Text Meaning Inverter Interactive Jupyter Notebook Tool

Below is a Python program designed to invert the meaning of any set of paragraphs and integrate this functionality into a Jupyter Notebook interface with a clickable button. This program uses ipywidgets for the interactive button and nltk for natural language processing to generate opposite meanings by applying negations.

In [1]:
```
import ipywidgets as widgets
from IPython.display import display, Markdown
import nltk
from nltk.tokenize import sent_tokenize, word_tokenize
from nltk.corpus import wordnet
```

```
A module that was compiled using NumPy 1.x cannot be run in
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versions of NumPy, modules must be compiled with NumPy 2.0.
Some module may need to rebuild instead e.g. with 'pybind11>=2.12'.

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downgrade to 'numpy<2' or try to upgrade the affected module.
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    self.io_loop.start()
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    self.asyncio_loop.run_forever()
  File "C:\ProgramData\anaconda3\Lib\asyncio\base_events.py", line 607, in run_forever
    self._run_once()
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    handle._run()
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    self._context.run(self._callback, *self._args)
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelbase.py", line 510, in dispatch_queue
    await self.process_one()
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    await result
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    reply_content = await reply_content
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    res = shell.run_cell(
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\zmqshell.py", line 531, in run_cell
    return super().run_cell(*args, **kwargs)
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3006, in run_cell
    result = self._run_cell(
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3061, in _run_cell
    result = runner(coro)
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    coro.send(None)
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  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3445, in run_ast_nodes
    if await self.run_code(code, result, async_=asy):
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3505, in run_code
    exec(code_obj, self.user_global_ns, self.user_ns)
  File "C:\Users\PURNANGSHU ROY\AppData\Local\Temp\ipykernel_18340\2278116741.py", line 3, in <module>
    import nltk
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\__init__.py", line 146, in <module>
    from nltk.chunk import *
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\chunk\__init__.py", line 155, in <module>
    from nltk.chunk.api import ChunkParserI
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\chunk\api.py", line 13, in <module>
    from nltk.chunk.util import ChunkScore
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    from .base import clone
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    from .utils._estimator_html_repr import _HTMLDocumentationLinkMixin, estimator_html_repr
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    from ..utils._array_api import _asarray_with_order, _is_numpy_namespace, get_namespace
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    import pandas as pd
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\__init__.py", line 39, in <module>
    from pandas.compat import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\compat\__init__.py", line 27, in <module>
```

```
    from pandas.compat.pyarrow import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\compat\pyarrow.py", line 8, in <module>
    import pyarrow as pa
  File "C:\ProgramData\anaconda3\Lib\site-packages\pyarrow\__init__.py", line 65, in <module>
    import pyarrow.lib as _lib
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AttributeError                            Traceback (most recent call last)
AttributeError: _ARRAY_API not found
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    from pandas.core.api import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\api.py", line 9, in <module>
```

```
    from pandas.core.dtypes.dtypes import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\dtypes\dtypes.py", line 24, in <module>
    from pandas._libs import (
  File "C:\ProgramData\anaconda3\Lib\site-packages\pyarrow\__init__.py", line 65, in <module>
    import pyarrow.lib as _lib
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  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\api.py", line 28, in <module>
```

```
    from pandas.core.arrays import Categorical
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\__init__.py", line 1, in <module>
    from pandas.core.arrays.arrow import ArrowExtensionArray
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\arrow\__init__.py", line 5, in <m
odule>
    from pandas.core.arrays.arrow.array import ArrowExtensionArray
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\arrow\array.py", line 50, in <mod
ule>
    from pandas.core import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\ops\__init__.py", line 8, in <module>
    from pandas.core.ops.array_ops import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\ops\array_ops.py", line 56, in <module>
    from pandas.core.computation import expressions
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\computation\expressions.py", line 21, in
<module>
    from pandas.core.computation.check import NUMEXPR_INSTALLED
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\computation\check.py", line 5, in <modul
e>
    ne = import_optional_dependency("numexpr", errors="warn")
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\compat\_optional.py", line 135, in import_opt
ional_dependency
    module = importlib.import_module(name)
  File "C:\ProgramData\anaconda3\Lib\importlib\__init__.py", line 126, in import_module
    return _bootstrap._gcd_import(name[level:], package, level)
  File "C:\ProgramData\anaconda3\Lib\site-packages\numexpr\__init__.py", line 24, in <module>
    from numexpr.interpreter import MAX_THREADS, use_vml, __BLOCK_SIZE1__
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versions of NumPy, modules must be compiled with NumPy 2.0.
Some module may need to rebuild instead e.g. with 'pybind11>=2.12'.

If you are a user of the module, the easiest solution will be to
downgrade to 'numpy<2' or try to upgrade the affected module.
We expect that some modules will need time to support NumPy 2.

Traceback (most recent call last):  File "<frozen runpy>", line 198, in _run_module_as_main
  File "<frozen runpy>", line 88, in _run_code
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel_launcher.py", line 17, in <module>
    app.launch_new_instance()
  File "C:\ProgramData\anaconda3\Lib\site-packages\traitlets\config\application.py", line 992, in launch_instance
    app.start()
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelapp.py", line 711, in start
    self.io_loop.start()
  File "C:\ProgramData\anaconda3\Lib\site-packages\tornado\platform\asyncio.py", line 195, in start
    self.asyncio_loop.run_forever()
  File "C:\ProgramData\anaconda3\Lib\asyncio\base_events.py", line 607, in run_forever
    self._run_once()
  File "C:\ProgramData\anaconda3\Lib\asyncio\base_events.py", line 1922, in _run_once
    handle._run()
  File "C:\ProgramData\anaconda3\Lib\asyncio\events.py", line 80, in _run
    self._context.run(self._callback, *self._args)
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelbase.py", line 510, in dispatch_queue
    await self.process_one()
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelbase.py", line 499, in process_one
    await dispatch(*args)
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelbase.py", line 406, in dispatch_shell
    await result
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\kernelbase.py", line 729, in execute_request
    reply_content = await reply_content
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\ipkernel.py", line 411, in do_execute
    res = shell.run_cell(
  File "C:\ProgramData\anaconda3\Lib\site-packages\ipykernel\zmqshell.py", line 531, in run_cell
    return super().run_cell(*args, **kwargs)
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3006, in run_cell
    result = self._run_cell(
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3061, in _run_cell
    result = runner(coro)
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\async_helpers.py", line 129, in _pseudo_sync_runner
    coro.send(None)
```

```
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3266, in run_cell_async
    has_raised = await self.run_ast_nodes(code_ast.body, cell_name,
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3445, in run_ast_nodes
    if await self.run_code(code, result, async_=asy):
  File "C:\ProgramData\anaconda3\Lib\site-packages\IPython\core\interactiveshell.py", line 3505, in run_code
    exec(code_obj, self.user_global_ns, self.user_ns)
  File "C:\Users\PURNANGSHU ROY\AppData\Local\Temp\ipykernel_18340\2278116741.py", line 3, in <module>
    import nltk
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\__init__.py", line 146, in <module>
    from nltk.chunk import *
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\chunk\__init__.py", line 155, in <module>
    from nltk.chunk.api import ChunkParserI
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\chunk\api.py", line 13, in <module>
    from nltk.chunk.util import ChunkScore
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\chunk\util.py", line 12, in <module>
    from nltk.tag.mapping import map_tag
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\tag\__init__.py", line 70, in <module>
    from nltk.tag.sequential import (
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\tag\sequential.py", line 26, in <module>
    from nltk.classify import NaiveBayesClassifier
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\classify\__init__.py", line 97, in <module>
    from nltk.classify.scikitlearn import SklearnClassifier
  File "C:\ProgramData\anaconda3\Lib\site-packages\nltk\classify\scikitlearn.py", line 38, in <module>
    from sklearn.feature_extraction import DictVectorizer
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\__init__.py", line 84, in <module>
    from .base import clone
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\base.py", line 19, in <module>
    from .utils._estimator_html_repr import _HTMLDocumentationLinkMixin, estimator_html_repr
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\__init__.py", line 11, in <module>
    from ._chunking import gen_batches, gen_even_slices
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\_chunking.py", line 8, in <module>
    from ._param_validation import Interval, validate_params
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\_param_validation.py", line 14, in <mo
dule>
    from .validation import _is_arraylike_not_scalar
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\validation.py", line 26, in <module>
    from ..utils._array_api import _asarray_with_order, _is_numpy_namespace, get_namespace
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\_array_api.py", line 11, in <module>
    from .fixes import parse_version
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\sklearn\utils\fixes.py", line 24, in <module>
    import pandas as pd
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\__init__.py", line 62, in <module>
    from pandas.core.api import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\api.py", line 28, in <module>
```

```
    from pandas.core.arrays import Categorical
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\__init__.py", line 1, in <module>
    from pandas.core.arrays.arrow import ArrowExtensionArray
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\arrow\__init__.py", line 5, in <m
odule>
    from pandas.core.arrays.arrow.array import ArrowExtensionArray
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\arrow\array.py", line 64, in <mod
ule>
    from pandas.core.arrays.masked import BaseMaskedArray
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\arrays\masked.py", line 60, in <module>
    from pandas.core import (
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\core\nanops.py", line 52, in <module>
    bn = import_optional_dependency("bottleneck", errors="warn")
  File "C:\Users\PURNANGSHU ROY\AppData\Roaming\Python\Python311\site-packages\pandas\compat\_optional.py", line 135, in import_opt
ional_dependency
    module = importlib.import_module(name)
  File "C:\ProgramData\anaconda3\Lib\importlib\__init__.py", line 126, in import_module
    return _bootstrap._gcd_import(name[level:], package, level)
  File "C:\ProgramData\anaconda3\Lib\site-packages\bottleneck\__init__.py", line 7, in <module>
    from .move import (move_argmax, move_argmin, move_max, move_mean, move_median,
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
AttributeError: _ARRAY_API not found
```

In [2]:
```
# Download necessary NLTK data
nltk.download('punkt')
nltk.download('wordnet')
```

```
[nltk_data] Downloading package punkt to C:\Users\PURNANGSHU
[nltk_data]     ROY\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package wordnet to C:\Users\PURNANGSHU
[nltk_data]     ROY\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

Out[2]:
```
True
```

In [3]:
```
def negate_sentence(sentence):
    """
    Negate a given sentence by inserting 'not' or similar negations.
    """
    words = word_tokenize(sentence)
    inverted_sentence = []
    negated = False
```

```
    for word in words:
        if word.lower() in ["is", "are", "was", "were", "am", "be"]:
            inverted_sentence.append(word)
            inverted_sentence.append("not")
            negated = True
        else:
            inverted_sentence.append(word)

    # If no negation was applied, prepend with "Not" for default negation
    if not negated:
        inverted_sentence.insert(0, "Not")

    return " ".join(inverted_sentence)

def invert_paragraph(paragraph):
    """
    Process a paragraph, inverting the meaning of each sentence.
    """
    sentences = sent_tokenize(paragraph)
    inverted_sentences = [negate_sentence(sentence) for sentence in sentences]
    return " ".join(inverted_sentences)

def on_button_click(change):
    """
    Callback function for the button click.
    """
    original_text = text_area.value
    inverted_text = invert_paragraph(original_text)
    output_display.clear_output()
    with output_display:
        display(Markdown(f"**Inverted Text:**\n\n{inverted_text}"))

# UI elements
text_area = widgets.Textarea(
    value="Enter your paragraphs here...",
    placeholder="Type something",
    description="Input:",
    layout=widgets.Layout(width="90%", height="150px")
)
invert_button = widgets.Button(
    description="Invert Meaning",
    button_style="info"
)
```

```
output_display = widgets.Output()

# Button click event
invert_button.on_click(on_button_click)

# Display the interactive elements
display(text_area, invert_button, output_display)
```

```
Textarea(value='Enter your paragraphs here...', description='Input:', layout=Layout(height='150px', width='90%…
Button(button_style='info', description='Invert Meaning', style=ButtonStyle())
Output()
```

In [ ]: