In [3]:
```
#Chain of Density - Japanese Email - api-key Desktop

import pandas as pd
import openai
import os

from langchain.llms import OpenAI



#print(API_KEY)

'''
Task:   Construct a chain that will take in a text or string that is a customer e-mail.

1.  Detect the language the e-mail is written in
2.  Translate the e-mail from detected language to English
3.  Use Chain of Density to return a summary of the translated e-mail
4.  Return a summary of the summary
'''

japanese_email = open('Japanese_Email.txt').read()
print(japanese_email)

from langchain.chat_models import ChatOpenAI
from langchain.prompts import ChatPromptTemplate
from langchain.chains import LLMChain, SequentialChain

api_key = open("/Users/spencerneal/Dropbox/My Mac (Spencers-iMac.lan)/Desktop/API_Key.txt").read()
model = ChatOpenAI(openai_api_key = api_key)

llm = OpenAI(openai_api_key="api_key")


def translate_and_summarize(email):

    llm = ChatOpenAI()
    #Detect the Language
    template = "Return the language this email is written in:\n{email}\nONLY return the label it was written in."
    prompt1 = ChatPromptTemplate.from_template(template1)
    chain1 = LLMChain(llm=llm, prompt=prompt1, output_key = "language")

#Translate
    template2 = "Translate this e-mail from {language} to English:\n" +email
    prompt2 = ChatPromptTemplate.from_template(template2)
    chain2 = LLMChain(llm=llm, prompt=prompt2, output_key = 'translated_email')

    seq_chain = SequentialChain(chains = [chain1, chain2],
                                input_variables=['email'],
                                output_variables = ['language', 'translated_email'],
                                verbose = True)
    return seq_chain(email)

result = translate_and_summarize(japanese_email)

result.keys()
```

在外選挙人登録申請（来館が困難な方に対する特例措置について）

１ 本年４月１日から、遠隔地にお住まいの方等、一定の条件を満たす方に対して、在外選挙人登録申請の際の本人出頭を免除する特例措置を開始します。遠隔地にお住まいであることの他、在外選挙人証登録申請のために来館できない特別な事情がある方は、事前に当館までご相談ください。一定の条件を満たす場合には、ビデオ通話による本人確認及び事前に送付又は託送された提出書類の原本確認を行うことで在外選挙人登録申請ができます。

２ 本件特例措置の詳細につきましては、当館ホームページをご覧ください
https://www.houston.us.emb-japan.go.jp/itpr_ja/11_000001_00351.html

３ 今夏には、参議院議員通常選挙が予定されています。在外選挙人登録には、通常２か月ほど（注）かかりますので、早めの登録申請をお勧めいたします。

*このメールの送信アドレスは送信専用です。
*このメールは在留届・メールマガジン・たびレジに登録されたメールアドレスに自動的に配信されています。
*「たびレジ」簡易登録をした方でメールの配信を停止したい方は、以下のURLから停止手続きをお願いします。
URL：https://www.ezairyu.mofa.go.jp/tabireg/simple/delete
*災害や騒乱等が発生した際、ご家族、ご友人、同僚を守るため、一人でも多くの方に安全対策に関する情報が届くよう、在留届（3か月以上の滞在）の届出、又はたびレジ（3か月未満の滞在）の登録を、お知り合いの方や出張者・旅行者にご案内いただけますようお願いいたします。

> Entering new SequentialChain chain...

> Finished chain.

Out[3]:
```
dict_keys(['email', 'language', 'translated_email'])
```

In [4]:
```
translated_email = result['translated_email']
translated_email
```

Out[4]:
```
'Registration of Overseas Voters (Special Measures for Those Unable to Visit the Office)\n\n1. Starting from April 1st of this year, we will begin implementing special measures to exempt individuals who meet certain conditions, such as those living in remote areas, from the requirement to appear in person for the registration of overseas voters. If you are unable to visit the office for the registration of overseas voter card due to special circumstances, in addition to residing in a remote area, please consult with our office in advance. If you meet certain conditions, you will be able to apply for the registration of overseas voters through video calls for identity verification and confirmation of the original documents previously sent or delivered.\n\n2. For more details regarding this special measure, please visit our office\'s website at: https://www.houston.us.emb-japan.go.jp/itpr_en/11_000001_00351.html\n\n3. The regular election for members of the House of Councillors is scheduled for this summer. The registration process for overseas voters usually takes about two months (note), so we recommend applying for registration as early as possible.\n\n*Please note that this email address is for sending purposes only.\n*This email is automatically distributed to the email addresses registered for residence notification, email magazine, and Tabireg.\n*If you have performed a simple registration for "Tabireg" and wish to stop receiving emails, please follow the URL below for the cancellation procedure: URL: https://www.ezairyu.mofa.go.jp/tabireg/simple/delete\n*In the event of a disaster or disturbance, in order to protect your family, friends, and colleagues, we kindly ask that you inform acquaintances and business travelers or tourists about the submission of residence notifications (for stays of more than 3 months) or registration for Tabireg (for stays of less than 3 months), so that they can receive information regarding safety measures.'
```

In [5]:
```
#Implement the Chain of Density prompting with GPT-4

'''With the help of OpenAI Functions features and the PyLLMCore library, we create data classes to provided a
receptacle for our data.

Data classes are created with annotations to help GPT models infer the data type.
'''

from typing import List
from dataclasses import dataclass
from llm_core.assistants import OpenAIAssistant

@dataclass
class DenseSummary:
    denser_summary:str
    missing_entities:List[str]

@dataclass
class DenserSummaryCollection:
    system_prompt = """You are an expert in writing rich and dense summaries in broad domains.
    """

    prompt= """
    Translated Email:

    {translated_email}

    ---
    You will generate increasingly concise, entity-dense summaries of the above translated email.

    Repeat the following 2 steps 5 times.

    - Step 1:  Identity 1-3 informative Entities from the translated email which are missing from the previously
    generated summary and are the most relevant.

    - Step 2:  Write a new, denser summary of idenical length which covers every entity

    A Missing Entity is:

    - Relevant: to the main email
    - Specific: descriptive yet concise (5 words or fewer)
    - Novel:  not in the previous summary
    - Faithful: present in the translated email
    - Anywhere: located anywhere in the translated email


    Guidelines:
    - The first summary should be long (4-5 sentences, approx. 80 words) yet highly non-specific, containing
    little information beyond the entities marked as missing.

    - Use overly verbose language and fillers (e.g. "this translated email discusses") to reach approx. 80 words.

    - Make every word count:  re-write the previous summary to improve flow and make space for additional entities.

    - Make space with fusion, compression, and removal of uniformative phrases like "the translated email discusses"

    - The summaries should become highly dense and concise yet self-contained,
  e.g., easily understood without the translated email.

  - Missing entities can appear anywhere in the new summary.

  - Never drop entities from the previous summary. If space cannot be made, add fewer new entities.

  > Remember to use the exact same number of words for each summary.
  Answer in JSON.

  > The JSON in `summaries_per_step` should be a list (length 5) of
  dictionaries whose keys are "missing_entities" and "denser_summary".
"""

    summaries: List[DenseSummary]

    @classmethod
    def summarize(cls, translated_email):
        with OpenAIAssistant(cls, model='gpt-4') as assistant:
            return assistant.process(translated_email=translated_email)
```

In [6]:
```
'''Now, we can print the results for each iteration; note that iterations are in-context,
these are not separate requests.'''

summary_collection = DenserSummaryCollection.summarize(translated_email)
print(len(summary_collection.summaries))
```

```
5
```

In [7]:
```
print(summary_collection.summaries[0].missing_entities)
```

```
['Special measures for registration', 'Video calls for identity verification', 'Election for House of Councillors']
```

In [8]:
```
print (summary_collection.summaries[0].denser_summary),
length_of_summary_01 = len(summary_collection.summaries[0].denser_summary)
length_of_summary_01

print("\n" "Length of Summary 01:", length_of_summary_01)
```

```
This translated email discusses the implementation of special measures starting from April 1st, for individuals living in remote areas who are unable to visit the office for the registration of overseas voters. The registration can be done through video calls for identity verification. More details are available on the office's website. The regular election for members of the House of Councillors is scheduled for this summer. The registration process usually takes about two months.

Length of Summary 01: 486
```

In [9]:
```
print(summary_collection.summaries[1].missing_entities)
```

```
['Email for sending purposes', 'Email distributed to registered addresses', 'Registration takes two months']
```

In [10]:
```
print(summary_collection.summaries[1].denser_summary)

length_of_summary_02 = len(summary_collection.summaries[1].denser_summary)
length_of_summary_02

print("\n" "Length of Summary 02:", length_of_summary_02)
```

```
From April 1st, special measures will be in place for remote residents unable to register as overseas voters in person. Video calls will be used for identity verification. The office's website provides more information. The House of Councillors election is due this summer, with registration taking approximately two months. This email is for sending purposes only and is distributed to registered addresses.

Length of Summary 02: 408
```

In [ ]:
```

```