

HELP MATE AI FOR INSURANCE POLICY DOCUMENT

GENERATIVE SEARCH

Objective

Building a Help Mate RAG system.

Problem Statement - The goal of the project will be to build a robust generative search system capable of effectively and accurately answering questions from various insurance policy documents. The project will build a RAG system using LlamaIndex.

Why LlamaIndex and not LangChain?

LlamaIndex is preferred, because:

- LlamaIndex's is good in data ingestion and retrieval. It is apt in document heavy use-cases.
- LlamaIndex's core strength is on use-cases such as getting answers from documents.
- LlamaIndex simplifies the process of Q&A
- LangChain is more suitable in cases of LLM Orchestration

Design

The below diagrams outlines the overall system design and the various layers of the project.

RAG High Level Architecture

Retrieval Augmented Generation (RAG)

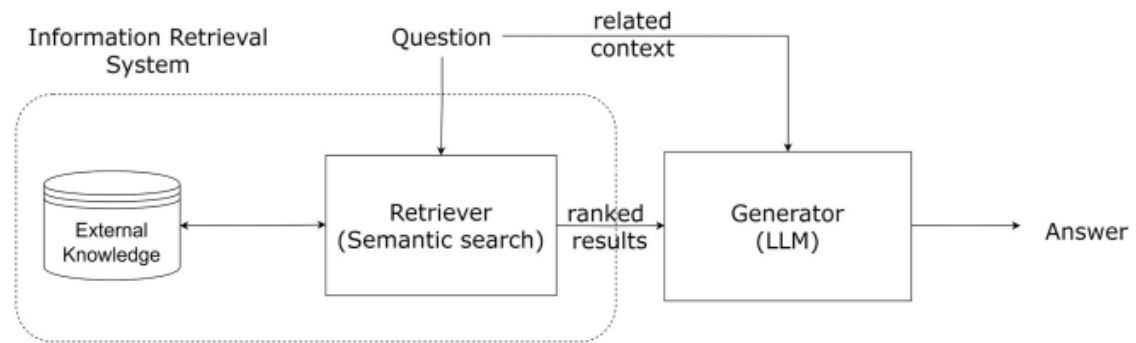


Figure1: RAG High Level Architecture

Basic RAG pipeline in LlamaIndex

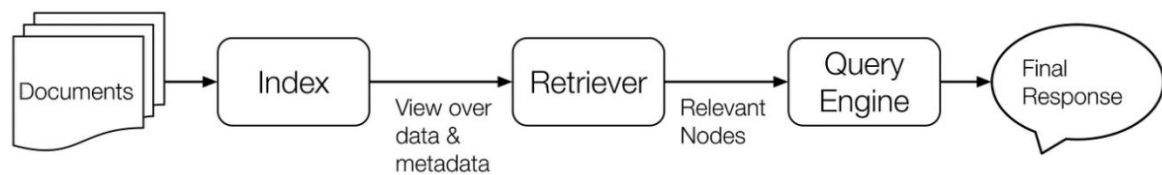
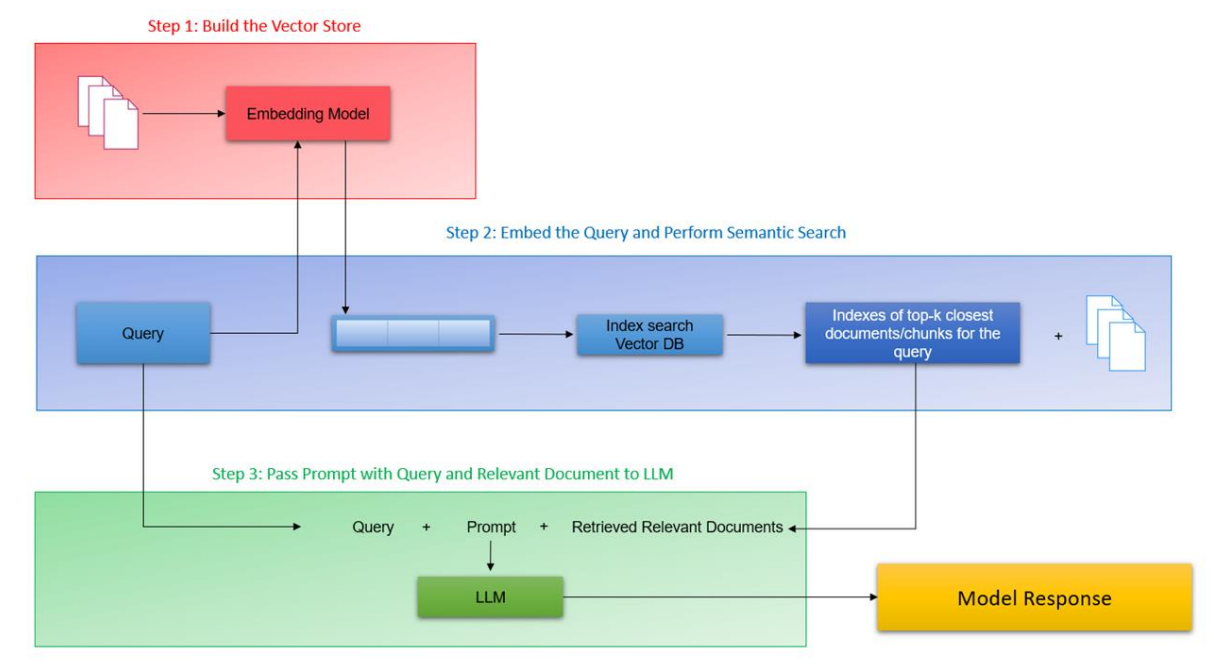


Figure2: Basic RAG pipeline in LlamaIndex

RAG: Layers and Steps



RAG: Layers and Steps

Implementation

The implementation details is covered in the jupyter notebook attached with this file.

To run it,

- Please use Google Colab.
- Please access the insurance documents mentioned in the jupyter notebook and upload them to your google drive,
- Ensure the chatgpt keys are also made available

Results

Response Pipeline gave good results:

```
1 # Start the conversation
2 initialize_conv()

Feel free to ask Questions regarding HDFC Insurance. Press exit once you are done
Sum Assured

The Sum Assured refers to the amount payable under the Master Policy per Scheme Member upon death or diagnosis of any one of the covered 29 critical illnesses during the Coverage Term, subject to the terms, conditions, and provisions of the Master Policy. Check further at HDFC-Life-Group-Poorna-Suraksha-101N137V02-Policy-Documnet.pdf page nos 6,3

Premium Rates

Premium rates vary based on the policy type and payment mode. For policies other than 'Single Premium', the premium allocation charge is 4% for the annual mode and 3% for the half-yearly and monthly modes. For 'Single Premium' policies, the allocation charge ranges from 0.5% for premiums between Rs. 1,00,000 to Rs. 3,49,999 to nil for premiums between Rs. 3,50,000 to Rs. 4,99,999, and above Rs. 5,00,000. Additionally, there is no premium allocation charge for top-up premiums. Check further at HDFC-Life-Smart-Pension-Plan-Policy-Documnet-Online.pdf page nos 18,32

Maturity Benefit of HDFC Life Sanchay Plus

The Maturity Benefit of HDFC Life Sanchay Plus is the Guaranteed Income on Maturity payable at the end of each Income Payout Frequency as provided under the Policy Schedule, starting from the (Policy Term + 1)th year till the individual attains age 99 years. Additionally, on the Maturity Date, there is an option to receive the Guaranteed Sum Assured on Maturity, which is the present value of future payouts discounted at a rate of 9% p.a. This interest rate is subject to change with prior approval and will be applicable only to policies sold after the date of change. Check further at HDFC-Life-Sanchay-Plus-Life-Long-Income-Option-101N134V19-Policy-Documnet.pdf page nos 8,17

Discount rate of Smart Pension Plan

The discount rate of the Smart Pension Plan is not explicitly mentioned in the provided context information. Check further at HDFC-Life-Smart-Pension-Plan-Policy-Documnet-Online.pdf page nos 9,18

exit
Exiting the program... bye
Good
```

Testing Pipeline gave good results:

```
1 testing_pipeline(questions)

Discount rate of Smart Pension Plan
The discount rate of the Smart Pension Plan is not explicitly mentioned in the provided context information.
Check further at HDFC-Life-Smart-Pension-Plan-Policy-Documnet-Online.pdf page nos 9,18

Please provide your feedback on the response provided by the bot
Good
Maturity Benefit of HDFC Life Sanchay Plus
The Maturity Benefit of HDFC Life Sanchay Plus is the Guaranteed Income on Maturity payable at the end of each Income Payout Frequency as provided under the Policy Schedule, starting from the (P
Check further at HDFC-Life-Sanchay-Plus-Life-Long-Income-Option-101N134V19-Policy-Documnet.pdf page nos 8,17

Please provide your feedback on the response provided by the bot
Good
Premium Rates of HDFC Life Group Term Life
The Premium Rates of HDFC Life Group Term Life policy are determined based on various factors such as the age of the insured member, the coverage amount, and any additional benefits opted for, 1
Check further at HDFC-Life-Group-Term-Life-Policy.pdf page nos 20,17

Please provide your feedback on the response provided by the bot
Good
HDFC Life Sampoorna Jeevan Plan's Recipients of Benefits
The recipients of benefits under the HDFC Life Sampoorna Jeevan Plan include the Policyholder, the Life Assured, and the Nominee(s) designated by the Life Assured.
Check further at HDFC-Life-Sampoorna-Jeevan-101N158V04-Policy-Documnet (1).pdf page nos 18,2

Please provide your feedback on the response provided by the bot
Good
Surrender Value of SurgiCare Plan
There is no benefit payable on the surrender of the policy under the SurgiCare Plan.
Check further at HDFC-Life-Easy-Health-101N110V03-Policy-Bond-Single-Pay.pdf page nos 9,7

Please provide your feedback on the response provided by the bot
Good

Question Response Page Good or Bad
0 Discount rate of Smart Pension Plan The discount rate of the Smart Pension Plan is... 9,18 Good
1 Maturity Benefit of HDFC Life Sanchay Plus The Maturity Benefit of HDFC Life Sanchay Plus... 8,17 Good
2 Premium Rates of HDFC Life Group Term Life The Premium Rates of HDFC Life Group Term Life... 20,17 Good
3 HDFC Life Sampoorna Jeevan Plan's Recipients of Benefits The recipients of benefits under HDFC Life Sam... 18,2 Good
4 Surrender Value of SurgiCare Plan There is no benefit payable on the surrender o... 9,7 Good
```

LLM/Chatgpt gave good results:

Output1:

```
[38] 1 # print chat query before sending it to chatgpt
2 print(chat_query)

What is the Maturity Benefit of HDFC Life Sanchay Plus?

[39] 1 # Custom prompt template for improved query response
2 messages = [
3     {"role": "system", "content": "You are an AI assistant to user."},
4     {"role": "user", "content": f'""{chat_query} Check in '{retrieved}' ""'},
5 ]

[40] 1 response2 = openai.chat.completions.create(
2     model="gpt-3.5-turbo",
3     messages=messages)
4 response2.choices[0].message.content

The Maturity Benefit of HDFC Life Sanchay Plus is described as follows:\n\n- On survival of the Life Assured till the Maturity Date and provided all Premiums which have fallen due have been paid, the Maturity Benefit payable shall be Guaranteed Income on Maturity.\n- Maturity Benefit will be paid as Guaranteed Income starting from the (Policy Term + 1)th year till the individual attains age 99 years, in arrears on payment of all due premiums.\n- At the end of the Payout Period, the Policy terminates by returning the Total Premiums paid.\n- On the Maturity Date, there is an option to receive the Guaranteed Sum Assured on Maturity, which is the present value of future payouts discounted at a rate of 9% p.a.\n- The interest rate of 9% p.a. is not guaranteed, and any change in the interest rate will be subject to prior approval of the Authority and will be applicable only to the policies sold after the date of change.\n- During the Payout Period, there is an option to receive the future in...'
```

Output2 (Negative Test gave right results):

```
What is the Discount rate of Smart Pension Plan?

[48] 1 # Custom prompt template for improved query response
      2 messages = [
      3     {"role": "system", "content": "You are an AI assistant to user."},
      4     {"role": "user", "content": f"({chat_query}) Check in '{retrieved}' ""},
      5 ]

[49] 1 response2 = openai.chat.completions.create(
      2     model="gpt-3.5-turbo",
      3     messages=messages)
      4 response2.choices[0].message.content

Based on the terms and conditions provided for the HDFC Life Smart Pension Plan, the Discount rate information is not explicitly mentioned. The document mainly outlines the Policy Administration Charges, Fund Management Charges, Policy Discontinuance Charges, Switch Charges, Premium Redirection Charges, and Partial Withdrawal Charges. If you are specifically looking for the Discount rate information, you may need to refer to a different section or document related to the plan or consult with the HDFC Life representatives for clarification.
```

Challenges and/or Lessons Learnt

- 1) SimpleDirectoryReader is sufficient if the number of PDF documents to be read is less
- 2) Do negative test to check the effectiveness of your query. E.g. Ask a question whose response is not available in the document.
- 3) Conduct tests to check the effectiveness of getting the data from the Vector DB – i.e. basic retriever is working, & retriever streaming is working
- 4) While testing the query engine – try out various options to build confidence in your own code.
- 5) Ensure the Testing Pipeline output is scored.
- 6) Even when using prompts, use negative testing.