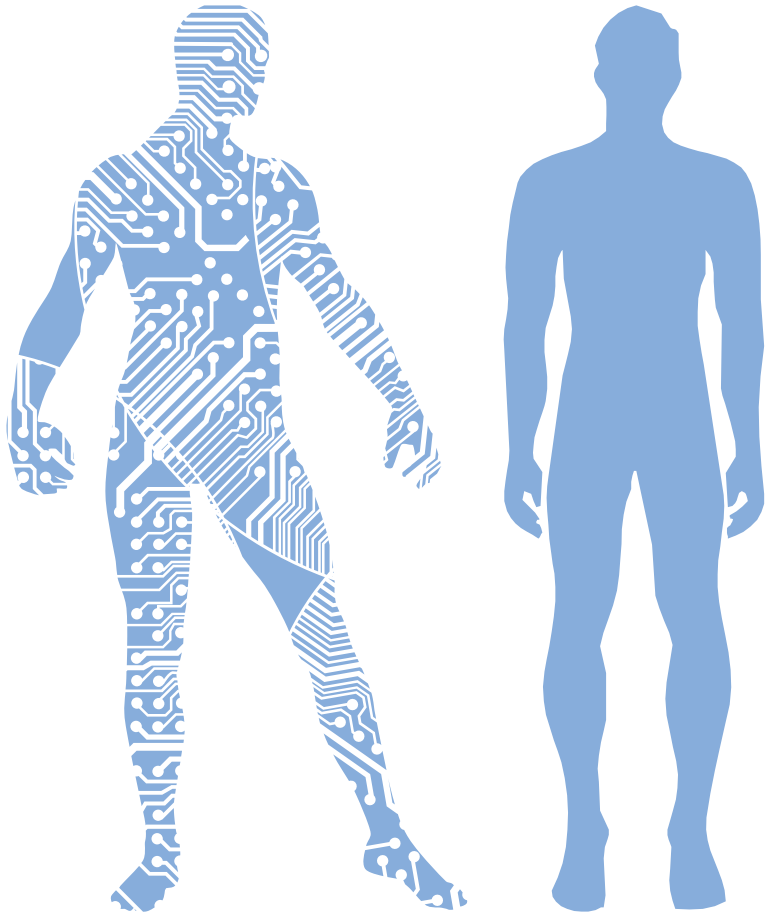


The future work is to build an interactive AI Callbot.

Recommendation

Convert the ChatBot to CallBot (Interactive AI Call)

- Transcribe speech to text.
- Decision making machine.
- Transcribe text to speech.




Thank You