



HHEM Victorious Medical Data Query Analyzer





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Team Name: HHEM Victorious

Short Description: Utilizing HHEM Vectara RAG allows us to gain insights into how query structure affects sensitivity, aiming to reduce medical errors and improve patient safety.

Product: Medical Data Query Analyzer

Team Leader: Michael Lively

Team Members:

Subhan Liaqat

Ahmad Talha Ansari

Andrej Angelovski



Featuring

- 1) Synthetic Data Custom GPT
- 2) Data Query Custom GPT
- 3) HHEM-Vectara Query Tuner
- 4) Agent Model Evaluation



1) Synthetic Data Custom GPT

This element is tasked with generating artificial medical data, thereby expediting the testing procedures.



Synthetic Medical Data

By Michael L Lively

Creating Synthetic Clinical Data

```
{
  "Case Number": 1002,
  "Chief Complaint (CC)": "Severe headache and blurred vision for the last 4 hours.",
  "History of Present Illness (HPI)": "Ms. Linda Johnson, a 52-year-old female with a history of chronic kidney disease and hypertension, presents with a sudden onset of severe, throbbing headache on the frontal region, rated 9/10, accompanied by blurred vision. The symptoms started approximately 4 hours ago while watching TV. Denies nausea or vomiting but reports mild dizziness. No recent head injury. History of similar headaches, but less intense.",
  "Past Medical History (PMH)": [
    "Chronic kidney disease, stage 3, diagnosed 8 years ago.",
    "Hypertension, diagnosed 15 years ago, poorly controlled.",
    "No known allergies."
  ],
  "Medication History": [
    "Amlodipine 10 mg daily.",
    "Furosemide 40 mg daily.",
    "No over-the-counter medications."
  ],
  "Social History (SH)": [
    "High school teacher.",
    "Non-smoker.",
    "Moderate alcohol consumption on weekends.",
    "Lives alone."
  ],
  "Family History (FH)": [
    "Father with chronic kidney disease.",
    "Mother died of stroke at age 65.",
    "No siblings."
  ],
  "Review of Systems (ROS)": "Negative for fever, chest pain, cough, shortness of breath, abdominal pain, diarrhea, constipation. Positive for occasional mild dizziness.",
  "Physical Examination (PE)": {
    "General": "Awake, alert, appears in distress due to headache.",
    "Vital Signs": "BP 190/110 mmHg, HR 78 bpm, RR 14/min, Temp 98.6°F (37°C), O2 Sat 97% on room air.",
    "HEENT": "Pupils equal, round, reactive to light and accommodation. No neck stiffness.",
    "Cardiovascular": "Regular rate and rhythm, no murmurs.",
    "Respiratory": "Clear to auscultation bilaterally.",
    "Neurological": "Alert and oriented, cranial nerves II-XII intact, no focal deficits."
  },
  "Diagnostic Test Results": {
    "Brain MRI": "No acute intracranial abnormality.",
    "Blood tests": "Creatinine elevated at 2.8 mg/dL, BUN 55 mg/dL."
  },
  "Assessment and Plan": {
    "Assessment": "Hypertensive crisis with severe headache and blurred vision, likely related to poorly controlled hypertension and chronic kidney disease.",
    "Plan": [
      "Immediate administration of oral antihypertensive medication to gradually lower blood pressure.",
      "Admission to the internal medicine ward for close monitoring of blood pressure and neurological status.",
      "Consult nephrology for chronic kidney disease management.",
      "Adjustment of antihypertensive medications to achieve better blood pressure control.",
      "Patient education on the importance of blood pressure management and adherence to medication.",
      "Follow-up appointment in nephrology and primary care clinic."
    ]
  },
  "Problem List": [
    "Hypertensive crisis",
    "Chronic kidney disease, stage 3",
    "Hypertension"
  ]
}
```



2) Data Query Custom GPT

Through the use of a RAG system, this component retrieves synthetic data and applies various transformations. These alterations enable us to assess the data's vulnerability to inaccuracies.



Query & Summarize Data

By Michael L Lively

Input a case number between 2001 and 2099



EA

You

sumarize Chief complaint and Assessment and Plan into one short paragraph



Query & Summarize Data

Ms. Sarah Lee, a 22-year-old female college student with a history of mild intermittent asthma, presented with worsening shortness of breath and chest tightness during exercise, necessitating increased use of her albuterol inhaler for temporary relief. The details for "Assessment and Plan" were not provided in the extracted data, so a comprehensive summary integrating both Chief Complaint and specific management or treatment plans cannot be completed based on the available information.



3) HHEM-Victara Query Tuner

This tool is designed to evaluate the transformed data, determining how adjustments to query structure influence the likelihood of errors.

Synthetic Data Data Query **HHEM-Victara Query Tuner** Model Evaluation

HHEM-Victara Query Tuner

Enter your text for query tuning

Ms. Sarah Lee, a 22-year-old female college student with a history of mild intermittent asthma, presented with worsening shortness of breath and chest tightness during exercise, necessitating increased use of her albuterol inhaler for temporary relief. The details for "Assessment and Plan" were not provided in the extracted data, so a comprehensive summary integrating both Chief

Lambda Value

0.00 0.50 1.00

Top K Results

10 - +

Query Vectara



Query Vectara

Summary

Ms. Sarah Lee, a 22-year-old female college student with a history of mild intermittent asthma, presented with worsening shortness of breath and chest tightness during exercise, requiring increased use of her albuterol inhaler for temporary relief [1]. However, the extracted data does not provide information on the assessment and treatment plans, making it impossible to provide a comprehensive summary of the management for her condition [1].

Top Results

	Fact	HHEM Score
0	"] }, "Problem List": ["Clostridium difficile colitis. "] }, { "Case Numbe	0.8658
1	", "Father with allergies. "], "Review of Systems (ROS)": "Negative for fever, coi	0.1282
2	", "Patient education on hand hygiene and avoiding spread to household contact	0.8255
3	", "Risk factor management, including blood pressure and lipid control. "] },	0.0065
4	", "Follow-up in 6 weeks to evaluate progress. "] }, "Problem List": ["Chron	0.0588



4) Agent Model Evaluation

This phase involves the scrutiny of mixed normal and specific models, including mixtral normal, mixtral crazy, gemini, phi2, and zephyr, to gauge the impact of query modifications on the precision of results.

Model Evaluation

Enter your research topic:

Ms. Sarah Lee, a 22-year-old female college student with a history of mild intermittent asthma, presented with worsening shortness of breath and chest tightness during exercise, necessitating increased use of her albuterol inhaler for temporary relief. The details for "Assessment and Plan" were not provided in the extracted data, so a comprehensive summary integrating both Chief

Choose the process to run:

crewai_process_gemini

crewai_process_gemini

crewai_process_mixtral_crazy

crewai_process_mixtral_normal

crewai_process_zephyr_normal

crewai_process_phi2



Application Demo



[Synthetic Data](#) [Data Query](#) [HHEM-Victara Query Tuner](#) [Model Evaluation](#)

Synthetic Data

Create Synthetic Medical Data

Algorithm:

You are an experienced medical doctor with extensive experience in creating medical records, when clicking "Create Data" create synthetic data with the following Elements similar to the given Example following the Condition. If a number is entered product that many synthetic cases varying the details, if not just produce one case.

Elements: Chief Complaint, History of Present Illness, Past Medical History, Medication History, Social History, Family History, Review of Systems, Physical Examination, Diagnostic Test Results, Assessment and Plan, Problem List

Condition: allow for a variety of different cases and make sure the illnesses are consistent. BE VERBOSE, PUT IN JSON FORMAT.

Example: [

Case Number: 1001

Chief Complaint (CC): "I've been having chest pain for the past two hours."

History of Present Illness (HPI): Mr. Michael Smith, a 65-year-old male with a history of



Custom Everything Conclusion

Our software serves as a crucial experimental platform, providing invaluable insights into how even minor modifications and model changes can significantly affect the retrieval of medical data.

Subhan Liaqat. Ahmad Talha Ansari, Andrej Angelovski

