

Phase 1 Submission

Team : DeepFakes

Fit-Fest

Metrics

- *Average Time to respond to given Query:* less than 40 seconds
- *Extraction of PDF (241 pages) from the given manual:* 2 mins 35 secs

Task	Time
Average Time to Respond to Given Query	< 15 Secs
Extraction of PDF (Including Table Detection for every page + 241 Pages)	2 Min 25 Secs
Extraction of PDF (Plain Text Extraction + 241 Pages)	15 Secs

Pipeline Components

1. Extractor File

The extractor file efficiently extracts text and tables from PDF documents, optimizing the process by:

- Utilizing bounding box detection and grouping algorithms (column_boxes) to accurately identify text regions.
- Extracting Tables and Text data simultaneously.
- Normalizing extracted text for better LLM results.

2. ChromaDB

ChromaDB serves as a vector store to store word embeddings.

3. RAG Model

The RAG model is the core component of the pipeline:

- It combines retrieval and generation techniques to answer user queries.
- Performs similarity checks between the user query and multiple PDFs, generating a ranking of top K Documents.
- Returns a summarized answer along with links to paragraphs and page numbers in the manual.

4. Local LLM (Mistral)

Mistral is a local language model designed for low latency. It generates summarized outputs by condensing relevant information from paragraphs identified by the RAG model.

How to Run

Extractor

- To run the Extractor,
- Place the PDFs to be extracted in the Data Folder
- Run `python extractor.py`
- Output Folder will Contain Your extracted Files

RAG Model

Download Dependencies:

- Install the Local Ollama Model from Ollama.
- Then run `ollama run mistral`.

To Run the Model:

- Run `pip install requirements.txt`
- Execute `python populate_database.py`.
- Execute `python query_data.py "{YOUR QUERY}"`


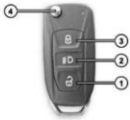

Results

1. **Question:** What functions does the mechanical do?

Expected Answer:

OPENING & CLOSING

Keys (as available)

Sn	Name	Remote Key	Description
1.	Mechanical key		1. Locking all doors 2. Unlocking all doors
2.	Flip key with remote		1. Unlocking all doors 2. Approach light/Tail gate opening 3. Locking all doors 4. Folding key blade in/out
3.	Smart Key (PEPS)		1. Locking all doors 2. Approach light 3. Tail gate opening 4. Unlocking all doors

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Result:

```
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main % python query_data.py " what functions does mechanical key do"
Response: The mechanical key can be used to lock and unlock the doors of the vehicle from the outside when the smart key is not in use or not functioning. It can also be used to open the door manually when the remote key is not responding. In case the remote key enters sleep mode, the mechanical key can be used to activate its functionalities by opening the door mechanically with the key blade.
Sources: ['data/output.pdf:39:1', 'data/output.pdf:40:2', 'data/nexon-owner-manual-2022.pdf:36:0', 'data/output.pdf:40:3', 'data/nexon-owner-manual-2022.pdf:37:0']
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main %
```

2. **Question:** What must be checked when night driving according to the nexon manual?

Expected Answer:

Night Driving

- Ensure that all lights are working and windshield, window glasses are clean.
- Drive more slowly at night than in the daytime, as the visual range is restricted at night. Maintain a speed such that you can stop within illuminated distance of headlamps.
- Do not use the high beam unless inevitable. It may dazzle the driver of the oncoming vehicle, thus causing an accident.
- Use headlamp main/dip beam to alert other road users on turns/ cross roads etc.
- Use side indicators for lane change or

Result:

```
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main % python query_data.py " what must be checked when night driving according to the nexon Manual"
Response: According to the Nexon manual, there are several things that should be checked when night driving:

1. Ensure all lights are working, including headlights, tail lights, side indicators, and fog lights if equipped.
2. Clean windshield and window glasses for clear visibility.
3. Drive more slowly than during daytime, maintaining a speed at which you can stop within the illuminated distance of headlamps.
4. Use headlamp main/dip beam to alert other road users on turns or crossroads.
5. Turn on side indicators before taking a turn or changing lanes.
6. Decelerate to a safe speed before taking turns and do not apply brakes during cornering.
7. Be aware of other vehicles when overtaking and watch out for the oncoming vehicle.
8. Do not drive under the influence of alcohol or drugs.
9. Check side indicators, brake pedal position, steering wheel position, mirrors, engine oil level, coolant level, brake fluid level, windshield washer fluid level, battery electrolyte level, fuel level, and tire pressure regularly.
10. Avoid frequent starts and stops as they increase fuel consumption.
11. Ensure correct tyre pressure and do not carry unnecessary weight.
12. Regularly service your vehicle to maintain optimal performance.
Sources: ['data/nexon-owner-manual-2022.pdf:10:2', 'data/nexon-owner-manual-2022.pdf:9:1', 'data/output.pdf:64:1', 'data/output.pdf:9:0', 'data/output.pdf:48:1']
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main % █
```

3. **Question:** What is the recommended CRS position for each age group and Mass Group?

Expected Answer:

Group	Mass Group	Age Group	Fr	Rear Out-board Lh	Rear Out-board Rh	Rear Center
0	Up to 10 kg	Up to 9 months	X	U	U	X
0+	Up to 13 kg	Up to 24 months	X	U	U	X
I	9 to 18 kg	9 months to 48 months	X	U	U	X
II	15 to 25 kg	Approx. 3 to 7 Years	X	U	U	X
III	22 to 36 kg	Approx. 6 to 12 Years	X	U	U	X

Result:

```
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main % python query_data.py " what recommended CRS position for each age group and Mass group"
Response: Based on the context provided, here are the recommended CRS (Child Restraint System) positions according to each age group and mass group:

1. Up to 10 kg (Up to 9 months): Rear-facing seat with a harness (X for front seat), suitable for universal category restraints (U).
2. 0+, up to 13 kg, up to 24 months: Forward-facing seat with a harness (X for front seat), suitable for universal category restraints (U).
3. 9 to 18 kg, 9 months to 48 months: Forward-facing seat with a harness or booster seat (backless) with a harness (X for front seat), suitable for universal category restraints (U).
4. Approx. 3 to 7 years (15 to 25 kg): Booster seat with a backrest (forward-facing) and a lap and shoulder belt (X for front seat, but only if the vehicle has a passenger airbag deactivation switch), suitable for universal category restraints (U).
5. Approx. 6 to 12 years (22 to 36 kg): Booster seat without a backrest (forward-facing) and a lap and shoulder belt, suitable for universal category restraints (U).

It's important to note that children below the age of one year must always ride in a rear-facing infant CRS. Additionally, if your vehicle is equipped with a front passenger airbag and does not have a deactivation switch, do not install a rear-facing CRS in the front passenger seat. Make sure the CRS is properly installed in the vehicle, and the child fits properly and wears the harness.
Sources: ['data/output.pdf:31:0', 'data/nexon-owner-manual-2022.pdf:16:0', 'data/output.pdf:11:2', 'data/output.pdf:11:3', 'data/output.pdf:12:0']
(base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main %
```

4. Question: How to Close Sunroof?

Expected Answer:

OPENING & CLOSING

button.

To stop at any position press control button (2) one touch.

Closing Procedure



Press the sunroof control button (2) (one touch) sunroof will close to full position automatically.

Press and hold the control button (2) and adjust the sunroof closing manually to desired position and release the button.

NOTE

Sunshade will not close automatically during sunroof close operation. It should be closed manually.

Emergency Close Feature

If express (one touch) / manual (long press) sunroof close function may not work due to:

- Consecutive several attempts to close sunroof, due to pinch protection (only for closing sunroof).
- Excessive ice / dirt accumulation on the sunroof glass/guiderrails.

Follow the Emergency Close Command as Below:

Emergency close feature can be used, if sliding sunroof consecutive reversal movement observed 3 times within 10 sec, then continue as below to use emergency close feature.

1. On the 4th attempt continuously push the sunroof close switch until it closes

completely to ensure occupant privacy, safety & theft prevention from sunroof open window. This is emergency close feature.

WARNING

Never keep your hands or head in the sunroof window while performing this operation it may cause severe injury, since anti-pinch function will not work at this 4th attempt.

2. Once the sunroof is completely closed, release the switch.
3. Alternatively, user may wait for min. 30 secs before operating sunroof, then sunroof can be operated with normal functions.

NOTE

If the sunroof doesn't operate as above, visit an authorized TATA dealer or TATA authorized service facility for assistance."

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Result:

```
((base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main % python query_data.py "How to close sunroof"
Response: To close the sunroof, press the sunroof control button (2) (one touch). If you want to adjust the position manually before releasing
, press and hold the control button (2), release it when you're satisfied with the position. However, if the emergency close feature is necessa
ry due to consecutive reversal moves or excessive ice/dirt accumulation, follow the emergency close command. This may involve keeping the sunro
of close switch pressed continuously for certain steps. Remember, self-learning must be done after completing initialization and the sunroof sh
ould be in an open position before closing.
Sources: ['data/output.pdf:43:1', 'data/nexon-owner-manual-2022.pdf:50:0', 'data/output.pdf:45:0', 'data/output.pdf:43:3', 'data/nexon-owner-ma
nual-2022.pdf:46:0']
((base) manasvivarma@Manasvis-MacBook-Pro rag-tutorial-v2-main %
```