

# Automated Redaction

---

**MACHINE LEARNING TOOL FOR MASKING PERSONAL INFORMATION**

## **MENTOR**

DR SHILPA CHOUDHARY

## **BY G291**

Meghana Jakku  
Bandaru Somi  
B. Ruchira Reddy  
B. Mounika  
Chinmayi Thumma  
Manaswini .K

# INTRODUCTION

**Automated redaction** is a crucial technology for protecting sensitive information in various industries, particularly in **healthcare, legal, media and publishing** sectors. By leveraging advanced techniques like **natural language processing** (NLP) and **machine learning**, automated redaction enables the efficient identification and removal of confidential data from documents.

# PROBLEM STATEMENT

"**RE-DACT**" is a sophisticated machine learning-based redaction tool that ensures the secure handling of **sensitive information** across various formats, including text files, PDFs, CSVs, and Word documents. Utilizing advanced **natural language processing (NLP)**, deep learning models, and the **Pategan model** for generating synthetic text, it efficiently identifies and redacts sensitive data, such as **personal identifiers**, while preserving the structure and coherence of the original content. This enables enhanced privacy protection while maintaining the usability of the data.

# BUSINESS CASES

- Healthcare
- Legal Sector
- Financial Services
- Government
- Education
- Media & Publishing

	Stored Data	Redacted Display
Full	10/09/1992	01/01/2001
Partial	987-65-4328	XXX-XX-4328
RegExp	first.last@example.com	[hidden]@example.com
Random	5105105105105100	5500000000000004



Health Information Summary Report

**Health Information Summary**

PCC Pediatric Test Associates  
20 Winooski Falls Way, Suite 7  
Winooski, VT 05404-2228  
(800) 722-7708

Address: [REDACTED]

Date of Last Physical: 09/29/2014

Phone:  
Home Phone: [REDACTED]  
Work Phone: [REDACTED]  
Cell Phone: [REDACTED]  
Emg Phone: [REDACTED]

Problem	Onset Date	Status
[REDACTED]		Active
[REDACTED]		Active
[REDACTED]		Resolved

Allergy	Onset Date	Reaction	Status
---------	------------	----------	--------

भारतीय स्टेट बैंक  
State Bank Of India

New Delhi  
Kapil Bazar NH, 65 Ram Ghat  
Mahadev Road - 110025  
IFC CODE - SBIN0011256

केवल 3 महीने के लिए वैध / VALID FOR 3 MONTHS ONLY  
0 1 0 1 2 0 2 0  
D D M M Y Y Y Y

PAY **Teach Lane** को या उनके आदेश पर OR ORDER

रुपये RUPEES [REDACTED]

अदा करें ₹ **5000/-**

खा.सं.  
A/c No. [REDACTED] VALID FOR Rs. 100000/- & UNDER

Prefix :  
1515900002

**Here Signature** → [Signature]

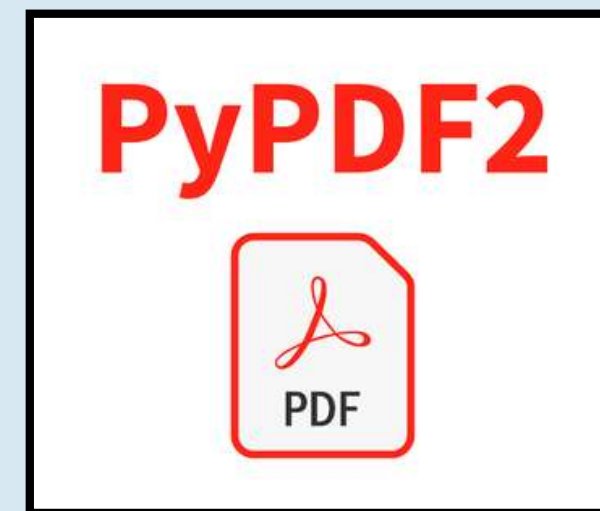
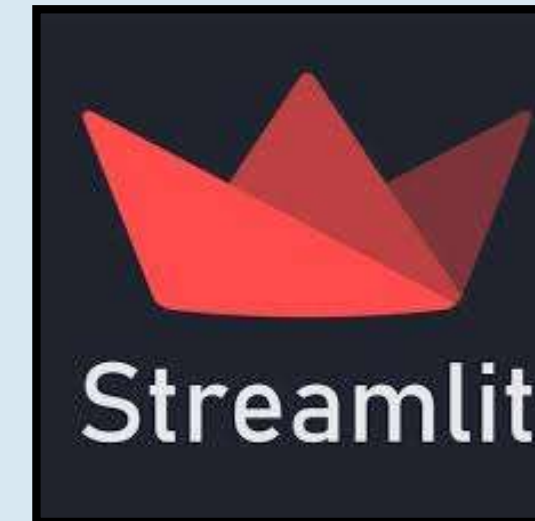
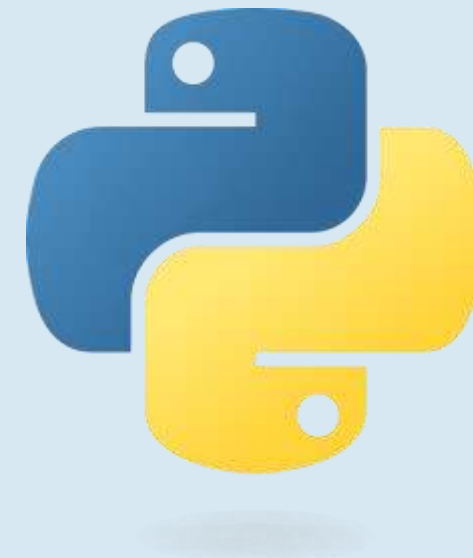
**Dipak Das**  
Please sign above

MULTI-CITY CHEQUE Payable at Par at All Branches of SBI

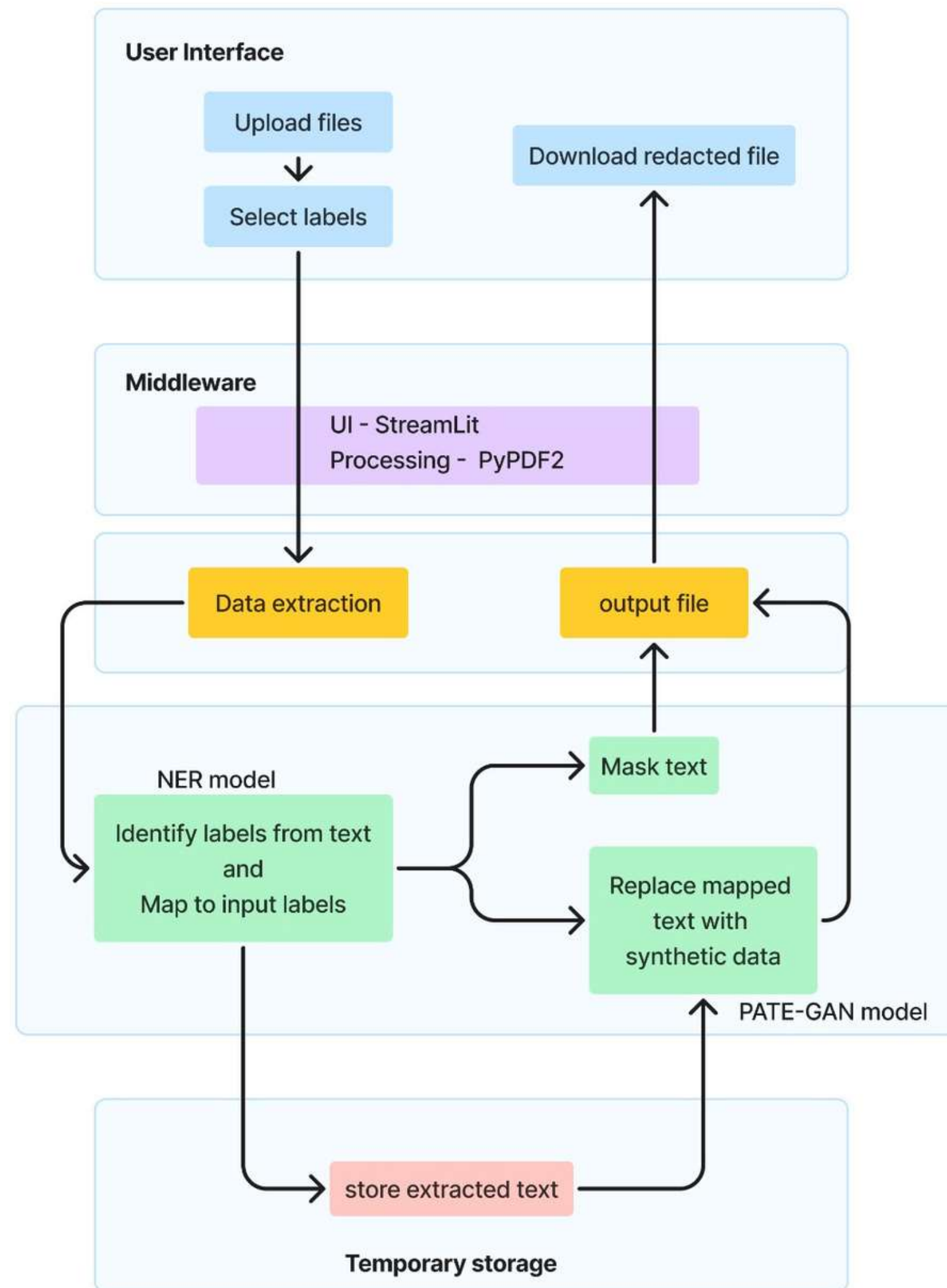


# TECHNOLOGY STACK

- Python
- DeBERTa model
- PATE-GAN
- TensorFlow
- PyPDF2
- Streamlit(UI)
- NumPy and Pandas
- Scikit-learn
- XGBoost



# ARCHITECTURE DIAGRAM

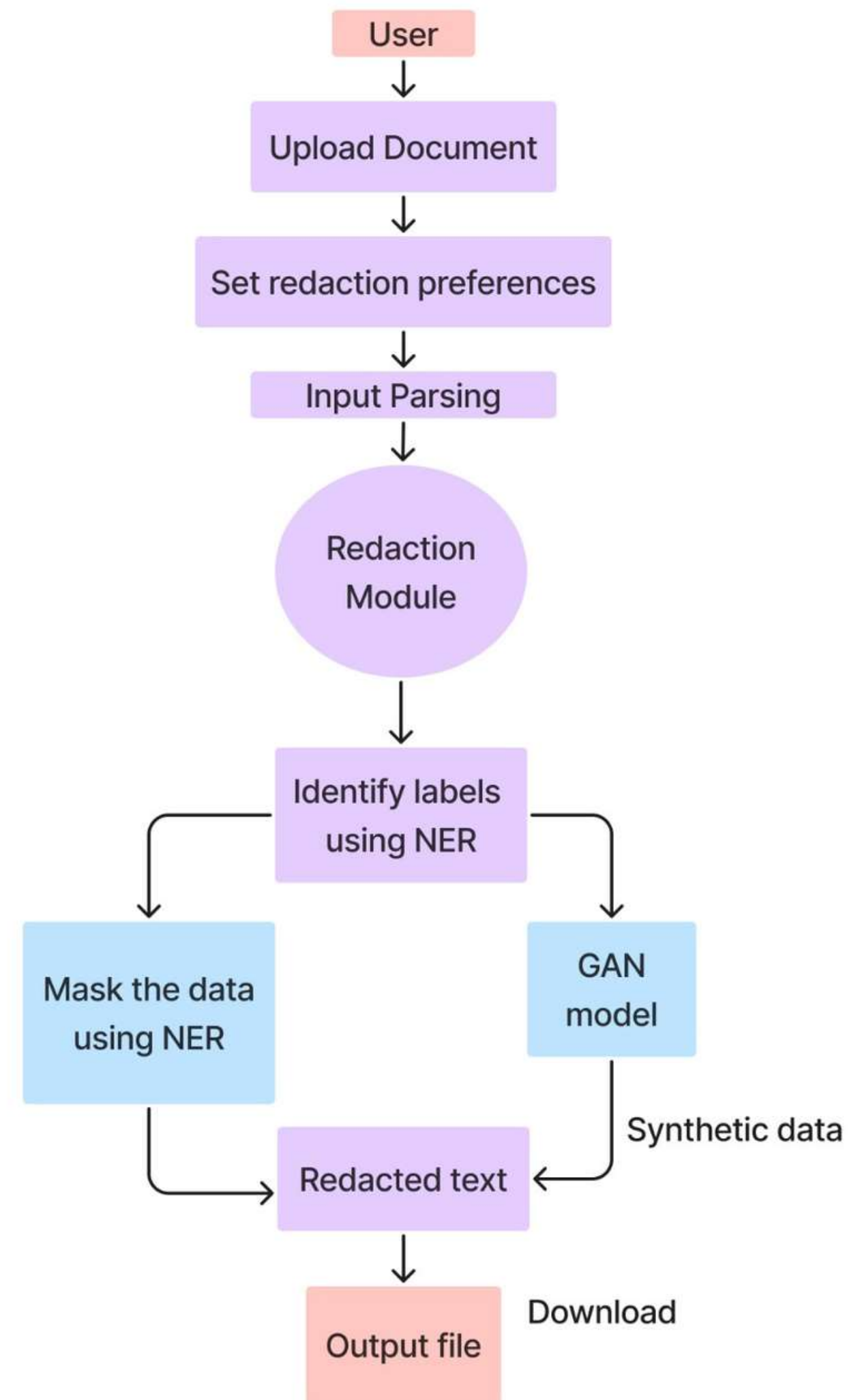


- **User Interface** : end user interaction
- **Middleware** : to process .txt, .docx,.pdf .csv files
- **Backend** : **NER** model for identifying and masking data and **PATE GAN** model for generating synthetic data.
- **Temporary Storage** :store details, uploaded and redacted files.

# DATA FLOW DIAGRAM

## **Redaction process:**

users upload a document, set redaction preferences, and parse input. The redaction module identifies sensitive data using NER, either masking it or generating synthetic data via a GAN model. The processed text is exported as an output file.





# USER INTERFACE

## Automated Sensitive Information Redaction

Easily redact sensitive information from PDF, TXT, DOCX, or CSV files.

Select labels to redact:

**all** ×

× ▼

Upload a file (PDF, TXT, DOCX, or CSV)

 Drag and drop file here  
Limit 200MB per file • PDF, TXT, DOCX, CSV

Browse files

## Extracting text from the uploaded file...

Extracted Text

PII Redaction Test Document

This document contains various types of Personally Identifiable Information for testing purposes. The data included should be redacted for privacy.

Name: John Doe

Phone: +1 (555) 123-4567

Email: john.doe@example.com

SSN: 123-45-6789

Address: 1234 Elm Street, Springfield, IL, 62704

Credit Card: 4111 1111 1111 1111

Bank Account: 987654321, Routing: 123456789

Please ensure all the above information is properly redacted in your production environment.

Page 1

Redact Text



# REDACTION RESULTS

PII Redaction Test Document

This document contains various types of Personally Identifiable Information (PII) for testing purposes. The data included should be redacted for privacy.

Name: John Doe

Phone: +1 (555) 123-4567

Email: john.doe@example.com

SSN: 123-45-6789

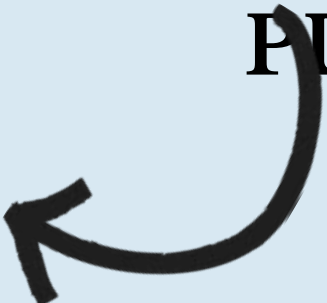
Address: 1234 Elm Street, Springfield, IL, 62704

Credit Card: 4111 1111 1111 1111

Bank Account: 987654321, Routing: 123456789

Please ensure all the above information is properly redacted in your process.

Original  
PDF



Masked output



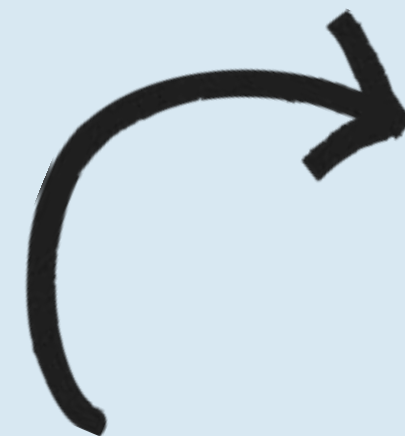
PII Redaction Test Document  
This document contains various types of Personally Identifiable Information (PII) for testing purposes. The data included should be redacted for privacy.  
Name:\*\*\*\*\*  
Phone:\*\*\*\*\*  
Email:\*\*\*\*\*.\*\*\*@example.com  
SSN:\*\*\*\*\*  
Address:\*\*\*\*\* , \*\*\*\*\* , IL, \*\*\*\*\*  
Credit Card:\*\*\*\*\*  
Bank Account:\*\*\*\*\* , Routing: 123456789  
Please ensure all the above information is properly redacted in your process.  
Page 1



original csv



```
original_data.csv X
wth > original_data.csv > data
1 I-ACCOUNTNUM,I-BUILDINGNUM,I-CITY,I-CREDITCARDNUMBER,I-DATEOFBIRTH,I-DRIVERLI
2 528660896,397,Sloanville,6177651577986454,1998-07-02,4247054087,lopezrussell@
3 983064405,46,Alvaradostad,4197064216116101,1982-10-30,1057391123,brianmiller@
4 118450730,871,Amandatown,1782625868747780,1946-12-28,2678800856,elizabethhans
5 618700177,69,Port Joe,5858292395107313,1987-08-14,1539286544,drakeeric@examp
6 977011862,142,Lindaburgh,4748670385801243,1951-06-05,2522958450,akirby@examp
7 268256468,890,Rickyhaven,3976361619231475,1963-01-15,8233018209,pbarrera@exan
8 141067066,163,Jenniferview,6280313904707292,1941-02-22,5029649776,codymartine
9 495876080,767,Snowbury,9107369627075931,2005-08-10,5998389428,riveraalexandr
10 744189398,294,Lake Michael,7327619842613925,1974-04-21,3322531918,juanbennett
11 739706291,932,East Ashley,8187633285335429,1981-02-23,1160309903,ypotter@exan
12 993427594,501,South Lauraborough,7621545697496753,1941-11-09,2748381818,heath
```



generated fake csv

```
original_data.csv synthetic_data.csv X
wth > synthetic_data.csv > data
1 I-ACCOUNTNUM,I-BUILDINGNUM,I-CITY,I-CREDITCARDNUMBER,I-DATEOFBIRTH,I-DRIVERLI
2 662581760,558,New Michael,5916441467420672,1971-01-01,4064091392,juangross@ex
3 607686336,636,Lisaburgh,4843755668504576,1965-01-29,5304020480,jefferybrooksc
4 624927872,434,Lauraview,6096698560479232,1958-03-27,5196331008,janet22@examp
5 533524608,447,Lake Lauraport,5619311871787008,1957-07-07,5413202432,joshuabur
6 477816736,431,Mosshaven,5740121248759808,1976-09-04,6690623488,linda80@examp
7 630778432,539,Lisaborough,5801944081760256,1954-12-22,5645399040,karen32@exa
8 680860672,568,New Amanda,4165428129562624,1965-07-26,5767621632,ncook@examp
9 657595648,549,Mirandaton,5181698190868480,1971-11-04,5628887552,katrina47@exa
10 717203840,506,New Amanda,5534961398448128,1960-08-02,5271602176,kgarner@examp
11 585210304,542,New Craig,5910844051292160,1972-06-16,4426420736,katelyn01@exa
12 698202368,558,New Connorfort,5563712446398464,1948-06-08,5554429440,kara77@ex
```



# CONCLUSION

To conclude, this project developed an automated redaction framework using NER models to identify and mask sensitive labels and PATE-GAN to generate synthetic data, ensuring data privacy. This approach enhances data security while maintaining usability. In the future, we aim to integrate PATE-GAN directly into the redaction process to replace sensitive text with synthetic data, preserving relationships and context within the text for enhanced usability.

**THANK YOU**