Local LLM(10 days project)

Industrial Attachment IMH

Objectives

To study the possible to implement the local LLM in the control environment without internet access

To demonstrate the application implement on the local LLM

Understand the performance of the application with the local LLM

Local Large Language Model(LLM)

Challenge

Computational resources: LLMs can be very demanding on your computer's resources, especially the CPU and GPU. You may need a high-end computer to run them smoothly.

Storage: LLMs can also be quite large, so you will need a significant amount of storage space on your computer to download and run them.

Maintenance: You will be responsible for keeping the LLM software up-to-date and troubleshooting any problems that arise.

Local Large Language Model(LLM)

Method

GGUF (GPT-Generated Unified Format) is a new framework designed to make it easier to run large language models (LLMs) on your computer. It primarily uses CPU resources, but can also leverage GPUs for specific parts when needed. This makes it well-suited for devices with weaker CPUs, like those found in Apple products. GGUF also compresses the data used by the LLM, making it more efficient to store and run. Overall, GGUF is a more flexible and user-friendly way to run LLMs locally.

Local Large Language Model(LLM)

Open Source LLM

Mistral AI is an artificial intelligence startup that makes large language models (LLMs). Based in Paris, France, and founded by former researchers at Google DeepMind and Meta, Mistral is known for its transparent, portable, customizable and cost-effective models that require fewer computational resources than other popular LLMs.

Gemma is a family of open-weights Large Language Model (LLM) by Google DeepMind, based on Gemini research and technology.

Orca LLM, a language model developed by Microsoft, seeks to address the limitations of ChatGPT by introducing a logic-based framework that simulates human-like reasoning.

Local Large Language Model(LLM)

Implementation: Using Langchain - llamacpp

Universal Compatibility: Llama.cpp's design as a CPU-first C++ library means less complexity and seamless integration into other programming environments. This broad compatibility accelerated its adoption across various platforms.

Comprehensive Feature Integration: Acting as a repository for critical low-level features, Llama.cpp mirrors LangChain's approach for high-level capabilities, streamlining the development process albeit with potential future scalability challenges.

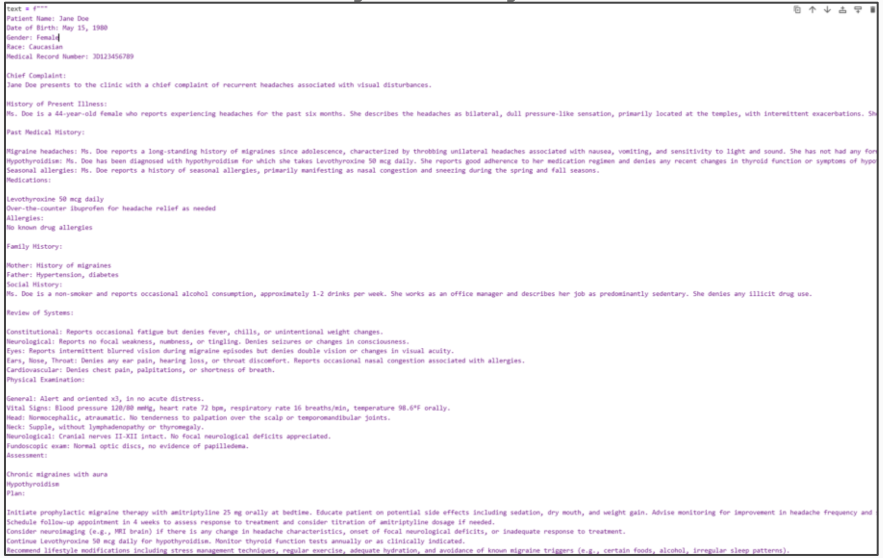
Focused Optimization: Llama.cpp focuses on a single model architecture, enabling precise and effective improvements. Its commitment to Llama models through formats like GGML and GGUF has led to substantial efficiency gains.

Local Large Language Model(LLM)

Implementation

```
model_path = "./models/llm/mistral-7b-instruct-v0.1.Q6_K.gguf"
llm = LlamaCpp(
    model_path = model_path,
    n_gpu_layers=n_gpu_layers,
    n_batch=n_batch,
    n_ctx=8000,
    max_tokens = 1024,
    f16_kv=True,  # MUST set to True, otherwise you will run into problem after a couple of
calls
    callback_manager=callback_manager,
    verbose=False,
)
```

Test Summary of a synthetic medical record with basic prompt

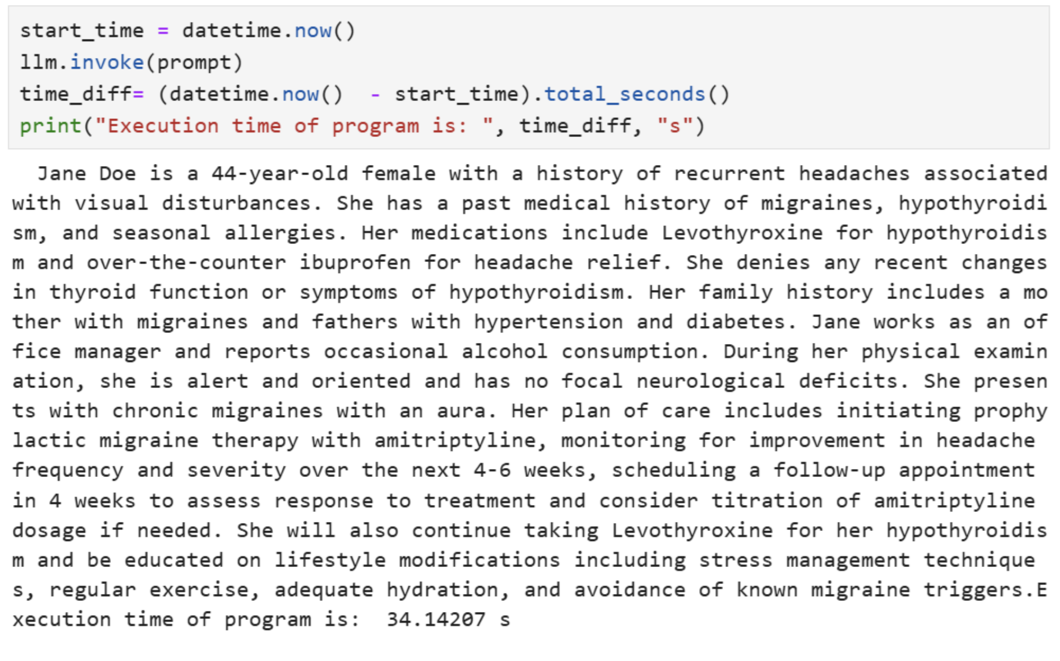


```
text = f"""
Patient Name: Jane Doe
Date of Birth: May 15, 1980
Gender: Female
Race: Caucasian
Medical Record Number: JD123456789

Chief Complaint:
Jane Doe presents to the clinic with a chief complaint of recurrent headaches associated with visual disturbances.

History of Present Illness:
Ms. Doe is a 44-year-old female who reports experiencing headaches for the past six months. She describes the headaches as bilateral, dull pressure-like sensation, primarily located at the temples, with intermittent exacerbations. Sh

Past Medical History:

Migraine headaches: Ms. Doe reports a long-standing history of migraines since adolescence, characterized by throbbing unilateral headaches associated with nausea, vomiting, and sensitivity to light and sound. She has not had any for
Hypothyroidism: Ms. Doe has been diagnosed with hypothyroidism for which she takes Levothyroxine 50 mcg daily. She reports good adherence to her medication regimen and denies any recent changes in thyroid function or symptoms of hypo
Seasonal allergies: Ms. Doe reports a history of seasonal allergies, primarily manifesting as nasal congestion and sneezing during the spring and fall seasons.
Medications:

Levothyroxine 50 mcg daily
Over-the-counter ibuprofen for headache relief as needed
Allergies:
No known drug allergies

Family History:

Mother: History of migraines
Father: Hypertension, diabetes
Social History:
Ms. Doe is a non-smoker and reports occasional alcohol consumption, approximately 1-2 drinks per week. She works as an office manager and describes her job as predominantly sedentary. She denies any illicit drug use.

Review of Systems:

Constitutional: Reports occasional fatigue but denies fever, chills, or unintentional weight changes.
Neurological: Reports no focal weakness, numbness, or tingling. Denies seizures or changes in consciousness.
Eyes: Reports intermittent blurred vision during migraine episodes but denies double vision or changes in visual acuity.
Ears, Nose, Throat: Denies any ear pain, hearing loss, or throat discomfort. Reports occasional nasal congestion associated with allergies.
Cardiovascular: Denies chest pain, palpitations, or shortness of breath.
Physical Examination:

General: Alert and oriented x3, in no acute distress.
Vital Signs: Blood pressure 120/80 mmHg, heart rate 72 bpm, respiratory rate 16 breaths/min, temperature 98.6°F orally.
Head: Normocephalic, atraumatic. No tenderness to palpation over the scalp or temporomandibular joints.
Neck: Supple, without lymphadenopathy or thyromegaly.
Neurological: Cranial nerves II-XII intact. No focal neurological deficits appreciated.
Fundoscopic exam: Normal optic discs, no evidence of papilledema.
Assessment:

Chronic migraines with aura
Hypothyroidism
Plan:

Initiate prophylactic migraine therapy with amitriptyline 25 mg orally at bedtime. Educate patient on potential side effects including sedation, dry mouth, and weight gain. Advise monitoring for improvement in headache frequency and
Schedule follow-up appointment in 4 weeks to assess response to treatment and consider titration of amitriptyline dosage if needed.
Consider neuroimaging (e.g., MRI brain) if there is any change in headache characteristics, onset of focal neurological deficits, or inadequate response to treatment.
Continue Levothyroxine 50 mcg daily for hypothyroidism. Monitor thyroid function tests annually or as clinically indicated.
Recommend lifestyle modifications including stress management techniques, regular exercise, adequate hydration, and avoidance of known migraine triggers (e.g., certain foods, alcohol, irregular sleep patterns).
```

```
prompt = f"""
  Summarise the patient medical record in the following text.

  Below is the text to be summarised:   {text}
  Summarise text:

"""
```

Local Large Language Model(LLM)

Result with CPU only

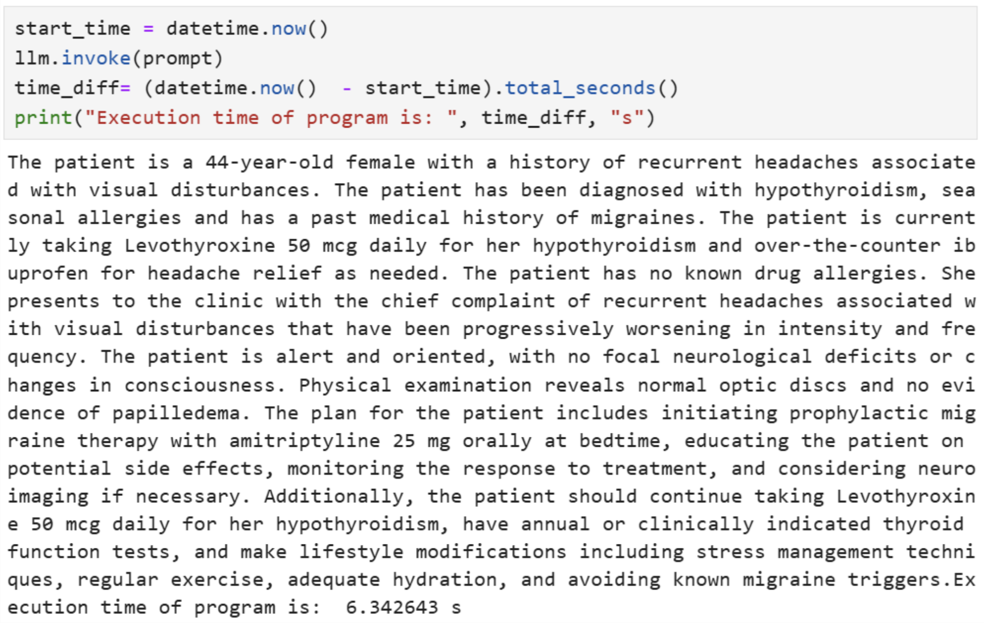


```python
start_time = datetime.now()
llm.invoke(prompt)
time_diff= (datetime.now()  - start_time).total_seconds()
print("Execution time of program is: ", time_diff, "s")
```

```
  Jane Doe is a 44-year-old female with a history of recurrent headaches associated
with visual disturbances. She has a past medical history of migraines, hypothyroidi
sm, and seasonal allergies. Her medications include Levothyroxine for hypothyroidis
m and over-the-counter ibuprofen for headache relief. She denies any recent changes
in thyroid function or symptoms of hypothyroidism. Her family history includes a mo
ther with migraines and fathers with hypertension and diabetes. Jane works as an of
fice manager and reports occasional alcohol consumption. During her physical examin
ation, she is alert and oriented and has no focal neurological deficits. She presen
ts with chronic migraines with an aura. Her plan of care includes initiating prophy
lactic migraine therapy with amitriptyline, monitoring for improvement in headache
frequency and severity over the next 4-6 weeks, scheduling a follow-up appointment
in 4 weeks to assess response to treatment and consider titration of amitriptyline
dosage if needed. She will also continue taking Levothyroxine for her hypothyroidis
m and be educated on lifestyle modifications including stress management technique
s, regular exercise, adequate hydration, and avoidance of known migraine triggers.E
xecution time of program is:  34.14207 s
```

Local Large Language Model(LLM)

Result with CPU+GPU

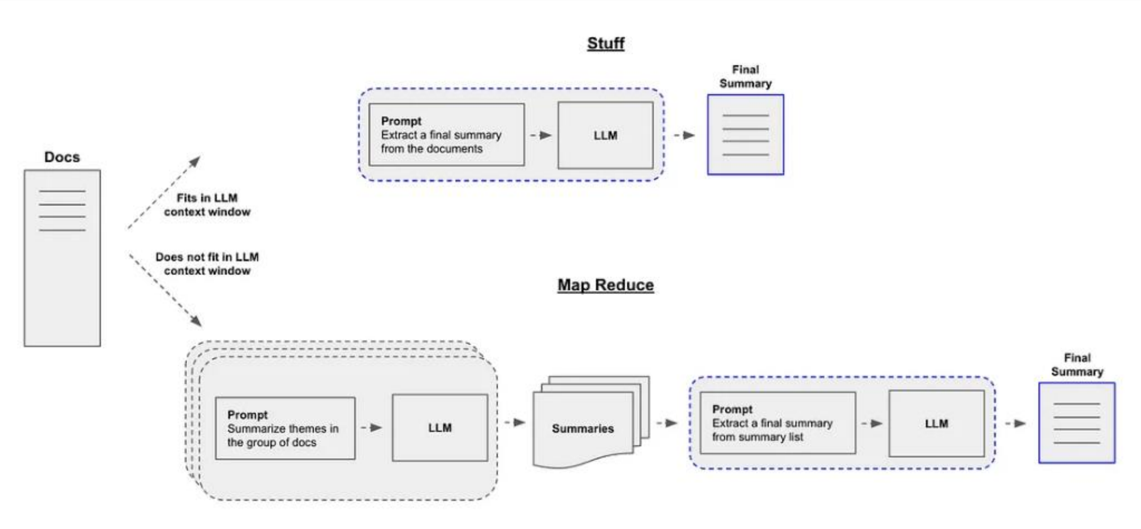


```
start_time = datetime.now()
llm.invoke(prompt)
time_diff= (datetime.now()  - start_time).total_seconds()
print("Execution time of program is: ", time_diff, "s")
```

```
The patient is a 44-year-old female with a history of recurrent headaches associate
d with visual disturbances. The patient has been diagnosed with hypothyroidism, sea
sonal allergies and has a past medical history of migraines. The patient is current
ly taking Levothyroxine 50 mcg daily for her hypothyroidism and over-the-counter ib
uprofen for headache relief as needed. The patient has no known drug allergies. She
presents to the clinic with the chief complaint of recurrent headaches associated w
ith visual disturbances that have been progressively worsening in intensity and fre
quency. The patient is alert and oriented, with no focal neurological deficits or c
hanges in consciousness. Physical examination reveals normal optic discs and no evi
dence of papilledema. The plan for the patient includes initiating prophylactic mig
raine therapy with amitriptyline 25 mg orally at bedtime, educating the patient on
potential side effects, monitoring the response to treatment, and considering neuro
imaging if necessary. Additionally, the patient should continue taking Levothyroxin
e 50 mcg daily for her hypothyroidism, have annual or clinically indicated thyroid
function tests, and make lifestyle modifications including stress management techni
ques, regular exercise, adequate hydration, and avoiding known migraine triggers.Ex
ecution time of program is:  6.342643 s
```

Local LLM Application - Text Summarization

Summarization Technique

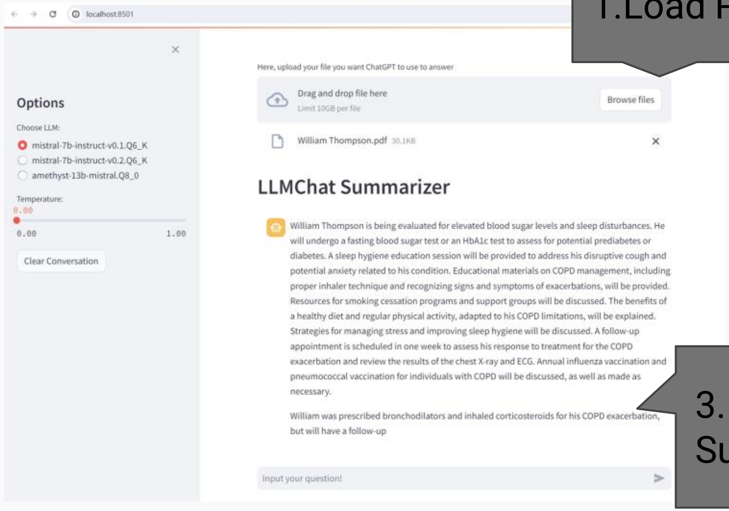

Stuff
Docs
Fits in LLM context window
Does not fit in LLM context window
Prompt
Extract a final summary from the documents
LLM
Final Summary
Map Reduce
Prompt
Summarize themes in the group of docs
LLM
Summaries
Prompt
Extract a final summary from summary list
LLM
Final Summary

Courtesy of langchain

Local LLM Application - Text Summarization

Summarization Application (Map Reduce)

1.Load PDF



Choose LLM:

● mistral-7b-instruct-v0.1.Q6_K
○ mistral-7b-instruct-v0.2.Q6_K
○ amethyst-13b-mistral.Q8_0

Temperature: 0.00

Here, upload your file you want ChatGPT to use to answer

Drag and drop file here
Limit 10GB per file

William Thompson.pdf 30.1KB

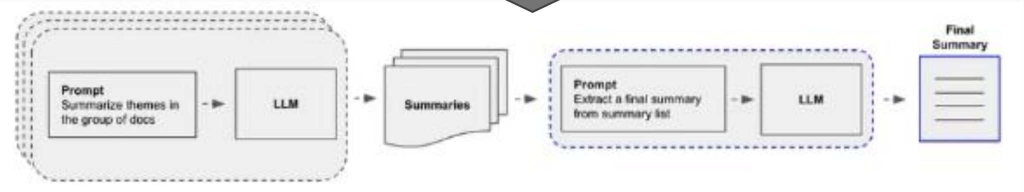
LLMChat Summarizer

William Thompson is being evaluated for elevated blood sugar levels and sleep disturbances. He will undergo a fasting blood sugar test or an HbA1c test to assess for potential prediabetes or diabetes. A sleep hygiene education session will be provided to address his disruptive cough and potential anxiety related to his condition. Educational materials on COPD management, including proper inhaler technique and recognizing signs and symptoms of exacerbations, will be provided. Resources for smoking cessation programs and support groups will be discussed. The benefits of a healthy diet and regular physical activity, adapted to his COPD limitations, will be explained. Strategies for managing stress and improving sleep hygiene will be discussed. A follow-up appointment is scheduled in one week to assess his response to treatment for the COPD exacerbation and review the results of the chest X-ray and ECG. Annual influenza vaccination and pneumococcal vaccination for individuals with COPD will be discussed, as well as made as necessary.

William was prescribed bronchodilators and inhaled corticosteroids for his COPD exacerbation, but will have a follow-up

Input your question!

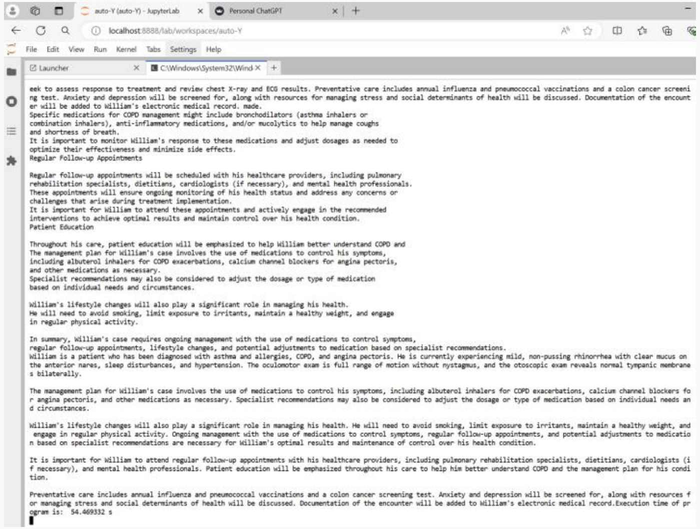
2. Map Reduce summarization



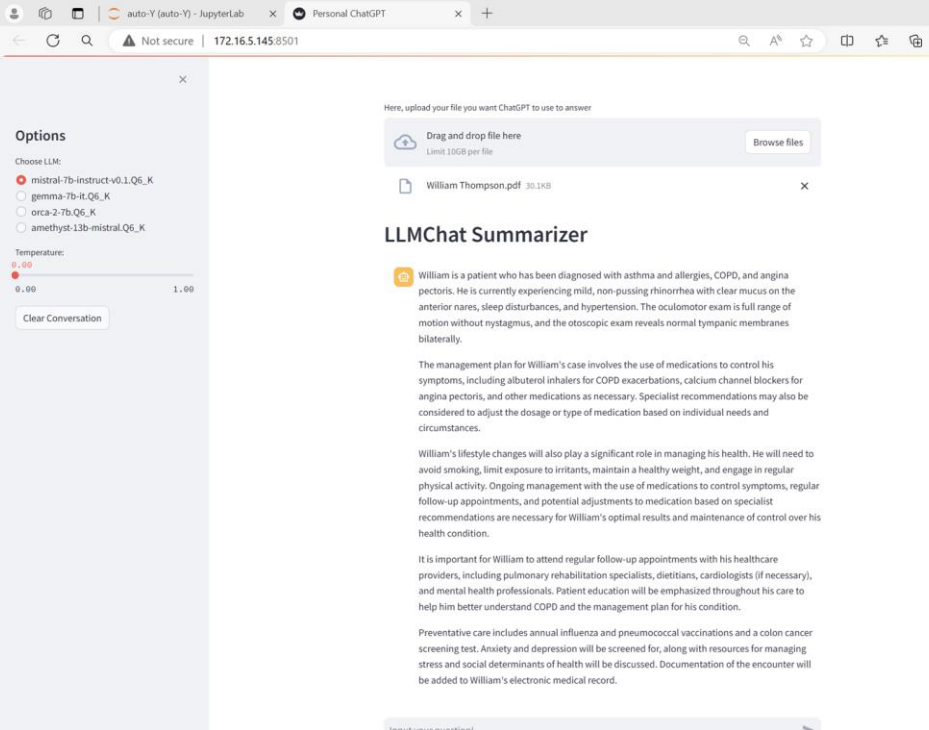
Prompt
Summarize themes in the group of docs
LLM
Summaries
Prompt
Extract a final summary from summary list
LLM
Final Summary

3.Display Summary

Text Summarization -Mapreduce



```
eek to assess response to treatment and review chest X-ray and ECG results. Preventative care includes annual influenza and pneumococcal vaccinations and a colon cancer screeni
ng test. Anxiety and depression will be screened for, along with resources for managing stress and social determinants of health will be discussed. Documentation of the encount
er will be added to William's electronic medical record. made.
Specific medications for COPD management might include bronchodilators (asthma inhalers or
combination inhalers), anti-inflammatory medications, and/or mucolytics to help manage coughs
and shortness of breath.
It is important to monitor William's response to these medications and adjust dosages as needed to
optimize their effectiveness and minimize side effects.
Regular Follow-up Appointments

Regular follow-up appointments will be scheduled with his healthcare providers, including pulmonary
rehabilitation specialists, dietitians, cardiologists (if necessary), and mental health professionals.
These appointments will ensure ongoing monitoring of his health status and address any concerns or
challenges that arise during treatment implementation.
It is important for William to attend these appointments and actively engage in the recommended
interventions to achieve optimal results and maintain control over his health condition.
Patient Education

Throughout his care, patient education will be emphasized to help William better understand COPD and
The management plan for William's case involves the use of medications to control his symptoms,
including albuterol inhalers for COPD exacerbations, calcium channel blockers for angina pectoris,
and other medications as necessary.
Specialist recommendations may also be considered to adjust the dosage or type of medication
based on individual needs and circumstances.

William's lifestyle changes will also play a significant role in managing his health.
He will need to avoid smoking, limit exposure to irritants, maintain a healthy weight, and engage
in regular physical activity.

In summary, William's case requires ongoing management with the use of medications to control symptoms,
regular follow-up appointments, lifestyle changes, and potential adjustments to medication based on specialist recommendations.
William is a patient who has been diagnosed with asthma and allergies, COPD, and angina pectoris. He is currently experiencing mild, non-pussing rhinorrhea with clear mucus on
the anterior nares, sleep disturbances, and hypertension. The oculomotor exam is full range of motion without nystagmus, and the otoscopic exam reveals normal tympanic membrane
s bilaterally.

The management plan for William's case involves the use of medications to control his symptoms, including albuterol inhalers for COPD exacerbations, calcium channel blockers fo
r angina pectoris, and other medications as necessary. Specialist recommendations may also be considered to adjust the dosage or type of medication based on individual needs an
d circumstances.

William's lifestyle changes will also play a significant role in managing his health. He will need to avoid smoking, limit exposure to irritants, maintain a healthy weight, and
 engage in regular physical activity. Ongoing management with the use of medications to control symptoms, regular follow-up appointments, and potential adjustments to medicatio
n based on specialist recommendations are necessary for William's optimal results and maintenance of control over his health condition.

It is important for William to attend regular follow-up appointments with his healthcare providers, including pulmonary rehabilitation specialists, dietitians, cardiologists (i
f necessary), and mental health professionals. Patient education will be emphasized throughout his care to help him better understand COPD and the management plan for his condi
tion.

Preventative care includes annual influenza and pneumococcal vaccinations and a colon cancer screening test. Anxiety and depression will be screened for, along with resources f
or managing stress and social determinants of health will be discussed. Documentation of the encounter will be added to William's electronic medical record.Execution time of pr
ogram is:  54.469332 s
```



Options

Choose LLM:

- ● mistral-7b-instruct-v0.1.Q6_K
- ○ gemma-7b-it.Q6_K
- ○ orca-2-7b.Q6_K
- ○ amethyst-13b-mistral.Q6_K

Temperature: 0.00 (0.00 – 1.00)

Here, upload your file you want ChatGPT to use to answer

William Thompson.pdf 30.1KB

LLMChat Summarizer

William is a patient who has been diagnosed with asthma and allergies, COPD, and angina pectoris. He is currently experiencing mild, non-pussing rhinorrhea with clear mucus on the anterior nares, sleep disturbances, and hypertension. The oculomotor exam is full range of motion without nystagmus, and the otoscopic exam reveals normal tympanic membranes bilaterally.

The management plan for William's case involves the use of medications to control his symptoms, including albuterol inhalers for COPD exacerbations, calcium channel blockers for angina pectoris, and other medications as necessary. Specialist recommendations may also be considered to adjust the dosage or type of medication based on individual needs and circumstances.

William's lifestyle changes will also play a significant role in managing his health. He will need to avoid smoking, limit exposure to irritants, maintain a healthy weight, and engage in regular physical activity. Ongoing management with the use of medications to control symptoms, regular follow-up appointments, and potential adjustments to medication based on specialist recommendations are necessary for William's optimal results and maintenance of control over his health condition.

It is important for William to attend regular follow-up appointments with his healthcare providers, including pulmonary rehabilitation specialists, dietitians, cardiologists (if necessary), and mental health professionals. Patient education will be emphasized throughout his care to help him better understand COPD and the management plan for his condition.

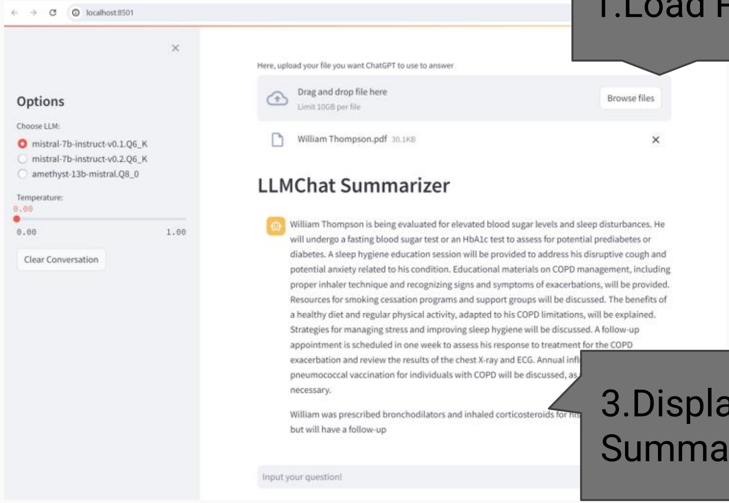
Preventative care includes annual influenza and pneumococcal vaccinations and a colon cancer screening test. Anxiety and depression will be screened for, along with resources for managing stress and social determinants of health will be discussed. Documentation of the encounter will be added to William's electronic medical record.

Local LLM Application - Text Summarization

Summarization Application (Refine)

1.Load PDF

2. Refine summarization



Here, upload your file you want ChatGPT to use to answer

William Thompson.pdf 30.1KB

Choose LLM:

● mistral-7b-instruct-v0.1.Q6_K
○ mistral-7b-instruct-v0.2.Q6_K
○ amethyst-13b-mistral.Q8_0

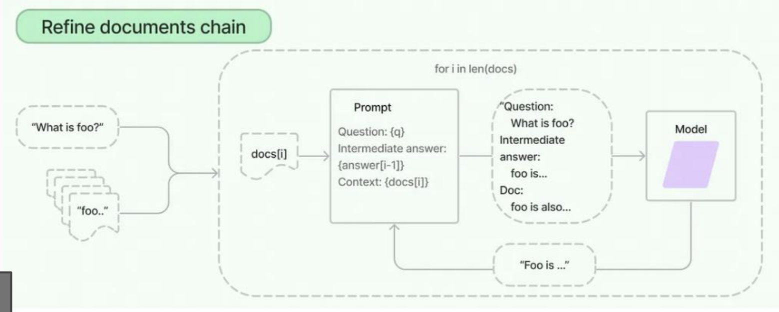
Temperature: 0.00 (0.00 – 1.00)

LLMChat Summarizer

William Thompson is being evaluated for elevated blood sugar levels and sleep disturbances. He will undergo a fasting blood sugar test or an HbA1c test to assess for potential prediabetes or diabetes. A sleep hygiene education session will be provided to address his disruptive cough and potential anxiety related to his condition. Educational materials on COPD management, including proper inhaler technique and recognizing signs and symptoms of exacerbations, will be provided. Resources for smoking cessation programs and support groups will be discussed. The benefits of a healthy diet and regular physical activity, adapted to his COPD limitations, will be explained. Strategies for managing stress and improving sleep hygiene will be discussed. A follow-up appointment is scheduled in one week to assess his response to treatment for the COPD exacerbation and review the results of the chest X-ray and ECG. Annual infl pneumococcal vaccination for individuals with COPD will be discussed, as necessary.

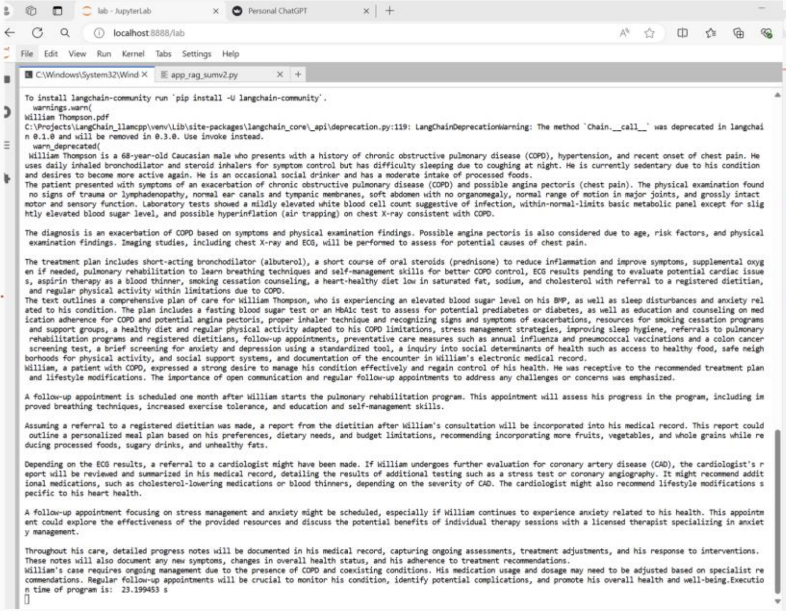
William was prescribed bronchodilators and inhaled corticosteroids for his but will have a follow-up

3.Display Summary

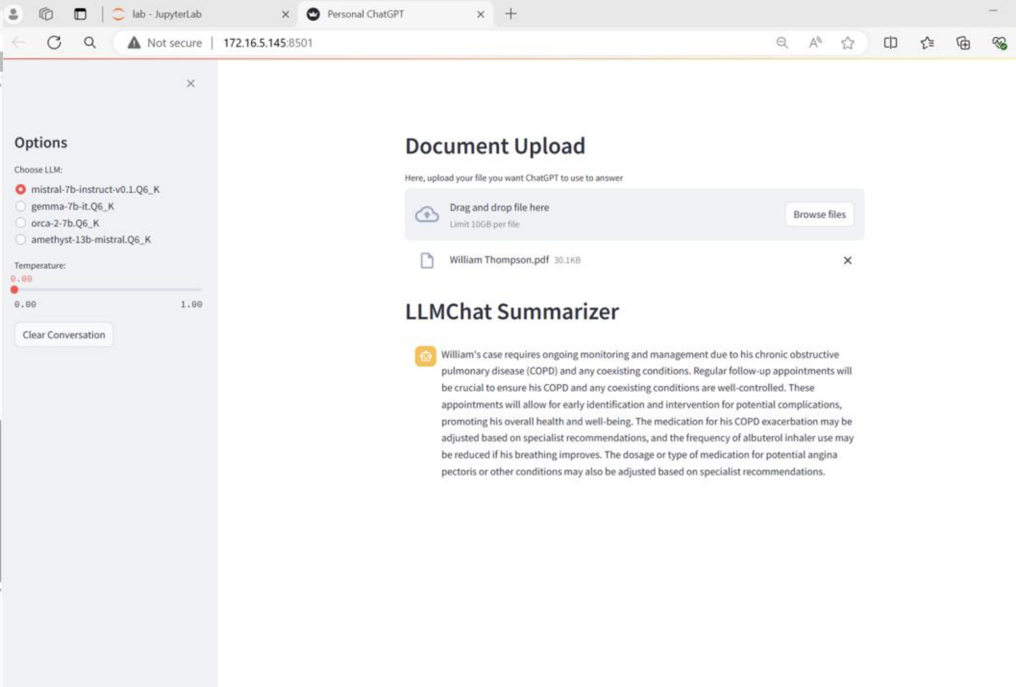


source:https://python.langchain.com/docs/modules/chains/document/refine

Text Summarization - Refine



```
To install langchain-community run `pip install -U langchain-community`.
  warnings.warn(
William Thompson.pdf
C:\Projects\LangChain_llamcpp\venv\Lib\site-packages\langchain_core\_api\deprecation.py:119: LangChainDeprecationWarning: The method `Chain.__call__` was deprecated in langchai
n 0.1.0 and will be removed in 0.3.0. Use invoke instead.
  warn_deprecated(
 William Thompson is a 68-year-old Caucasian male who presents with a history of chronic obstructive pulmonary disease (COPD), hypertension, and recent onset of chest pain. He
uses daily inhaled bronchodilator and steroid inhalers for symptom control but has difficulty sleeping due to coughing at night. He is currently sedentary due to his condition
and desires to become more active again. He is an occasional social drinker and has a moderate intake of processed foods.
The patient presented with symptoms of an exacerbation of chronic obstructive pulmonary disease (COPD) and possible angina pectoris (chest pain). The physical examination found
 no signs of trauma or lymphadenopathy, normal ear canals and tympanic membranes, soft abdomen with no organomegaly, normal range of motion in major joints, and grossly intact
motor and sensory function. Laboratory tests showed a mildly elevated white blood cell count suggestive of infection, within-normal-limits basic metabolic panel except for slig
htly elevated blood sugar level, and possible hyperinflation (air trapping) on chest X-ray consistent with COPD.

The diagnosis is an exacerbation of COPD based on symptoms and physical examination findings. Possible angina pectoris is also considered due to age, risk factors, and physical
 examination findings. Imaging studies, including chest X-ray and ECG, will be performed to assess for potential causes of chest pain.

The treatment plan includes short-acting bronchodilator (albuterol), a short course of oral steroids (prednisone) to reduce inflammation and improve symptoms, supplemental oxyg
en if needed, pulmonary rehabilitation to learn breathing techniques and self-management skills for better COPD control, ECG results pending to evaluate potential cardiac issue
s, aspirin therapy as a blood thinner, smoking cessation counseling, a heart-healthy diet low in saturated fat, sodium, and cholesterol with referral to a registered dietitian,
 and regular physical activity within limitations due to COPD.
The text outlines a comprehensive plan of care for William Thompson, who is experiencing an elevated blood sugar level on his BMP, as well as sleep disturbances and anxiety rel
ated to his condition. The plan includes a fasting blood sugar test or an HbA1c test to assess for potential prediabetes or diabetes, as well as education and counseling on med
ication adherence for COPD and potential angina pectoris, proper inhaler technique and recognizing signs and symptoms of exacerbations, resources for smoking cessation programs
 and support groups, a healthy diet and regular physical activity adapted to his COPD limitations, stress management strategies, improving sleep hygiene, referrals to pulmonary
 rehabilitation programs and registered dietitians, follow-up appointments, preventative care measures such as annual influenza and pneumococcal vaccinations and a colon cancer
 screening test, a brief screening for anxiety and depression using a standardized tool, a inquiry into social determinants of health such as access to healthy food, safe neigh
borhoods for physical activity, and social support systems, and documentation of the encounter in William's electronic medical record.
William, a patient with COPD, expressed a strong desire to manage his condition effectively and regain control of his health. He was receptive to the recommended treatment plan
 and lifestyle modifications. The importance of open communication and regular follow-up appointments to address any challenges or concerns was emphasized.

A follow-up appointment is scheduled one month after William starts the pulmonary rehabilitation program. This appointment will assess his progress in the program, including im
proved breathing techniques, increased exercise tolerance, and education and self-management skills.

Assuming a referral to a registered dietitian was made, a report from the dietitian after William's consultation will be incorporated into his medical record. This report could
 outline a personalized meal plan based on his preferences, dietary needs, and budget limitations, recommending incorporating more fruits, vegetables, and whole grains while re
ducing processed foods, sugary drinks, and unhealthy fats.

Depending on the ECG results, a referral to a cardiologist might have been made. If William undergoes further evaluation for coronary artery disease (CAD), the cardiologist's r
eport will be reviewed and summarized in his medical record, detailing the results of additional testing such as a stress test or coronary angiography. It might recommend addit
ional medications, such as cholesterol-lowering medications or blood thinners, depending on the severity of CAD. The cardiologist might also recommend lifestyle modifications s
pecific to his heart health.

A follow-up appointment focusing on stress management and anxiety might be scheduled, especially if William continues to experience anxiety related to his health. This appointm
ent could explore the effectiveness of the provided resources and discuss the potential benefits of individual therapy sessions with a licensed therapist specializing in anxiet
y management.

Throughout his care, detailed progress notes will be documented in his medical record, capturing ongoing assessments, treatment adjustments, and his response to interventions.
These notes will also document any new symptoms, changes in overall health status, and his adherence to treatment recommendations.
William's case requires ongoing management due to the presence of COPD and coexisting conditions. His medication usage and dosage may need to be adjusted based on specialist re
commendations. Regular follow-up appointments will be crucial to monitor his condition, identify potential complications, and promote his overall health and well-being.Executio
n time of program is:  23.199453 s
```



Options

Choose LLM:

● mistral-7b-instruct-v0.1.Q6_K
○ gemma-7b-it.Q6_K
○ orca-2-7b.Q6_K
○ amethyst-13b-mistral.Q6_K

Temperature: 0.00

0.00 1.00

Clear Conversation

Document Upload

Here, upload your file you want ChatGPT to use to answer

Drag and drop file here
Limit 10GB per file

William Thompson.pdf 30.1KB

LLMChat Summarizer

William's case requires ongoing monitoring and management due to his chronic obstructive pulmonary disease (COPD) and any coexisting conditions. Regular follow-up appointments will be crucial to ensure his COPD and any coexisting conditions are well-controlled. These appointments will allow for early identification and intervention for potential complications, promoting his overall health and well-being. The medication for his COPD exacerbation may be adjusted based on specialist recommendations, and the frequency of albuterol inhaler use may be reduced if his breathing improves. The dosage or type of medication for potential angina pectoris or other conditions may also be adjusted based on specialist recommendations.

LLM Performance

LLM 7b/13b

- Time for summarization time - time taken
- Accuracy of summary - BertScore

LLM Performance

LLM 7b/13b

Time for summarization time - time taken

With the GPU the long text summarization time taken was reasonable

Testing on different text sizes(20K,50K tokens)

LLM Performance -BertScore

LLM 7b/13b

Accuracy of summary - BertScore

BertScore is a method used to measure the quality of text summarization. This method measures how similar the text summary is to the original text.

Challenge: not able to find good annotated summarized text to compare the generated summary.

LLM Performance- Custom LLM prompt

Use the LLM prompt to evaluate the summary content(Not implemented yet)

evaluate the text summarization based on the following:

1.Coverage of details from the original text.

2.Factual alignment between the original text and summary.

Give each result in the grading 1-10, where 1 is the lowest and 10 is the highest.

original text:

LLM Performance- Custom LLM prompt

Use the LLM prompt to evaluate the summary respond(summary from mistral 7b)

Based on the evaluation criteria provided:

1. **Summary text's coverage of details from the original text**: 4/10
   - The summary text covers the general idea of stress's impact on immunity and mentions some key points such as acute versus chronic stress effects, the role of hormones, and implications for vaccination responses. However, it lacks specific details about mechanisms like the HPA axis, specific cytokine interactions, and detailed immune cell responses.
2. **Factual alignment between the original text and summary**: 3/10
   - There are significant discrepancies between the original text and the summary. The summary oversimplifies and generalizes complex interactions and mechanisms described in the original text. It misses crucial details such as specific hormone names, immune cell types, and their functions in stress responses. Moreover, it introduces new information about ChatGPT in medicine, which is unrelated to the original topic.

Overall, while the summary attempts to capture the general concept of stress's effects on immunity, it falls short in terms of detail coverage and factual alignment with the original text.

LLM Performance- Custom LLM prompt

Use the LLM prompt to evaluate the summary respond(summary from mistral 7b)

Based on the criteria provided:

1. **Summary text's coverage of details from the original text**: 3/10
   - The summary does not adequately cover the details from the original text. It focuses solely on hypertension, which is not the primary focus of the original text on stress and immune response.
2. **Factual alignment between the original text and summary**: 2/10
   - There is minimal alignment between the factual details of the original text and the summary. The summary completely diverges from the original text's focus on stress, immunity, and psychological factors affecting health.

Overall, the summary fails to reflect the main themes, content, and factual accuracy of the original text.

LLM Performance- Custom LLM prompt

Use the LLM prompt to evaluate the summary respond(summary from Gemma 7b)

Based on the evaluation criteria provided, let's assess the summary text's performance:

1. **Summary text's coverage of details from the original text**: 6/10
   - The summary covers various aspects discussed in the original text, such as stress effects on immunity, cytokine influence, and psychological stress impacts. However, it misses some detailed explanations and examples provided in the original, resulting in a slightly reduced score.
2. **Factual alignment between the original text and summary**: 7/10
   - The summary generally aligns well with the factual content of the original text. It accurately captures the main concepts like stress impact on immune cells, hormonal responses, and immune system modulation. However, some nuances and specific mechanisms described in the original are not fully reflected in the summary, affecting the completeness of alignment.

Overall, while the summary provides a reasonable overview of the original text's main points, it could benefit from including more specific details and examples to improve coverage and alignment.

LLM Performance- Custom LLM prompt

Use the LLM prompt to evaluate the summary respond(summary from Orca 7b)

Based on the evaluation criteria provided, here are the ratings for the text summarization:

1. **Coverage of details from the original text**: 7/10
   - The summary covers a significant amount of detail from the original text, including discussions on stress effects on immunity, pathways involved, and specific immune responses. However, some details on specific hormones and immune cell types could have been more explicitly included.
2. **Factual alignment between the original text and summary**: 8/10
   - The summary aligns well with the factual content of the original text. It accurately reflects the main points about stress's impact on immune function, including mechanisms and outcomes discussed. However, there were a few instances where specific details or pathways were not entirely mirrored in the summary.

Overall, the summarization effectively captures the essence of the original text on stress and immunity, providing a comprehensive overview while maintaining factual accuracy.