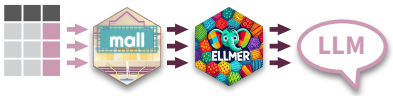
Natural Language Processing using LLMs in R : : **CHEAT SHEET**

Intro

Use LLM's to perform NLP row-wise over a data frame. **`mall`** comes with pre-defined prompts that perform specific NLP operations, and then places the results in a new column. Use **OpenAI**, **Ollama**, **Anthropic** and many others thanks to its integration with **`ellmer`**:



`mall`'s data frame functions are designed with 'tidy' principals in mind, so they work will **`tidyverse`** packages.

`mall` also includes functions that work with string vectors.

Getting Started

1. Load the libraries

```
library(mall)
library(ellmer)
```

2. Create a vendor specific chat connection

```
chat <- chat_openai()
```

3. Pass the chat object to `mall`

```
llm_use(chat)
```

For dataframes:

```
data("reviews") # Sample product reviews
reviews |>
  llm_sentiment(review)
```

For vectors:

```
llm_vec_sentiment(c("I am happy", "I am sad"))
```

CONNECT AUTOMATICALLY

As a convenience, mall is able to automatically establish a connection with the LLM. To do this you can use the ***`.mall_chat`*** option:

```
options(.mall_chat=ellmer::chat_openai(model="gpt-4o"))
```

Add this line to your **.Rprofile** file in order for that code to run every time you start R. You can call **`usethis::edit_r_profile()`** to edit.

NLP Functions

SENTIMENT ANALYSIS

llm_sentiment(.data, col, options = c("positive", "negative", "neutral"), pred_name = ".sentiment", additional_prompt = "")**

llm_sentiment(reviews, review)

llm_vec_sentiment(x, options = c("positive", "negative", "neutral"), additional_prompt = "", preview = FALSE)**

llm_vec_sentiment(c("I am happy", "I am sad"))

Special arguments:

options - Customize the sentiments to check for: `options = c("positive", "negative")`. Use 'tilde' to mask the results, for example `c("positive" ~ 1, "negative" ~ 0))` returns 1 for positive and 0 for negative.

EXTRACT

Extract specific entity, or entities, from the provided text

llm_extract(.data, col, labels, expand_cols = FALSE, additional_prompt = "", pred_name = ".extract")**

llm_extract(reviews, review, labels = "product")

llm_vec_extract(x, labels = c(), additional_prompt = "", preview = FALSE)**

llm_vec_extract("bob smith, 123 3rd street", c("name", "address"))

Special arguments:

labels - A vector to specify the entities to identify

expand_cols - If multiple labels, this indicates if the labels will show up in their own column (data frames only)

SUMMARIZE

Summarize text into a specified number of words

llm_summarize(.data, col, max_words = 10, pred_name = ".summary", additional_prompt = "")

llm_summarize(reviews, review, max_words = 5)

llm_vec_summarize(x, max_words = 10, additional_prompt = "", preview = FALSE)**

llm_vec_summarize("This has been the best TV I've ever used. Great screen, and sound.", max_words = 5)

VERIFY

Check if a statement is true or not based on the provided text

llm_verify(.data, col, what, yes_no = factor(c(1, 0)), pred_name = ".verify", additional_prompt = "")**

llm_verify(reviews, review, "is the customer happy")

llm_vec_verify(x, what, yes_no = factor(c(1, 0)), additional_prompt = "", preview = FALSE)**

llm_verify(c("I am happy", "I am sad"), "is the person happy")

Special arguments:

yes_no - Customize what it returns for true/false with a vector `yes_no = c("y", "n")`.

CLASSIFY

Classify the provided text as one of the options provided via the `labels`

llm_classify(.data, col, labels, pred_name = ".classify", additional_prompt = "")**

llm_classify(reviews, review, c("appliance", "computer"))

llm_vec_classify(x, labels, additional_prompt = "", preview = FALSE)**

llm_vec_classify(c("this is important!", "just whenever"), c("urgent", "not urgent"))

Special arguments:

labels - A character vector with at least 2 labels to classify the text as

TRANSLATE

Translate into target language

llm_translate(.data, col, language, pred_name = ".translation", additional_prompt = "")**

llm_translate(reviews, review, "spanish")

llm_vec_translate(x, language, additional_prompt = "", preview = FALSE)**

llm_vec_translate("grass is green", "spanish")

Special arguments:

language - Target language. No origin language is passed since the LLM detects it automatically.

CUSTOM

Create your own prompt

llm_custom(.data, col, prompt = "", pred_name = ".pred", valid_resps = "")**

my_prompt <-"Answer a question. Return only the answer, no explanation. Acceptable answers are 'yes', 'no'. Answer this about the following text, is this a happy customer?:"
llm_custom(reviews , review, my_prompt)

llm_vec_custom(x, prompt = "", valid_resps = NULL)**

Special arguments:

valid_resps - A vector to specify the set of answers expected back. `mall` will change those not in the set to NA.

SHARED ARGUMENTS

additional_prompt - Appends instructions to the LLM.
llm_classify(reviews, review, c("appliance", "computers"), additional_prompt = "Consider TVs as appliances")

pred_name - Name of the new column. Defaults are set based on the NLP operation. *(Data frames only)*
llm_vec_translate("grass is green", "spanish", pred_name = "in_spanish")

preview - Returns what it would be sent to the LLM instead *(Vectors only)*

Other Features

OLLAMA DIRECT

If Ollama is the only LLM provider you are using, then a simplified way to connect is available which does not require an `ellmer` Chat object. Simply pass "ollama" as the `backend`, and specify the model:

```
llm_use("ollama", model= "llama3.2")
```

CACHING RESULTS

By default, `mall` saves the LLM results in a temp folder. To specify a folder call:

```
llm_use(chat, .cache = "<my folder>")
```

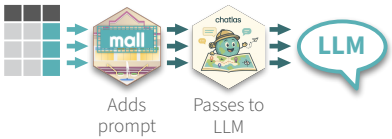
To turn off use:

```
llm_use(chat, .cache = "")
```

Natural Language Processing using LLMs in **Python** : : **CHEAT SHEET**

Intro

Use LLM's to perform NLP row-wise over a data frame. **`mall`** comes with pre-defined prompts that perform specific NLP operations, and then places the results in a new column. Use **OpenAI**, **Ollama**, **Anthropic** and many others thanks to its integration with **`chatlas`**:



`mall` works as an extension for Polars data frames. It also works with string vectors.

Getting Started

Start by creating a new LLM connection

```
from chatlas import ChatOpenAI
chat = ChatOpenAI()
```

DATA FRAMES

1. Load the library

```
import mall
```

2. Read or load your data frame

```
reviews = mall.MallData.reviews # Sample product reviews
```

3. Pass the chat object to `mall`

```
reviews.llm.use(chat)
```

4. Access NLP functions via `.llm`

```
reviews.llm.sentiment('review')
```

STRING VECTORS

1. Load the `LLMVec` class

```
from mall import LLMVec
```

2. Create a new `LLMVec` object

```
llm = LLMVec(chat)
```

3. Pass a vector to a function in the new object

```
llm.sentiment(['I am happy', 'I am sad'])
```

NLP Functions

SENTIMENT ANALYSIS

<DataFrame>.**llm.sentiment(**col, options = ['positive', 'negative', 'neutral'], additional='', pred_name ='sentiment'**)**
reviews.llm.sentiment("review")

< LLMVec object >.**sentiment(**x, options=['positive', 'negative', 'neutral'], additional=''**)**
llm.sentiment(['I am happy', 'I am sad'])

Special arguments:

options - Customize the sentiments to check for: `options = ["positive", "negative"]`. Use a DICT object to mask the results, for example `{"positive" : 1, "negative" : 0}` returns 1 for positive and 0 for negative.

EXTRACT

Extract specific entity, or entities, from the provided text

<DataFrame>.**llm.extract(**col, labels='', expand_cols = False, additional = '', pred_name = 'extract'**)**
reviews.llm.extract("review", labels = "product")

< LLMVec object >.**extract(**x, labels='', additional=''**)**
llm.extract(['bob smith, 123 3rd street'], labels=['name', 'address'])

Special arguments:

labels - A vector to specify the entities to identify

expand_cols - If multiple labels, this indicates if the labels will show up in their own column (data frames only)

SUMMARIZE

Summarize text into a specified number of words

<DataFrame>.**llm.summarize(**x, max_words=10, additional=''**)**
reviews.llm.summarize("review", 5)

< LLMVec object >.**summarize(**x, max_words=10, additional=''**)**
llm.summarize(['This has been the best TV Ive ever used. Great screen, and sound.'], max_words = 5)

VERIFY

Check if a statement is true or not based on the provided text

<DataFrame>.**llm.verify(**col, what='', yes_no=[1, 0], additional='', pred_name='verify'**)**
reviews.llm.verify("review", "is the customer happy")

< LLMVec object >.**verify(**x, what='', yes_no=[1, 0], additional=''**)**
llm.verify(['I am happy', 'I am sad'], what = 'Is the person happy?')

Special arguments:

yes_no - Customize what it returns for true/false with a vector `yes_no = ["y", "n"]`.

CLASSIFY

Classify the provided text as one of the options provided via the `labels`

<DataFrame>.**llm.classify(**col, labels='', additional='', pred_name='classify'**)**
reviews.llm.classify("review", ["appliance", "computer"])

< LLMVec object >.**classify(**x, labels='', additional=''**)**
llm.classify(['this is important!', 'there is no rush'], ['urgent', 'not urgent'])

Special arguments:

labels - A character vector with at least 2 labels to classify the text as

TRANSLATE

Translate into target language

<DataFrame>.**llm.translate(**col, language='', additional='', pred_name='translation'**)**
reviews.llm.translate("review", "spanish")

< LLMVec object >.**translate(**x, language='', additional=''**)**
llm.translate(['the grass is green'], language = 'spanish')

Special arguments:

language - Target language. No origin language is passed since the LLM detects it automatically.

CUSTOM

Create your own prompt

<DataFrame>.**llm.custom(**col, prompt='', valid_resps='', pred_name='custom'**)**
my_prompt ='Answer a question. Return only the answer, no explanation. Acceptable answers are 'yes', 'no'. Answer this about the following text, is this a happy customer?:'
reviews.llm.custom("review", prompt = my_prompt)

< LLMVec object >.**custom(**x, prompt='', valid_resps=''**)**

Special arguments:

valid_resps - A vector to specify the set of answers expected back.

SHARED ARGUMENTS

additional - Appends more instructions to the LLM.
reviews.llm.classify("review", ["appliance", "computer"],additional="Consider TVs as appliances")

pred_name - Name of the new column. Defaults are set based on the NLP operation. *(Data frames only)*

Other Features

OLLAMA DIRECT

If Ollama is the only LLM provider you are using, then a simplified way to connect is available which does not require an `ellmer` Chat object. Simply pass "ollama" as the `backend`, and specify the model:

Dataframe:
```
reviews.llm.use('ollama','llama3.2')
```
Vector:
```
llm = LLMVec('ollama','llama3.2')
```

CACHING RESULTS

By default, `mall` saves the LLM results in a temp folder. To specify a folder call:

Dataframe:
```
reviews.llm.use(chat, _cache='<my folder>')
```
Vector:
```
llm = LLMVec(chat, _cache='<my folder>')
```

To turn off use:

Dataframe:
```
reviews.llm.use(chat, _cache='')
```
Vector:
```
llm = LLMVec(chat, _cache='')
```