ML6 USE CASE

WELCOME

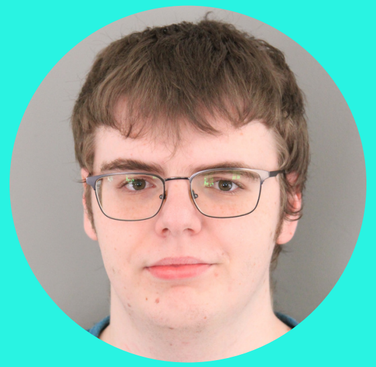
Text extraction from PDF to Json

THE TEAM

MARYAME

ALEX

MAARTEN



JONATHAN

SDS DOCUMENTATION

EKOS OD 1988

Main page Offer Data base About company Contact

SAFETY DATA SHEET - ANNEX II

SAFETY DATA SHEET (SDS)

The Annex II of EU Regulation (EC) No 1907/2006 (REACH) has mandated what information should and could be included in each section of the SDS. This annex II is ammended by the COMMISSION REGULATION (EU) No **2015/830** in May 2015.

All SDS shall meet the latest requirements of REACH regulation.

The Commission has adopted a Regulation amending the REACH Annexes relevant for SDS – Annex II and, to a lesser extent, Annex VI. The revision brings the SDS requirements into line with the Regulation on Classification, Labelling and Packaging (Regulation (EC) No 1272/2008) and with the guidance on the preparation of SDSs as laid down in the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) of the United Nations. A three column reference document compares Annex II as amended from 1 December 2010 onwards, with the relevant text of the GHS and with the original version of Annex II.

The safety data sheet shall include the following 16 headings

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.3. Details of the supplier of the safety data sheet

1.4. Emergency telephone number

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.2. Label elements

2.3. Other hazards

SECTION 3: Composition/information on ingredients

3.1. Substances

3.2. Mixtures

SECTION 4: First aid measures

```
dict_structure = {"SECTION 1: Identification of the substance":
                        {"1.1. Product identifier":"",
                         "1.2. Relevant identified uses of the substance or mixture and uses advis
                         "1.3. Details of the supplier of the safety data sheet":"",
                         "1.4. Emergency telephone number":""},
                  "SECTION 2: Hazards identification":
                        {"2.1. Classification of the substance or mixture":"",
                         "2.2. Label elements":"",
                         "2.3. Other hazards":""},
                  "SECTION 3: Composition/information on ingredients":
                        {"3.1. Substances":"",
                         "3.2. Mixtures":""},
                  "SECTION 4: First aid measures":
                        {"4.1. Description of first aid measures":"",
                         "4.2. Most important symptoms and effects, both acute and delayed":"",
                         "4.3. Indication of any immediate medical attention and special treatment
                  "SECTION 5: Firefighting measures":
                        {"5.1. Extinguishing media":"",
                         "5.2. Special hazards arising from the substance or mixture":"",
                         "5.3. Advice for firefighters":""},
```

WORKFLOW

PDF TEXT EXTRACTION

HEADERS SUBHEADERS CORPUS

PARSING REGEX

NESTED DICT JSON

PDFMINER

TEXTRACT

TIKA

REGEX

JSON

MAIN LIBRARIES USED

PIPELINE

TEXT EXTRACTION

```python
laparams = pdfminer.layout.LAParams()
setattr(laparams, 'all_texts', True)

def miner_extract_text_from_pdf(pdf_path):
    resource_manager = PDFResourceManager()
    fake_file_handle = io.StringIO()
    converter = TextConverter(resource_manager, fake_file_handle, laparams=laparams)
    page_interpreter = PDFPageInterpreter(resource_manager, converter)

    with open(pdf_path, 'rb') as fh:
        for page in PDFPage.get_pages(fh,
                                      caching=True,
                                      check_extractable=True):
            page_interpreter.process_page(page)

        text = fake_file_handle.getvalue()

    # close open handles
    converter.close()
    fake_file_handle.close()

    if text:
        return text
```

```python
from tika import parser

def tika_extract_text_from_pdf(pdf_path):
    # opening pdf file
    parsed_pdf = parser.from_file(pdf_path)
    # saving content of pdf
    # you can also bring text only, by parsed_pdf['text']
    # parsed_pdf['content'] #returns string
    text = parsed_pdf['content']

    if text:
        return text
```

OUTPUT

10N_Sodium_Hydroxide_(NaOH_40%)_(6)_(US)_EN_sds

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 02/09/2017 Reviewed on 02/09/2017

44.2.1

* 1 Identification
· Product Identifier
· Trade name: 10N Sodium Hydroxide (NaOH 40%)
· Product Number: NGT-10N NaOH
· Relevant identified uses of the substance or mixture and uses advised against:
No further relevant information available.

· Product Description PC21 Laboratory chemicals
· Application of the substance / the mixture: Laboratory chemicals
· Details of the Supplier of the Safety Data Sheet:
· Manufacturer/Supplier:
NuGeneration Technologies, LLC (dba NuGenTec)
1155 Park Avenue, Emeryville, CA 94608
salesteam@nugentec.com www.nugentec.com
1-888-996-8436 or 1-707-820-4080 for product information

· Emergency telephone number:
PERS Emergency Response: Domestic and Canada – 1-800-633-8253, International 1-801-629-0667

* 2 Hazard(s) Identification
· Classification of the substance or mixture:

d~ GHS05 Corrosion
Skin Corr. 1A H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· Label elements:
· GHS label elements
The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms:

SUBDIVISION AND PARSING

```python
import re

def FindOccurences(Text, RegularExpression):
    # Find all Occurences of SubString in text.
    # Return dict with begin and end position in Text for each occurence
    # If not found, returns empty dictionary
    count = 1
    Dict = {}
    for m in re.finditer(RegularExpression, Text, flags= re.MULTILINE | re.IGNORECASE):
        Dict[count] = (m.start(), m.end())
        count += 1

    return(Dict)
```

```
HeaderDict = { 0 : [""], \
               1 : ["SECTION 1: Identification of the substance", "1. PRODUCT AND COMPANY IDENTIFICA
               2 : ["SECTION 2: Hazards identification", "Hazards Identification", "2. HAZARDS IDENT
               3 : ["SECTION 3: Composition/information on ingredients", "3. COMPOSITION/INFORMATION
               4 : ["SECTION 4: First aid measures", "4. FIRST AID MEASURES", "4 First-Aid Measures'
               5 : ["SECTION 5: Firefighting measures", "5. FIRE-FIGHTING MEASURES", "5 Fire-Fightir
               6 : ["SECTION 6: Accidental release measures", "6. ACCIDENTAL RELEASE MEASURES", "6 A
               7 : ["SECTION 7: Handling and storage", "7. HANDLING AND STORAGE", "7 Handling and St
               8 : ["SECTION 8: Exposure controls/personal protection", "8. EXPOSURE CONTROLS/PERSON
               9 : ["SECTION 9: Physical and chemical properties", "9. PHYSICAL AND CHEMICAL PROPERT
               10 : ["SECTION 10: Stability and reactivity", "10. STABILITY AND REACTIVITY", "10 Sta
               11 : ["SECTION 11: Toxicological information", "11. TOXICOLOGICAL INFORMATION", "11 T
               12 : ["SECTION 12: Ecological information", "12. ECOLOGICAL INFORMATION", "12 Ecologi
               13 : ["SECTION 13: Disposal considerations", "13. DISPOSAL CONSIDERATIONS", "13 Dispo
               14 : ["SECTION 14: Transport information", "14. TRANSPORT INFORMATION", "14 Transport
               15 : ["SECTION 15: Regulatory information", "15. REGULATORY INFORMATION", "15 Regulat
               16 : ["SECTION 16: Other information", "16. OTHER INFORMATION", "16 Other Informatior
             }
```

REGEX

```
import re

regex1 = "^[^a-zA-Z\n]*?(SECTION)?[^\S\r\n]?(?<!\.)"
regex2 = "[^\S\r\n]?[.:-]?[^\S\r\n]*?(\w+[\s/]+)*?"

sections = {
    1: "(IDENTIFICATION|Identification|identification)",
    2: "(HAZARDS|Hazard\(s\)|INGREDIENTS)",
    3: "(COMPOSITION|INGREDIENTS|HAZARDS|Hazard\(s\))",
    4: "(First[\s-]aid)",
    5: "(Fire[\s-]*Fighting)",
    6: "(Accidental\sRelease)",
    7: "(Handling\sAnd\sStorage)",
    8: "(Exposure\s(Controls\s*)?[And|/]*\s*?Personal\s(Protection)*)",
    9: "(Physical\s(And|&)\sChemical\sProperties)",
    10: "(Stability\s(And|&)\sReactivity)",
    11: "(Toxicological\sInformation)",
    12: "(Ecological\sInformation)",
    13: "(Disposal\sConsiderations*)",
    14: "(Transport(ation)*\sInformation)",
    15: "(Regulatory\sInformation)",
    16: "(Other\sInformation)"
}
```

```
def GenerateHeaderRE(SectionNbr):
    # Output the Regular expression to search for the Section Headers of section SectionNbr.
    RE = regex1 + str(SectionNbr) + regex2 + f"{sections[SectionNbr]}"
    return(RE)
```

```
SubHeaderDict = { 0: {}, \
                  1: { 1 : ["Product identifier","1.1. Identification","PRODUCT NAME:","Product Nam
                       2 : ["Relevant identified uses of the substance or mixture and uses advised
                       3 : ["Details of the supplier of the safety data sheet","Supplier's details
                       4 : ["Emergency telephone number","Emergency","Emergency telephone\nnumber (
                     }, \
                  2: { 1 : ["Classification of the substance or mixture","Classification","Emergenc
                       2 : ["Label elements"], \
                       3 : ["Other hazards","Hazards not otherwise classified","Potential Health Ef
                     }, \
                  3: { 1 : ["Substances","components"], \
                       2 : ["Mixtures"] \
                     }, \
                  4: { 1 : ["Description of first aid measures","4.1. Description of first aid meas
                       2 : ["Most important symptoms and effects, both acute and delayed","Most imp
                       3 : ["Indication of any immediate medical attention and special treatment ne
                     }, \
                  5: { 1 : ["Extinguishing media","· Suitable extinguishing agents:"], \
                       2 : ["Special hazards arising from the substance or mixture","Hazardous Comb
                       3 : ["Advice for firefighters","Special protective actions \nfor fire-fighte
                     }, \
                  6: { 1 : ["Personal precautions, protective equipment and emergency procedures","
                       2 : ["Environmental precautions","Containment Procedures"], \
                       3 : ["Methods and material for containment and cleaning up","Clean-Up Proced
                       4 : ["Reference to other sections","Special Procedures"] \
                     }, \
                  7: { 1 : ["Precautions for safe handling","Handling"], \
                       2 : ["Conditions for safe storage, including any incompatibilities","Conditi
                       3 : ["Specific end use(s)","Specific end use\(s\)","Specific Use"] \
                     }, \
                  8: { 1 : ["Control parameters","Engineering Controls"], \
                       2 : ["Exposure controls","Substance Exposure Limits","Exposure Guidelines","
                       }, \
                  9: { 1 : ["Information on basic physical and chemical properties","Appearance"],
                       2 : ["Other information","Other safety information","NOTE:"] \
```

```python
from fuzzywuzzy import fuzz

def get_starting_section(first_header_pos, text):
    section = text[:first_header_pos]
    section_list = section.split("\n")
    return section_list

def RemovePageHeaders(FileText):
    # Clean the file text from headers
    # FileText: full text of PDF file
    # zero_section_list : list of all lines of the header, one line per list item

    # locate header on first page of PDF:
    AllHeaders = FindOccurences(FileText, GenerateHeaderRE(1))
    # Pageheader = all lines before first header:
    zero_section_list = get_starting_section(AllHeaders[1][0], FileText)

    CleanFile = ""

    for division in FileText.split("\n"):
        if not(division == ""):
            PageHeaderMatch = False
            for zero in zero_section_list:
                ratio = fuzz.token_sort_ratio(zero, division)
                if ratio >= 85: # match with header, skip line
                    PageHeaderMatch = True
                    break
            if not PageHeaderMatch:
                CleanFile += (division + "\n")

    return(CleanFile)
```

FUNCTIONS

```python
# Removing Extra Whitespaces

import re

def RemoveExtraSpaces(Text):
    """
    Return : string, text after removing duplicate whitespaces between words and leading and trailir
    Input : string, text to be cleaned
    Output : string
    """

    # Duplicate spaces and newlines between words:
    Pattern = r'\s+'
    SpaceRemoved = re.sub(pattern=Pattern, repl=" ", string=Text)

    #Remove leading and trailing whitespaces:

    return(SpaceRemoved.strip(" \n"))
```

```
def SortHeaders(HeaderIndexes):
    # indicate which is the order the headers occur in the text

    val = [item[0] for item in list(HeaderIndexes.values())]
    SortList = sorted(val)
    SortedHeaders = []
    for count in range(len(SortList)):
        for k,v in HeaderIndexes.items():
            if v[0] == SortList[count]:
                SortedHeaders.append(k)
                break;

    return(SortedHeaders)
```

```
def SubSectionsStr(SectionNbr, SectionText):
    # Split text of section SectionNbr from PDFSectionText into subsections
    # Correct order of subsections
    SubSectionTextDict = {}
    # Verify there is a section:
    if len(SectionText) < 8:
        return({})
    # Check if there are subsections:
    if SubHeaderDict[SectionNbr]:
        # Locate all Headers:
        HeaderIndexes = {}
        AllHeaders = {}
        # loop through all possible subheaders of the section:
        for sh in range(1,len(SubHeaderDict[SectionNbr])+1):    # indexing of subsections starts at
            # loop through all possible regular expressions for that subheader:
            for i in range(len(SubHeaderDict[SectionNbr][sh])):
                AllHeaders = FindOccurences(SectionText, SubHeaderDict[SectionNbr][sh][i])
                if AllHeaders:
                    HeaderIndexes[sh] = AllHeaders[1] # Assume first subheader occurence is the rig
        if not HeaderIndexes: # no sub headers found
            return({})
```

```
    # Subheaders found are not necessarily in sequential order in the text.
    # To allow for sequential cutting of the text body, sort the found headers
    HeaderOrder = SortHeaders(HeaderIndexes)
    # Determine begin and end position of each header:
    SectionIndexes = {}
    for SubSection in range(1,len(SubHeaderDict[SectionNbr])+1):
        # Subsection headers are optional, apply HeaderIndexes in order as in the text:
        SSlist = []
        for SubSection in HeaderOrder:
            SSlist.append(SubSection)
        if SSlist:
            if len(SSlist) == 1:
                SectionIndexes[SSlist[0]] = (HeaderIndexes[SSlist[0]][1] + 1, len(SectionText))
            else:
                for i in range(len(SSlist) - 1):
                    SectionIndexes[SSlist[i]] = (HeaderIndexes[SSlist[i]][1] + 1, HeaderIndexes
                SectionIndexes[SSlist[-1]] = (HeaderIndexes[SSlist[-1]][1] + 1, len(SectionText)
    # now switch to official section order again:
    if (SSlist):
        for SubSection in HeaderIndexes:
             SubSectionTextDict[SubSection] = ExtractText(SectionText, SectionIndexes[SubSectior
return(SubSectionTextDict)
```

```
def PDF2SubSections(PDFfile):
    # Convert a PDF file in a Dict of Sections
    # Locate all Headers:
    HeaderIndexes = {}
    AllHeaders = {}
    for Header in range(1,17):
        AllHeaders = FindOccurences(PDFfile, GenerateHeaderRE(Header))
        if AllHeaders:
            HeaderIndexes[Header] = AllHeaders[1]
            #VerifyOccurence(AllHeaders)
        else:
            print("\nHeader ", HeaderDict[Header], " not found")
            return(None)
    # Determine begin and end position of each header:
    SectionIndexes = {}
    SectionIndexes[0] = (0, HeaderIndexes[1][0] - 1)    # Section 0 is to contain PDF file intro
    for Section in range(1,16):
        SectionIndexes[Section] = (HeaderIndexes[Section][1] + 1, HeaderIndexes[Section + 1][0] - 1)
    SectionIndexes[16] = (HeaderIndexes[16][1] + 1, len(PDFfile) )
    # Extract the text of each section:
    SectionTextDict = {}
    for Section in range(0,17):
        Hlp = ExtractText(PDFfile, SectionIndexes[Section][0], SectionIndexes[Section][1])
        SubS = SubSectionsStr(Section, Hlp)
        if (SubS):
            SectionTextDict[Section] = SubS
        else: # no subsections
            SectionTextDict[Section] = Hlp
    return(SectionTextDict)
```

```python
import sys

def PrintSubSections(SubSectionDict, FileName = None):
    # Print out the PDF converted to Dictionary
    # If FileName given, will to write to that file, otherwise on screen display.
    if FileName:
        original_stdout = sys.stdout # Save a reference to the original standard output
        f = open(FileName, 'w')
        sys.stdout = f # Change the standard output to the file we created.
    for Section in range(0,17):
        print("==============\nSection ", Section, ": ", HeaderDict[Section][0], "\n==============\n
        if SubHeaderDict[Section]:
            if isinstance(SubSectionDict[Section], str):
                print(SubSectionDict[Section])
            elif isinstance(SubSectionDict[Section], dict):
                for sh in SubSectionDict[Section]:
                    print("-------------\nSubSection ", sh, ": ", SubHeaderDict[Section][sh][0], "\n
                    print(SubSectionDict[Section][sh])
        else:
            if SubSectionDict[Section]:
                print(SubSectionDict[Section])
    if FileName:
        sys.stdout = original_stdout # Reset the standard output to its original value

    return(None)
```

```
InputFile = './data/10N_Sodium_Hydroxide_NaOH_40_6_US_EN_sds (1).pdf'
PDFtext = tika_extract_text_from_pdf(InputFile)
SubSdict = PDF2SubSections(PDFtext)
PrintSubSections(SubSdict)
```

```
==============
Section  1 :  SECTION 1: Identification of the substance
==============

-------------
SubSection  1 :  Product identifier
-------------

· Trade name: 10N Sodium Hydroxide (NaOH 40%)
· Product Number: NGT-10N NaOH
·
-------------
SubSection  2 :  Relevant identified uses of the substance or mixture and uses advised against
-------------


No further relevant information available.

· Product Description PC21   Laboratory chemicals
· Application of the substance / the mixture: Laboratory chemicals
·
-------------
SubSection  3 :  Details of the supplier of the safety data sheet
-------------


· Manufacturer/Supplier:
NuGeneration Technologies, LLC (dba NuGenTec)
1155 Park Avenue, Emeryville, CA 94608
salesteam@nugentec.com www.nugentec.com
1-888-996-8436 or 1-707-820-4080 for product information

·
-------------
SubSection  4 :  Emergency telephone number
-------------

telephone number:
PERS Emergency Response: Domestic and Canada - 1-800-633-8253, International 1-801-629-0667
```

OUTPUT

JSON

```
# Create a template dictionary based on the SDS standard:
# Top level
SDSTemplate = {  \
              "identification" : {"product_identifier" : "", \
                                  "uses" : "", \
                                  "supplier_details" : "", \
                                  "emergency_telephone_number" : "" \
                                 }, \
              "hazards" :  {"classification" : "", \
                            "label" : "", \
                            "other" : "" \
                           }, \
              "ingredients" : {"substances" : "", \
                               "mixtures" : "" \
                              }, \
              "First-Aid" : {"measures" : "", \
                             "symptoms" : "", \
                             "treatment" : "", \
                            }, \
              "Firefighting" : {"extinguishing_media" : "", \
                                "special_hazards" : "", \
                                "advice" : "" \
                               }, \
              "Accidents" : {"procedures" : "", \
                             "environmental_precautions" : "", \
                             "containment_and_cleaning" : "", \
                             "section_reference" : "", \
                            }, \
              "Handling" :  {"precautions" : "", \
                             "safe_storage" : "", \
                             "specific_end_use" : "", \
```

```
def CreateJSONdict(InDict):
    # Create a dictionary with values according to the template:
    #InDict is the processed dictionary, with heading numbers as keys
    OutputDict = SDSTemplate.copy()
    TopCount = 1
    for kt in OutputDict.keys():
        if TopCount in InDict.keys():
            #print(kt, ":", TopCount)
            if isinstance(InDict[TopCount], str):
                OutputDict[kt] = InDict[TopCount]
            else:
                SubCount = 1
                for ks in OutputDict[kt].keys():
                    #print("\t", ks, ":", SubCount)
                    if SubCount in InDict[TopCount].keys():
                        OutputDict[kt][ks] = InDict[TopCount][SubCount]
                    else:
                        OutputDict[kt][ks] = ""
                    SubCount += 1
        TopCount += 1

    return(OutputDict)
```

```python
import json

def write_json(dictionary, filename):

    JsonDict = CreateJSONdict(dictionary)

    with open(filename, "w") as outfile:
        json.dump(JsonDict, outfile, indent=4)

    return(JsonDict)
```

OUTPUT

```
json_dict = write_json(SubSdict, 'json_out.txt')
```

```
json_dict
```


```
{'identification': {'product_identifier': '· Trade name: 10N Sodium Hydroxide (NaOH 40%) · Product Number: NGT-10N NaOH ·',
  'uses': 'No further relevant information available. · Product Description PC21 Laboratory chemicals · Application of the su
bstance / the mixture: Laboratory chemicals ·',
  'supplier_details': '· Manufacturer/Supplier: NuGeneration Technologies, LLC (dba NuGenTec) 1155 Park Avenue, Emeryville, C
A 94608 salesteam@nugentec.com www.nugentec.com 1-888-996-8436 or 1-707-820-4080 for product information ·',
  'emergency_telephone_number': 'telephone number: PERS Emergency Response: Domestic and Canada - 1-800-633-8253, Internation
al 1-801-629-0667'},
 'hazards': {'classification': 'of the substance or mixture: d~\uf082 GHS05 Corrosion Skin Corr. 1A H314 Causes severe skin b
urns and eye damage. Eye Dam. 1 H318 Causes serious eye damage. ·',
  'label': '· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS). · H
azard pictograms: d~\uf082 GHS05 · Signal word: Danger · Hazard-determining components of labeling: Sodium Hydroxide · Hazard
statements: H314 Causes severe skin burns and eye damage. · Precautionary statements: P260 Do not breathe dusts or mists. P28
0 Wear protective gloves/protective clothing/eye protection/face protection. P264 Wash thoroughly after handling. P303+P361+P
353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. P305+P351+P338 If in
eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (C
ontd. on page 2) US Page 2/11 Safety Data Sheet (SDS) OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03. Issue date 02/
09/2017 Reviewed on 02/09/2017 Trade name: 10N Sodium Hydroxide (NaOH 40%) 44.2.1 P310 Immediately call a POISON CENTER/docto
r. P321 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet). P304+P340 IF INHALED: Remove
person to fresh air and keep comfortable for breathing. P363 Wash contaminated clothing before reuse. P301+P330+P331 If swall
owed: Rinse mouth. Do NOT induce vomiting. P405 Store locked up. P501 Dispose of contents/container in accordance with local/
regional/national/ international regulations. · Unknown acute toxicity: This value refers to knowledge of known, established
toxicological or ecotoxicological values. 0 % of the mixture consists of component(s) of unknown toxicity. · Classification s
ystem: NFPA/HMIS Definitions: 0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme · NFPA ratings (scale 0 - 4) 3 0 0 Health = 3
```

BATCH

```python
# PDFminer based
# Only top level  - TODO sublevel

import os

def MinerProcessAllPDFs(Directory):
    # Converts to sections all PDF files in Directory

    # test for existence of JSON subdirectory, otherwise create it
    if not os.path.isdir(Directory + '/JSON'):
        os.makedirs(Directory + '/JSON')

    for filename in os.listdir(Directory):
        if filename.endswith(".pdf"):
            print(f"\n=========================================================\nFile: {filename}\n====
            PDFtext = miner_extract_text_from_pdf(Directory + '/' + filename)
            CleanedFile = RemovePageHeaders(PDFtext)
            PDFSectionsText = PDF2SubSections(CleanedFile)
            PrintSections(PDFSectionsText)
            write_json(PDFSectionsText, Directory + '/' + 'JSON/' + filename + '.json')

    return(None)
```

```python
# Tika based
# Top level + Sublevel

import os

def TikaProcessAllPDFs(Directory):
    # Converts to sections all PDF files in Directory

    # test for existence of JSON subdirectory, otherwise create it
    if not os.path.isdir(Directory + '/JSON'):
        os.makedirs(Directory + '/JSON')

    for filename in os.listdir(Directory):
        if filename.endswith(".pdf"):
            print(f"\n=========================================================\nFile: {filename}\n====
            PDFtext = tika_extract_text_from_pdf(Directory + '/' + filename)
            CleanedFile = RemovePageHeaders(PDFtext)
            PDFSectionsText = PDF2SubSections(CleanedFile)
            PrintSubSections(PDFSectionsText)
            write_json(PDFSectionsText, Directory + '/' + 'JSON/' + filename + '.json')

    return(None)
```

ADD ONS & IDEAS

KEY VALUE PAIRS UNDER SUBHEADERS

- NLP ON CORPUS
- SCIENTIFIC NOTATION OF CHEMICALS (SDSPARSER)

TABLE STRUCTURE

- XML FORMAT, RECONSTRUCTION TABLE KEY-VALUE

ONTOLOGY

HAZARD PICTOGRAMS (PDFBOX)

Alexey Shigarov, Andrey Mikhailov, Andrey Altaev: "Configurable Table Structure Recognition in Untagged PDF Documents"

Martha O. Perez-Arriaga, Trilce Estrada, and Soraya Abad-Mota : "TAO: System for Table Detection and Extraction from PDF Documents"

ADD ONS & IDEAS

KEY VALUE PAIRS UNDER SUBHEADERS

- NLP ON CORPUS
- SCIENTIFIC NOTATION OF CHEMICALS (SDSPARSER)

TABLE STRUCTURE

- XML FORMAT, RECONSTRUCTION TABLE KEY-VALUE

ONTOLOGY

HAZARD PICTOGRAMS (PDFBOX)

Kobkaew Opasjumruskit, Sirko Schindler, Laura Thiele, Philipp Matthias Schäfer: Towards Learning from User Feedback for Ontology-based Information Extraction

Kobkaew Opasjumruskit : "Automatic Enrichment of Ontology for Engineering Design Process"

ADD ONS & IDEAS

KEY VALUE PAIRS UNDER SUBHEADERS

- NLP ON CORPUS
- SCIENTIFIC NOTATION OF CHEMICALS (SDSPARSER)

TABLE STRUCTURE

- XML FORMAT, RECONSTRUCTION TABLE KEY-VALUE

ONTOLOGY

HAZARD PICTOGRAMS (PDFBOX)


```
import pdfbox

p = pdfbox.PDFBox()
```

```
p
```

```
<pdfbox.PDFBox at 0x7fa80809fbe0>
```

```
InputFile = 'data/gylcol-ether-dpm-sds.pdf'
```

```
# extracts images embedded in the PDF file as .png files
p.extract_images(InputFile) # writes images to /path/to/my_file-1.png, /path/to/my_file-2.png, etc.
```

```
#text extraction, in html format:
p.extract_text(InputFile, '-html')    # writes text to /path/to/my_file.txt, i.e. strips the extentic
```

FLAWS

CLEAN OUTPUT

- further removal of junk content
- mixed corpus
- still anomaly sensitive

PAGE HEADER AND FOOTER

- occasionally missed

PDF STRUCTURE FLEXIBILITY

- columns
- repetitions
- order of subheaders
- PDF types

THANKS

HTTPS://GITHUB.COM/JONATHANME658/PDF-INFO-EXTRACTION