Submission 2

Problem Statement:

Data Anonymizer

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Abstract

This project implements a basic data anonymization system using Natural Language Processing techniques. A pre-trained Named Entity Recognition (NER) model is used to detect person names from unstructured text. Once identified, these names are anonymized by replacing them with the tag [REDACTED]. Such anonymization techniques are useful in privacy-sensitive domains where personal information must be protected before further data processing or analysis.

Short Documentation

In this project, Named Entity Recognition (NER) is used to identify personal names within the raw text data. Used a pre-trained BERT-based NER model available through the Hugging Face Transformers library. The model is fine-tuned on the CoNLL-2003 dataset, which supports entity types such as Person (PER), Organization (ORG), and Location (LOC).

The implementation steps:

1. Load the NER pipeline using the Transformers library.
2. Provide a sample input text.
3. Detect named entities present in the text.
4. Filter entities of type PERSON (PER).
5. Replace detected person names with the tag [REDACTED] using string manipulation.

This approach shows how machine learning models can be combined with simple text processing techniques to achieve data anonymization.

Sample Output / Screenshots

Input Text:

John signed the agreement on behalf of AlphaTech Solutions in Singapore.

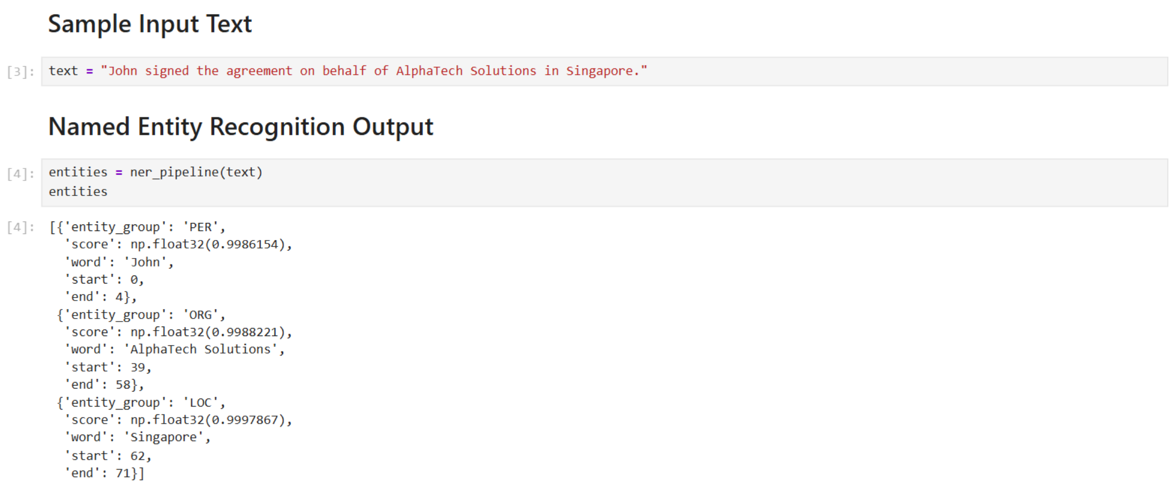
Detected Entity:

- John = PERSON

Anonymized Output:

[REDACTED] signed the agreement on behalf of AlphaTech Solutions in Singapore.

(Screenshots of the NER output and anonymized result are included.)



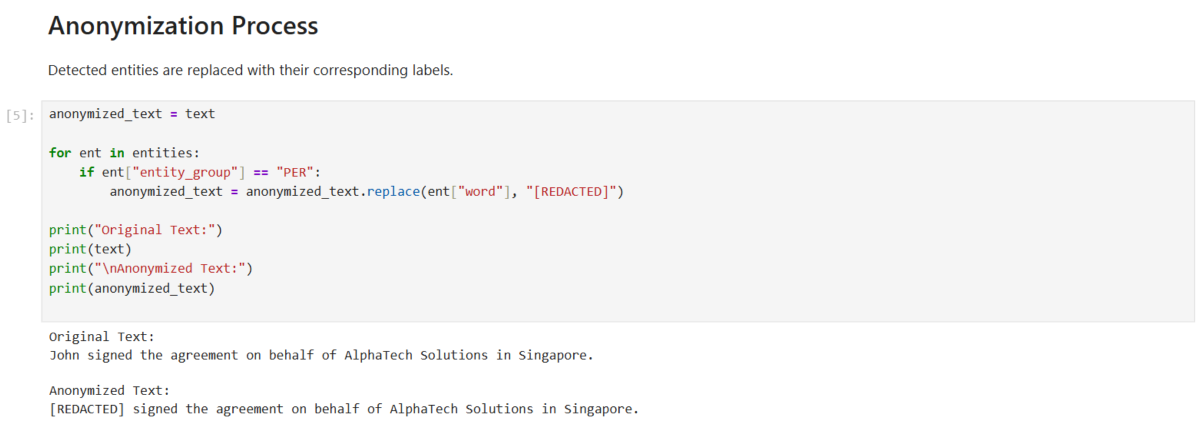
Sample Input Text

```
text = "John signed the agreement on behalf of AlphaTech Solutions in Singapore."
```

Named Entity Recognition Output

```
entities = ner_pipeline(text)
entities
```

```
[{'entity_group': 'PER',
  'score': np.float32(0.9986154),
  'word': 'John',
  'start': 0,
  'end': 4},
 {'entity_group': 'ORG',
  'score': np.float32(0.9988221),
  'word': 'AlphaTech Solutions',
  'start': 39,
  'end': 58},
 {'entity_group': 'LOC',
  'score': np.float32(0.9997867),
  'word': 'Singapore',
  'start': 62,
  'end': 71}]
```



Anonymization Process

Detected entities are replaced with their corresponding labels.

```
anonymized_text = text

for ent in entities:
    if ent["entity_group"] == "PER":
        anonymized_text = anonymized_text.replace(ent["word"], "[REDACTED]")

print("Original Text:")
print(text)
print("\nAnonymized Text:")
print(anonymized_text)
```

```
Original Text:
John signed the agreement on behalf of AlphaTech Solutions in Singapore.

Anonymized Text:
[REDACTED] signed the agreement on behalf of AlphaTech Solutions in Singapore.
```

GitHub Link:

https://github.com/PES2UG23CS336/Gen-AI.git