🏠   Modules   Model I/O   Output parsers   Retry parser

Retry parser

While in some cases it is possible to fix any parsing mistakes by only looking at the output, in other cases it can't. An example of this is when the output is not just in the incorrect format, but is partially complete. Consider the below example.

```python
from langchain.prompts import (
    PromptTemplate,
    ChatPromptTemplate,
    HumanMessagePromptTemplate,
)
from langchain.llms import OpenAI
from langchain.chat_models import ChatOpenAI
from langchain.output_parsers import (
    PydanticOutputParser,
    OutputFixingParser,
    RetryOutputParser,
)
from pydantic import BaseModel, Field, validator
from typing import List
```

API Reference:

- PromptTemplate from `langchain.prompts`
- ChatPromptTemplate from `langchain.prompts`
- HumanMessagePromptTemplate from `langchain.prompts`
- OpenAI from `langchain.llms`
- ChatOpenAI from `langchain.chat_models`
- PydanticOutputParser from `langchain.output_parsers`
- OutputFixingParser from `langchain.output_parsers`
- RetryOutputParser from `langchain.output_parsers`

```python
template = """Based on the user question, provide an Action and Action Input for what step should be taken.
{format_instructions}
Question: {query}
Response:"""
```

```python
class Action(BaseModel):
    action: str = Field(description="action to take")
    action_input: str = Field(description="input to the action")


parser = PydanticOutputParser(pydantic_object=Action)
```

```python
prompt = PromptTemplate(
    template="Answer the user
query.\n{format_instructions}\n{query}\n",
    input_variables=["query"],
    partial_variables={"format_instructions":
parser.get_format_instructions()},
)
```

```python
prompt_value = prompt.format_prompt(query="who is leo di caprios gf?")
```

```python
bad_response = '{"action": "search"}'
```

If we try to parse this response as is, we will get an error

```python
parser.parse(bad_response)
```

```
    ---------------------------------------------------------------------
--------

    ValidationError                          Traceback (most recent
call last)

    File ~/workplace/langchain/langchain/output_parsers/pydantic.py:24,
in PydanticOutputParser.parse(self, text)
        23      json_object = json.loads(json_str)
    ---> 24      return self.pydantic_object.parse_obj(json_object)
        26 except (json.JSONDecodeError, ValidationError) as e:


    File ~/.pyenv/versions/3.9.1/envs/langchain/lib/python3.9/site-
packages/pydantic/main.py:527, in pydantic.main.BaseModel.parse_obj()
```

```
    File ~/.pyenv/versions/3.9.1/envs/langchain/lib/python3.9/site-
packages/pydantic/main.py:342, in pydantic.main.BaseModel.__init__()


    ValidationError: 1 validation error for Action
    action_input
      field required (type=value_error.missing)



    During handling of the above exception, another exception occurred:


    OutputParserException                     Traceback (most recent
call last)

    Cell In[6], line 1
    ----> 1 parser.parse(bad_response)


    File ~/workplace/langchain/langchain/output_parsers/pydantic.py:29,
in PydanticOutputParser.parse(self, text)
        27 name = self.pydantic_object.__name__
        28 msg = f"Failed to parse {name} from completion {text}. Got:
{e}"
    ---> 29 raise OutputParserException(msg)


    OutputParserException: Failed to parse Action from completion
{"action": "search"}. Got: 1 validation error for Action
    action_input
      field required (type=value_error.missing)
```

If we try to use the `OutputFixingParser` to fix this error, it will be confused - namely, it doesn't know what to actually put for action input.

```
fix_parser = OutputFixingParser.from_llm(parser=parser,
llm=ChatOpenAI())
```

```
fix_parser.parse(bad_response)
```

```
    Action(action='search', action_input='')
```

Instead, we can use the RetryOutputParser, which passes in the prompt (as well as the original output) to try again to get a better response.

```python
from langchain.output_parsers import RetryWithErrorOutputParser
```

API Reference:

- RetryWithErrorOutputParser from `langchain.output_parsers`

```python
retry_parser = RetryWithErrorOutputParser.from_llm(
    parser=parser, llm=OpenAI(temperature=0)
)
```

```python
retry_parser.parse_with_prompt(bad_response, prompt_value)
```

```
    Action(action='search', action_input='who is leo di caprios gf?')
```