
tabula-py

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Feb 22, 2023

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tabula-py is a simple Python wrapper of [tabula-java](#), which can read table of PDF. You can read tables from PDF and convert them into pandas' DataFrame. tabula-py also converts a PDF file into CSV/TSV/JSON file.

We highly recommend looking at [the example notebook](#) and trying it on [Google Colab](#).

For high-level API reference, see [High level interfaces](#).

GETTING STARTED

1.1 Requirements

- Java
 - Java 8+
- Python
 - 3.8+

1.2 Installation

Before installing tabula-py, ensure you have Java runtime on your environment.

You can install tabula-py from PyPI with pip command.

```
pip install tabula-py
```

Note: conda recipe on conda-forge is not maintained by us. We recommend installing via pip to use the latest version of tabula-py.

1.2.1 Get tabula-py working (Windows 10)

This instruction is originally written by @lahoffm. Thanks!

- If you don't have it already, install [Java](#)
- Try to run an example code (replace the appropriate PDF file name).
- If there's a `FileNotFoundError` when it calls `read_pdf()`, and when you type `java` on command line it says '`java`' is not recognized as an internal or external command, operable program or batch file, you should set `PATH` environment variable to point to the Java directory.
- Find the main Java folder like `jre...` or `jdk...`. On Windows 10 it was under `C:\Program Files\Java`
- On Windows 10: **Control Panel** -> **System and Security** -> **System** -> **Advanced System Settings** -> **Environment Variables** -> Select **PATH** -> **Edit**
- Add the bin folder like `C:\Program Files\Java\jre1.8.0_144\bin`, hit OK a bunch of times.
- On command line, `java` should now print a list of options, and `tabula.read_pdf()` should run.

1.3 Example

tabula-py enables you to extract tables from a PDF into a DataFrame, or a JSON. It can also extract tables from a PDF and save the file as a CSV, a TSV, or a JSON.

```
import tabula

# Read pdf into a list of DataFrame
dfs = tabula.read_pdf("test.pdf", pages='all')

# Read remote pdf into a list of DataFrame
dfs2 = tabula.read_pdf("https://github.com/tabulapdf/tabula-java/raw/master/src/test/
↳resources/technology/tabula/arabic.pdf")

# convert PDF into CSV
tabula.convert_into("test.pdf", "output.csv", output_format="csv", pages='all')

# convert all PDFs in a directory
tabula.convert_into_by_batch("input_directory", output_format='csv', pages='all')
```

See [example notebook](#) for more detail. I also recommend reading the [tutorial article](#) written by [@aegis4048](#) and another [tutorial](#) written by [@tdpetrou](#).

Note: If you face some issues, we'd recommend trying [tabula.app](#) to see the limitation of tabula-java. Also, see [FAQ](#) as well.

2.1 tabula-py does not work

There are several possible reasons, but `tabula-py` is just a wrapper of `tabula-java`, make sure you've installed Java, and you can use `java` command on your terminal. Many issue reporters forget to set `PATH` for `java` command.

You can check whether `tabula-py` can call `java` from the Python process with `tabula.environment_info()` function.

2.2 I can't run from `tabula import read_pdf`

If you've installed `tabula`, it will conflict with the namespace. You should install `tabula-py` after removing `tabula`.

```
pip uninstall tabula
pip install tabula-py
```

2.3 I got an empty DataFrame. How can I resolve it?

`tabula-py` and `tabula-java` don't support image-based PDFs. It should contain text-based table information.

Before tuning the `tabula-py` option, you have to check you set an appropriate `pages` option. By default, `tabula-py` extracts tables from the first page of your PDF, with `pages=1` argument. If you want to extract from all pages, you need to set `pages` option like `pages="all"` or `pages=[1, 2, 3]`. You might want to extract multiple tables from multiple pages, if so you need to set `multiple_tables=True` together.

Depending on the PDF's complexity, it might be difficult to extract table contents accurately.

Tuning points of `tabula-py` are limited:

- Set specific area for accurate table detection
- Try `lattice=True` option for the table having explicit lines. Or try `stream=True` option

To know the limitation of `tabula-java`, I highly recommend using `tabula app`, the GUI version of `tabula-java`.

`tabula app` can:

- specify the area with GUI
- show a preview of the extraction with `lattice` or `stream` mode
- export template that is reusable for `tabula-py`

Even if you can't extract tabula-py for those table contents which can be extracted tabula app appropriately, file an issue on GitHub.

2.4 The result is different from tabula-java. Or, stream option seems not to work appropriately

tabula-py set guess option True by default, for beginners. It is known to make a conflict between stream option. If you feel something strange with your result, please set guess=False.

2.5 Can I use option xxx?

Yes. You can use options argument as follows. The format is the same as CLI of tabula-java.

```
read_pdf(file_path, options="--columns 10.1,20.2,30.3")
```

2.6 How can I ignore useless area?

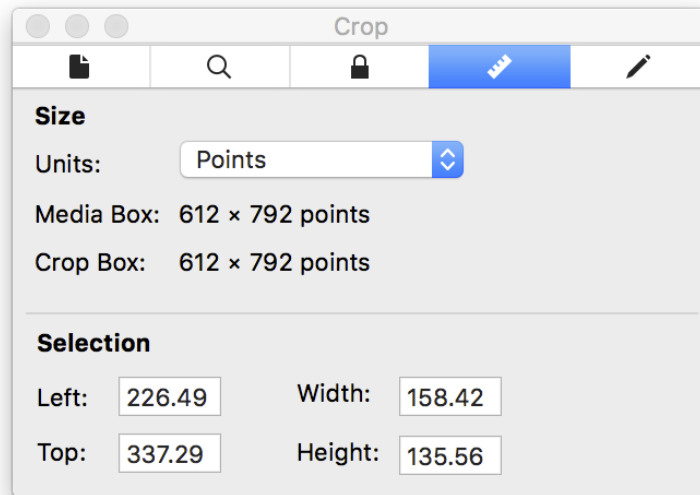
In short, you can extract with area and spreadsheet options.

```
In [4]: tabula.read_pdf('./table.pdf', spreadsheet=True, area=(337.29, 226.49, 472.85, 384.91))
Picked up JAVA_TOOL_OPTIONS: -Dfile.encoding=UTF-8
Out[4]:
  Unnamed: 0 Col2 Col3 Col4 Col5
0          A   B   12   R   G
1         NaN   R   T   23   H
2          B   B   33   R   A
3          C   T   99   E   M
4          D   I   12   34   M
5          E   I   I   W   90
6         NaN   1   2   W   h
7         NaN   4   3   E   H
8          F   E   E4   R   4
```

2.6.1 How to use area option

According to tabula-java wiki, there is an explanation of how to specify the area: <https://github.com/tabulapdf/tabula-java/wiki/Using-the-command-line-tabula-extractor-tool#grab-coordinates-of-the-table-you-want>

For example, using macOS's preview, I got area information of this PDF:



This is the header of the table				
Col1	Col2	Col3	Col4	Col5
A	B	12	R	G
	R	T	23	H
B	B	33	R	A
C	T	99	E	M
D	I	12	34	M
E	I	I	W	90
	1	2	W	h
	4	3	E	H
F	E	E4	R	4
G	3	D	R	4

```
java -jar ./target/tabula-1.0.1-jar-with-dependencies.jar -p all -a $y1,$x1,$y2,$x2 -o
→$csvfile $filename
```

given

```
# Note the left, top, height, and width parameters and calculate the following:
```

```
y1 = top
```

(continues on next page)

```
x1 = left
y2 = top + height
x2 = left + width
```

I confirmed with tabula-java:

```
java -jar ./tabula/tabula-1.0.1-jar-with-dependencies.jar -a "337.29,226.49,472.85,384.91" -r "table.pdf"
```

Without `-r`(same as `--spreadsheet`) option, it does not work properly.

2.7 I faced ParserError: Error tokenizing data. C error. How can I extract multiple tables?

This error occurs when pandas tries to extract multiple tables with different column size at once. Use `multiple_tables` option, then you can avoid this error.

2.8 I want to prevent tabula-py from stealing focus on every call on my mac

Set `java_options=["-Djava.awt.headless=true"]`. kudos @jakekara

2.9 I got ? character with results on Windows. How can I avoid it?

If the encoding of PDF is UTF-8, you should set `chcp 65001` on your terminal before launching a Python process.

```
chcp 65001
```

Then you can extract UTF-8 PDF with `java_options="-Dfile.encoding=UTF8"` option. This option will be added with `encoding='utf-8'` option, which is also set by default.

```
# This is an example for java_options is set explicitly
df = read_pdf(file_path, java_options="-Dfile.encoding=UTF8")
```

Replace `65001` and `UTF-8` appropriately, if the file encoding isn't UTF-8.

2.10 I can't extract file/directory names with space on Windows

You should escape the file/directory name yourself.

2.11 I want to use a different tabula .jar file

You can specify the jar location via environment variable

```
export TABULA_JAR="../../../tabula-x.y.z-jar-with-dependencies.jar"
```

2.12 I want to extract multiple tables from a document

You can use the following example code

```
df = read_pdf(file_path, multiple_tables=True)
```

The result will be a list of DataFrames. If you want separate tables across all pages in a document, use the `pages` argument.

2.13 Table cell contents sometimes overflow into the next row.

You can try using `lattice=True`, which will often work if there are lines separating cells in the table.

2.14 I got a warning/error message from PDFBox including `org.apache.pdfbox.pdmodel`. Is it the cause of the empty dataframe?

No.

Sometimes, you might see a message like `` Jul 17, 2019 10:21:25 AM org.apache.pdfbox.pdmodel.font.PDType1Font WARNING: Using fallback font NimbusSanL-Regu for Univers. Nothing was parsed from this one.`` This error message came from Apache PDFBox which is used under tabula-java, and this is caused by the PDF itself. Neither tabula-py nor tabula-java can't handle the warning itself, except for the silent option that suppresses the warning.

2.15 I can't figure out accurate extraction with tabula-py. Are there any similar Python libraries?

I know tabula-py has limitations depending on tabula-java. Sometimes your PDF is too complex to tabula-py. If you want to find plan B, there are similar packages as the following:

- <https://github.com/jsvine/pdfplumber>
- <https://camelot-py.readthedocs.io/en/master/>

CONTRIBUTING TO TABULA-PY

Interested in helping out? I'd love to have your help!

You can help by:

- [Reporting a bug](#).
- Adding or editing documentation.
- Contributing code via a Pull Request.
- Write a blog post or spread the word about `tabula-py` to people who might be able to benefit from using it.

3.1 Code formatting and testing

If you want to become a contributor, you can install dependency after cloning the repo as follows:

```
pip install -e .[dev, test]
pip install nox
```

For running tests and linter, run nox command.

```
nox .
```

3.2 Documentation

You can build document on your environment as follows:

```
pip install -e .[doc]
cd docs && make html
```

The documentation source is under `docs/` directory and the document is published on Read the Docs automatically.

4.1 High level interfaces

4.1.1 tabula.io

This module is a wrapper of tabula, which enables table extraction from a PDF.

This module extracts tables from a PDF into a pandas DataFrame. Currently, the implementation of this module uses subprocess.

Instead of importing this module, you can import public interfaces such as `read_pdf()`, `read_pdf_with_template()`, `convert_into()`, `convert_into_by_batch()` from `tabula` module directory.

Note: If you want to use your own tabula-java JAR file, set `TABULA_JAR` to environment variable for JAR path.

Example

```
>>> import tabula
>>> df = tabula.read_pdf("/path/to/sample.pdf", pages="all")
```

```
tabula.io.convert_into(input_path: IO | str | PathLike, output_path: str, output_format: str = 'csv',
                       java_options: List[str] | None = None, pages: str | int | Iterable[int] | None = None,
                       guess: bool = True, area: Iterable[float] | Iterable[Iterable[float]] | None = None,
                       relative_area: bool = False, lattice: bool = False, stream: bool = False, password: str
                       | None = None, silent: bool | None = None, columns: Iterable[float] | None = None,
                       relative_columns: bool = False, format: str | None = None, batch: str | None = None,
                       options: str = "") → None
```

Convert tables from PDF into a file. Output file will be saved into `output_path`.

Parameters

- **input_path** (*file like obj*) – File like object of target PDF file.
- **output_path** (*str*) – File path of output file.
- **output_format** (*str, optional*) – Output format of this function (csv, json or tsv).
Default: csv
- **java_options** (*list, optional*) – Set java options

Example

```
"-Xmx256m".
```

- **pages** (*str*, *int*, *iterable of int*, *optional*) – An optional values specifying pages to extract from. It allows *str*, *int*, *iterable of :int*. Default: *1*

Examples

```
'1-2,3', 'all', [1,2]
```

- **guess** (*bool*, *optional*) – Guess the portion of the page to analyze per page. Default *True* If you use “area” option, this option becomes *False*.

Note: As of tabula-java 1.0.3, guess option becomes independent from lattice and stream option, you can use guess and lattice/stream option at the same time.

- **area** (*iterable of float*, *iterable of iterable of float*, *optional*) – Portion of the page to analyze (top, left, bottom, right). Default is entire page.

Note: If you want to use multiple area options and extract in one table, it should be better to set `multiple_tables=False` for `read_pdf()`

Examples

```
[269.875, 12.75, 790.5, 561], [[12.1, 20.5, 30.1, 50.2], [1.0, 3.2, 10.5, 40.2]]
```

- **relative_area** (*bool*, *optional*) – If all area values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual height or width of the page. Default *False*.
- **lattice** (*bool*, *optional*) – Force PDF to be extracted using lattice-mode extraction (if there are ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **stream** (*bool*, *optional*) – Force PDF to be extracted using stream-mode extraction (if there are no ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **password** (*str*, *optional*) – Password to decrypt document. Default: empty
- **silent** (*bool*, *optional*) – Suppress all stderr output.
- **columns** (*iterable*, *optional*) – X coordinates of column boundaries.

Example

```
[10.1, 20.2, 30.3]
```

- **format** (*str*, *optional*) – Format for output file or extracted object. ("CSV", "TSV", "JSON")
- **batch** (*str*, *optional*) – Convert all PDF files in the provided directory. This argument should be directory path.
- **options** (*str*, *optional*) – Raw option string for tabula-java.

Raises

- **FileNotFoundError** – If downloaded remote file doesn't exist.
- **ValueError** – If output_format is unknown format, or if downloaded remote file size is 0.
- **tabula.errors.JavaNotFoundError** – If java is not installed or found.
- **subprocess.CalledProcessError** – If tabula-java execution failed.

```
tabula.io.convert_into_by_batch(input_dir: str, output_format: str = 'csv', java_options: List[str] | None = None, pages: str | int | Iterable[int] | None = None, guess: bool = True, area: Iterable[float] | Iterable[Iterable[float]] | None = None, relative_area: bool = False, lattice: bool = False, stream: bool = False, password: str | None = None, silent: bool | None = None, columns: Iterable[float] | None = None, relative_columns: bool = False, format: str | None = None, output_path: str | None = None, options: str = "") → None
```

Convert tables from PDFs in a directory.

Parameters

- **input_dir** (*str*) – Directory path.
- **output_format** (*str*, *optional*) – Output format of this function (csv, json or tsv)
- **java_options** (*list*, *optional*) – Set java options like *-Xmx256m*.
- **pages** (*str*, *int*, *iterable of int*, *optional*) – An optional values specifying pages to extract from. It allows *str`int`*, *iterable of :int*. Default: *1*

Examples

```
'1-2,3', 'all', [1,2]
```

- **guess** (*bool*, *optional*) – Guess the portion of the page to analyze per page. Default *True* If you use “area” option, this option becomes *False*.

Note: As of tabula-java 1.0.3, guess option becomes independent from lattice and stream option, you can use guess and lattice/stream option at the same time.

- **area** (*iterable of float*, *iterable of iterable of float*, *optional*) – Portion of the page to analyze(top,left,bottom,right). Default is entire page.

Note: If you want to use multiple area options and extract in one table, it should be better to set `multiple_tables=False` for [read_pdf\(\)](#)

Examples

```
[269.875, 12.75, 790.5, 561], [[12.1, 20.5, 30.1, 50.2], [1.0, 3.2, 10.5, 40.2]]
```

- **relative_area** (*bool, optional*) – If all area values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual height or width of the page. Default False.
- **lattice** (*bool, optional*) – Force PDF to be extracted using lattice-mode extraction (if there are ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **stream** (*bool, optional*) – Force PDF to be extracted using stream-mode extraction (if there are no ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **password** (*str, optional*) – Password to decrypt document. Default: empty
- **silent** (*bool, optional*) – Suppress all stderr output.
- **columns** (*iterable, optional*) – X coordinates of column boundaries.

Example

```
[10.1, 20.2, 30.3]
```

- **relative_columns** (*bool, optional*) – If all values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual width of the page. Default False.
- **format** (*str, optional*) – Format for output file or extracted object. ("CSV", "TSV", "JSON")
- **options** (*str, optional*) – Raw option string for tabula-java.

Returns

Nothing. Outputs are saved into the same directory with *input_dir*

Raises

- **ValueError** – If *input_dir* doesn't exist.
- **tabula.errors.JavaNotFoundError** – If java is not installed or found.
- **subprocess.CalledProcessError** – If tabula-java execution failed.

```
tabula.io.read_pdf(input_path: IO | str | PathLike, output_format: str | None = None, encoding: str = 'utf-8',
    java_options: List[str] | None = None, pandas_options: Dict[str, Any] | None = None,
    multiple_tables: bool = True, user_agent: str | None = None, use_raw_url: bool = False,
    pages: str | int | Iterable[int] | None = None, guess: bool = True, area: Iterable[float] |
    Iterable[Iterable[float]] | None = None, relative_area: bool = False, lattice: bool = False,
    stream: bool = False, password: str | None = None, silent: bool | None = None, columns:
    Iterable[float] | None = None, relative_columns: bool = False, format: str | None = None,
    batch: str | None = None, output_path: str | None = None, options: str = "") →
    List[DataFrame] | Dict[str, Any]
```

Read tables in PDF.

Parameters

- **input_path** (*str, path object or file-like object*) – File like object of target PDF file. It can be URL, which is downloaded by tabula-py automatically.
- **output_format** (*str, optional*) – Output format for returned object (dataframe or json) Giving this option enforces to ignore *multiple_tables* option.

- **encoding** (*str*, *optional*) – Encoding type for pandas. Default: utf-8
- **java_options** (*list*, *optional*) – Set java options.

Example

```
["-Xmx256m"]
```

- **pandas_options** (*dict*, *optional*) – Set pandas options.

Example

```
{'header': None}
```

Note: With `multiple_tables=True` (default), `pandas_options` is passed to `pandas.DataFrame`, otherwise it is passed to `pandas.read_csv`. Those two functions are different for accept options like `dtype`.

- **multiple_tables** (*bool*) – It enables to handle multiple tables within a page. Default: True

Note: If `multiple_tables` option is enabled, `tabula-py` uses not `pd.read_csv()`, but `pd.DataFrame()`. Make sure to pass appropriate `pandas_options`.

- **user_agent** (*str*, *optional*) – Set a custom user-agent when download a pdf from a url. Otherwise it uses the default `urllib.request` user-agent.
- **use_raw_url** (*bool*) – It enforces to use `input_path` string for url without quoting/dequoting. Default: False
- **pages** (*str*, *int*, *iterable of int*, *optional*) – An optional values specifying pages to extract from. It allows `str`int``, *iterable of :int*. Default: 1

Examples

```
'1-2,3', 'all', [1,2]
```

- **guess** (*bool*, *optional*) – Guess the portion of the page to analyze per page. Default `True` If you use “area” option, this option becomes `False`.

Note: As of `tabula-java 1.0.3`, `guess` option becomes independent from `lattice` and `stream` option, you can use `guess` and `lattice/stream` option at the same time.

- **area** (*iterable of float*, *iterable of iterable of float*, *optional*) – Portion of the page to analyze(`top,left,bottom,right`). Default is entire page.

Note: If you want to use multiple area options and extract in one table, it should be better to set `multiple_tables=False` for `read_pdf()`

Examples

```
[269.875, 12.75, 790.5, 561], [[12.1, 20.5, 30.1, 50.2], [1.0, 3.2, 10.5, 40.2]]
```

- **relative_area** (*bool*, *optional*) – If all area values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual height or width of the page. Default False.
- **lattice** (*bool*, *optional*) – Force PDF to be extracted using lattice-mode extraction (if there are ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **stream** (*bool*, *optional*) – Force PDF to be extracted using stream-mode extraction (if there are no ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **password** (*str*, *optional*) – Password to decrypt document. Default: empty
- **silent** (*bool*, *optional*) – Suppress all stderr output.
- **columns** (*iterable*, *optional*) – X coordinates of column boundaries.

Example

```
[10.1, 20.2, 30.3]
```

- **relative_columns** (*bool*, *optional*) – If all values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual width of the page. Default False.
- **format** (*str*, *optional*) – Format for output file or extracted object. ("CSV", "TSV", "JSON")
- **batch** (*str*, *optional*) – Convert all PDF files in the provided directory. This argument should be directory path.
- **output_path** (*str*, *optional*) – Output file path. File format of it is depends on *format*. Same as `--outfile` option of `tabula-java`.
- **options** (*str*, *optional*) – Raw option string for `tabula-java`.

Returns

list of DataFrames or dict.

Raises

- **FileNotFoundError** – If downloaded remote file doesn't exist.
- **ValueError** – If `output_format` is unknown format, or if downloaded remote file size is 0.
- **tabula.errors.CSVParseError** – If pandas CSV parsing failed.
- **tabula.errors.JavaNotFoundError** – If java is not installed or found.
- **subprocess.CalledProcessError** – If `tabula-java` execution failed.

Examples

Here is a simple example. Note that `read_pdf()` only extract page 1 by default.

Notes:

As of tabula-py 2.0.0, `read_pdf()` sets `multiple_tables=True` by default. If you want to get consistent output with previous version, set `multiple_tables=False`.

```
>>> import tabula
>>> pdf_path = "https://github.com/chezou/tabula-py/raw/master/tests/resources/data.
→pdf"
>>> tabula.read_pdf(pdf_path, stream=True)
[
    Unnamed: 0   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  _
→carb
0      Mazda RX4  21.0    6  160.0  110   3.90   2.620   16.46   0   1    4  _
→ 4
1      Mazda RX4 Wag  21.0    6  160.0  110   3.90   2.875   17.02   0   1    4  _
→ 4
2      Datsun 710   22.8    4  108.0   93   3.85   2.320   18.61   1   1    4  _
→ 1
3      Hornet 4 Drive  21.4    6  258.0  110   3.08   3.215   19.44   1   0    3  _
→ 1
4      Hornet Sportabout  18.7    8  360.0  175   3.15   3.440   17.02   0   0    3  _
→ 2
5      Valiant     18.1    6  225.0  105   2.76   3.460   20.22   1   0    3  _
→ 1
6      Duster 360   14.3    8  360.0  245   3.21   3.570   15.84   0   0    3  _
→ 4
7      Merc 240D   24.4    4  146.7   62   3.69   3.190   20.00   1   0    4  _
→ 2
8      Merc 230    22.8    4  140.8   95   3.92   3.150   22.90   1   0    4  _
→ 2
9      Merc 280    19.2    6  167.6  123   3.92   3.440   18.30   1   0    4  _
→ 4
10     Merc 280C   17.8    6  167.6  123   3.92   3.440   18.90   1   0    4  _
→ 4
11     Merc 450SE  16.4    8  275.8  180   3.07   4.070   17.40   0   0    3  _
→ 3
12     Merc 450SL  17.3    8  275.8  180   3.07   3.730   17.60   0   0    3  _
→ 3
13     Merc 450SLC  15.2    8  275.8  180   3.07   3.780   18.00   0   0    3  _
→ 3
14     Cadillac Fleetwood  10.4    8  472.0  205   2.93   5.250   17.98   0   0    3  _
→ 4
15     Lincoln Continental  10.4    8  460.0  215   3.00   5.424   17.82   0   0    3  _
→ 4
16     Chrysler Imperial  14.7    8  440.0  230   3.23   5.345   17.42   0   0    3  _
→ 4
17      Fiat 128   32.4    4   78.7   66   4.08   2.200   19.47   1   1    4  _
→ 1
18      Honda Civic  30.4    4   75.7   52   4.93   1.615   18.52   1   1    4  _
→ 2
19      Toyota Corolla  33.9    4   71.1   65   4.22   1.835   19.90   1   1    4  _
→ 1
```

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(continued from previous page)

20	Toyota Corona	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	↳
↳ 1												
21	Dodge Challenger	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3	↳
↳ 2												
22	AMC Javelin	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3	↳
↳ 2												
23	Camaro Z28	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3	↳
↳ 4												
24	Pontiac Firebird	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3	↳
↳ 2												
25	Fiat X1-9	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	↳
↳ 1												
26	Porsche 914-2	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	↳
↳ 2												
27	Lotus Europa	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	↳
↳ 2												
28	Ford Pantera L	15.8	8	351.0	264	4.22	3.170	14.50	0	1	5	↳
↳ 4												
29	Ferrari Dino	19.7	6	145.0	175	3.62	2.770	15.50	0	1	5	↳
↳ 6												
30	Maserati Bora	15.0	8	301.0	335	3.54	3.570	14.60	0	1	5	↳
↳ 8												
31	Volvo 142E	21.4	4	121.0	109	4.11	2.780	18.60	1	1	4	↳
↳ 2]												

If you want to extract all pages, set `pages="all"`.

```
>>> dfs = tabula.read_pdf(pdf_path, pages="all")
>>> len(dfs)
4
>>> dfs
[   0   1   2   3   4   5   6   7   8   9
0  mpg  cyl  disp  hp  drat    wt   qsec  vs  am  gear
1  21.0   6  160.0  110  3.90  2.620  16.46   0   1    4
2  21.0   6  160.0  110  3.90  2.875  17.02   0   1    4
3  22.8   4  108.0   93  3.85  2.320  18.61   1   1    4
4  21.4   6  258.0  110  3.08  3.215  19.44   1   0    3
5  18.7   8  360.0  175  3.15  3.440  17.02   0   0    3
6  18.1   6  225.0  105  2.76  3.460  20.22   1   0    3
7  14.3   8  360.0  245  3.21  3.570  15.84   0   0    3
8  24.4   4  146.7   62  3.69  3.190  20.00   1   0    4
9  22.8   4  140.8   95  3.92  3.150  22.90   1   0    4
10 19.2   6  167.6  123  3.92  3.440  18.30   1   0    4
11 17.8   6  167.6  123  3.92  3.440  18.90   1   0    4
12 16.4   8  275.8  180  3.07  4.070  17.40   0   0    3
13 17.3   8  275.8  180  3.07  3.730  17.60   0   0    3
14 15.2   8  275.8  180  3.07  3.780  18.00   0   0    3
15 10.4   8  472.0  205  2.93  5.250  17.98   0   0    3
16 10.4   8  460.0  215  3.00  5.424  17.82   0   0    3
17 14.7   8  440.0  230  3.23  5.345  17.42   0   0    3
18 32.4   4   78.7   66  4.08  2.200  19.47   1   1    4
19 30.4   4   75.7   52  4.93  1.615  18.52   1   1    4
```

(continues on next page)

(continued from previous page)

20	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	
21	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	
22	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3	
23	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3	
24	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3	
25	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3	
26	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	
27	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	
28	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	
29	15.8	8	351.0	264	4.22	3.170	14.50	0	1	5	
30	19.7	6	145.0	175	3.62	2.770	15.50	0	1	5	
31	15.0	8	301.0	335	3.54	3.570	14.60	0	1	5,	0
↔	1		2		3		4				↔
0	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species						
1		5.1	3.5	1.4	0.2	setosa					
2		4.9	3.0	1.4	0.2	setosa					
3		4.7	3.2	1.3	0.2	setosa					
4		4.6	3.1	1.5	0.2	setosa					
5		5.0	3.6	1.4	0.2	setosa					
6		5.4	3.9	1.7	0.4	setosa,				0	↔
↔	1		2		3		4		5		
0	NaN	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species					
1	145	6.7	3.3	5.7	2.5	virginica					
2	146	6.7	3.0	5.2	2.3	virginica					
3	147	6.3	2.5	5.0	1.9	virginica					
4	148	6.5	3.0	5.2	2.0	virginica					
5	149	6.2	3.4	5.4	2.3	virginica					
6	150	5.9	3.0	5.1	1.8	virginica,				0	
0	supp										
1	VC										
2	VC										
3	VC										
4	VC										
5	VC										
6	VC										
7	VC										
8	VC										
9	VC										
10	VC										
11	VC										
12	VC										
13	VC										
14	VC]										

```
tabula.io.read_pdf_with_template(input_path: IO | str | PathLike, template_path: IO | str | PathLike,  
                                pandas_options: Dict[str, Any] | None = None, encoding: str = 'utf-8',  
                                java_options: List[str] | None = None, user_agent: str | None = None,  
                                use_raw_url: bool = False, pages: str | int | Iterable[int] | None = None,  
                                guess: bool = False, area: Iterable[float] | Iterable[Iterable[float]] |  
                                None = None, relative_area: bool = False, lattice: bool = False, stream:  
                                bool = False, password: str | None = None, silent: bool | None = None,  
                                columns: List[float] | None = None, relative_columns: bool = False,  
                                format: str | None = None, batch: str | None = None, output_path: str |  
                                None = None, options: str | None = None) → List[DataFrame]
```

Read tables in PDF with a Tabula App template.

Parameters

- **input_path** (*str*, *path object* or *file-like object*) – File like object of target PDF file. It can be URL, which is downloaded by tabula-py automatically.
- **template_path** (*str*, *path object* or *file-like object*) – File like object for Tabula app template. It can be URL, which is downloaded by tabula-py automatically.
- **pandas_options** (*dict*, *optional*) – Set pandas options like {'header': None}.
- **encoding** (*str*, *optional*) – Encoding type for pandas. Default is 'utf-8'
- **java_options** (*list*, *optional*) – Set java options like ["-Xmx256m"].
- **user_agent** (*str*, *optional*) – Set a custom user-agent when download a pdf from a url. Otherwise it uses the default `urllib.request` user-agent.
- **use_raw_url** (*bool*) – It enforces to use *input_path* string for url without quoting/dequoting. Default: False
- **pages** (*str*, *int*, *iterable* of *int*, *optional*) – An optional values specifying pages to extract from. It allows *str*, *int*, *iterable* of *int*. Default: 1

Examples

```
'1-2,3', 'all', [1,2]
```

- **guess** (*bool*, *optional*) – Guess the portion of the page to analyze per page. Default *True* If you use “area” option, this option becomes *False*.

Note: As of tabula-java 1.0.3, guess option becomes independent from lattice and stream option, you can use guess and lattice/stream option at the same time.

- **area** (*iterable* of *float*, *iterable* of *iterable* of *float*, *optional*) – Portion of the page to analyze(top,left,bottom,right). Default is entire page.

Note: If you want to use multiple area options and extract in one table, it should be better to set `multiple_tables=False` for `read_pdf()`

Examples

```
[269.875, 12.75, 790.5, 561], [[12.1, 20.5, 30.1, 50.2], [1.0, 3.2, 10.5, 40.2]]
```

- **relative_area** (*bool*, *optional*) – If all area values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual height or width of the page. Default False.
- **lattice** (*bool*, *optional*) – Force PDF to be extracted using lattice-mode extraction (if there are ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **stream** (*bool*, *optional*) – Force PDF to be extracted using stream-mode extraction (if there are no ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **password** (*str*, *optional*) – Password to decrypt document. Default: empty
- **silent** (*bool*, *optional*) – Suppress all stderr output.
- **columns** (*iterable*, *optional*) – X coordinates of column boundaries.

Example

```
[10.1, 20.2, 30.3]
```

- **relative_columns** (*bool*, *optional*) – If all values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual width of the page. Default False.
- **format** (*str*, *optional*) – Format for output file or extracted object. ("CSV", "TSV", "JSON")
- **batch** (*str*, *optional*) – Convert all PDF files in the provided directory. This argument should be directory path.
- **output_path** (*str*, *optional*) – Output file path. File format of it is depends on *format*. Same as `--outfile` option of `tabula-java`.
- **options** (*str*, *optional*) – Raw option string for `tabula-java`.

Returns

list of DataFrame.

Raises

- **FileNotFoundError** – If downloaded remote file doesn't exist.
- **ValueError** – If `output_format` is unknown format, or if downloaded remote file size is 0.
- **tabula.errors.CSVParseError** – If pandas CSV parsing failed.
- **tabula.errors.JavaNotFoundError** – If java is not installed or found.
- **subprocess.CalledProcessError** – If `tabula-java` execution failed.

Examples

You can use template file extracted by tabula app.

```
>>> import tabula
>>> tabula.read_pdf_with_template(pdf_path, "/path/to/data.tabula-template.json")
[
    Unnamed: 0  mpg  cyl  disp  hp  ...  qsec  vs  am  gear  carb
0      Mazda RX4  21.0  6  160.0  110  ...  16.46  0  1  4  4
1      Mazda RX4 Wag  21.0  6  160.0  110  ...  17.02  0  1  4  4
2      Datsun 710  22.8  4  108.0  93  ...  18.61  1  1  4  1
3      Hornet 4 Drive  21.4  6  258.0  110  ...  19.44  1  0  3  1
4      Hornet Sportabout  18.7  8  360.0  175  ...  17.02  0  0  3  2
5      Valiant  18.1  6  225.0  105  ...  20.22  1  0  3  1
6      Duster 360  14.3  8  360.0  245  ...  15.84  0  0  3  4
7      Merc 240D  24.4  4  146.7  62  ...  20.00  1  0  4  2
8      Merc 230  22.8  4  140.8  95  ...  22.90  1  0  4  2
9      Merc 280  19.2  6  167.6  123  ...  18.30  1  0  4  4
10     Merc 280C  17.8  6  167.6  123  ...  18.90  1  0  4  4
11     Merc 450SE  16.4  8  275.8  180  ...  17.40  0  0  3  3
12     Merc 450SL  17.3  8  275.8  180  ...  17.60  0  0  3  3
13     Merc 450SLC  15.2  8  275.8  180  ...  18.00  0  0  3  3
14     Cadillac Fleetwood  10.4  8  472.0  205  ...  17.98  0  0  3  4
15     Lincoln Continental  10.4  8  460.0  215  ...  17.82  0  0  3  4
16     Chrysler Imperial  14.7  8  440.0  230  ...  17.42  0  0  3  4
17     Fiat 128  32.4  4  78.7  66  ...  19.47  1  1  4  1
18     Honda Civic  30.4  4  75.7  52  ...  18.52  1  1  4  2
19     Toyota Corolla  33.9  4  71.1  65  ...  19.90  1  1  4  1
20     Toyota Corona  21.5  4  120.1  97  ...  20.01  1  0  3  1
21     Dodge Challenger  15.5  8  318.0  150  ...  16.87  0  0  3  2
22     AMC Javelin  15.2  8  304.0  150  ...  17.30  0  0  3  2
23     Camaro Z28  13.3  8  350.0  245  ...  15.41  0  0  3  4
24     Pontiac Firebird  19.2  8  400.0  175  ...  17.05  0  0  3  2
25     Fiat X1-9  27.3  4  79.0  66  ...  18.90  1  1  4  1
26     Porsche 914-2  26.0  4  120.3  91  ...  16.70  0  1  5  2
27     Lotus Europa  30.4  4  95.1  113  ...  16.90  1  1  5  2
28     Ford Pantera L  15.8  8  351.0  264  ...  14.50  0  1  5  4
29     Ferrari Dino  19.7  6  145.0  175  ...  15.50  0  1  5  6
30     Maserati Bora  15.0  8  301.0  335  ...  14.60  0  1  5  8
31     Volvo 142E  21.4  4  121.0  109  ...  18.60  1  1  4  2
[32 rows x 12 columns],
    0      1      2      3      4
0  NaN  Sepal.Width  Petal.Length  Petal.Width  Species
1  5.1      3.5      1.4      0.2  setosa
2  4.9      3.0      1.4      0.2  setosa
3  4.7      3.2      1.3      0.2  setosa
4  4.6      3.1      1.5      0.2  setosa
5  5.0      3.6      1.4      0.2  setosa,
    0      1      2      3      4      5
0  NaN  Sepal.Length  Sepal.Width  Petal.Length  Petal.Width  Species
1  145      6.7      3.3      5.7      2.5  virginica
2  146      6.7      3.0      5.2      2.3  virginica
3  147      6.3      2.5      5.0      1.9  virginica
4  148      6.5      3.0      5.2      2.0  virginica
```

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```

5  149          6.2          3.4          5.4          2.3 virginica,
   Unnamed: 0  supp  dose
0           4.2  VC    0.5
1          11.5  VC    0.5
2           7.3  VC    0.5
3           5.8  VC    0.5
4           6.4  VC    0.5
5          10.0  VC    0.5
6          11.2  VC    0.5
7          11.2  VC    0.5
8           5.2  VC    0.5
9           7.0  VC    0.5
10         16.5  VC    1.0
11         16.5  VC    1.0
12         15.2  VC    1.0
13         17.3  VC    1.0]

```

4.1.2 tabula.util

Utility module providing some convenient functions.

```

class tabula.util.TabulaOption(pages: str | int | Iterable[int] | None = None, guess: bool = True, area:
    Iterable[float] | Iterable[Iterable[float]] | None = None, relative_area: bool
    = False, lattice: bool = False, stream: bool = False, password: str | None =
    None, silent: bool | None = None, columns: Iterable[float] | None = None,
    relative_columns: bool = False, format: str | None = None, batch: str | None
    = None, output_path: str | None = None, options: str | None = "",
    multiple_tables: bool = True)

```

Bases: object

Build options for tabula-java

Parameters

- **pages** (str, int, *iterable* of int, optional) – An optional values specifying pages to extract from. It allows *str*, *int*, *iterable* of *int*. Default: *1*

Examples

```
'1-2,3', 'all', [1,2]
```

- **guess** (*bool*, *optional*) – Guess the portion of the page to analyze per page. Default *True* If you use “area” option, this option becomes *False*.

Note: As of tabula-java 1.0.3, guess option becomes independent from lattice and stream option, you can use guess and lattice/stream option at the same time.

- **area** (*iterable* of float, *iterable* of *iterable* of float, *optional*) – Portion of the page to analyze (top, left, bottom, right). Default is entire page.

Note: If you want to use multiple area options and extract in one table, it should be better to set `multiple_tables=False` for `read_pdf()`

Examples

```
[269.875, 12.75, 790.5, 561], [[12.1, 20.5, 30.1, 50.2], [1.0, 3.2, 10.5, 40.2]]
```

- **relative_area** (*bool*, *optional*) – If all area values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual height or width of the page. Default `False`.
- **lattice** (*bool*, *optional*) – Force PDF to be extracted using lattice-mode extraction (if there are ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **stream** (*bool*, *optional*) – Force PDF to be extracted using stream-mode extraction (if there are no ruling lines separating each cell, as in a PDF of an Excel spreadsheet)
- **password** (*str*, *optional*) – Password to decrypt document. Default: empty
- **silent** (*bool*, *optional*) – Suppress all stderr output.
- **columns** (*iterable*, *optional*) – X coordinates of column boundaries.

Example

```
[10.1, 20.2, 30.3]
```

- **relative_columns** (*bool*, *optional*) – If all values are between 0-100 (inclusive) and preceded by '%', input will be taken as % of actual width of the page. Default `False`.
- **format** (*str*, *optional*) – Format for output file or extracted object. ("CSV", "TSV", "JSON")
- **batch** (*str*, *optional*) – Convert all PDF files in the provided directory. This argument should be directory path.
- **output_path** (*str*, *optional*) – Output file path. File format of it depends on format. Same as `--outfile` option of `tabula-java`.
- **options** (*str*, *optional*) – Raw option string for `tabula-java`.
- **multiple_tables** (*bool*, *optional*) – Extract multiple tables into a dataframe. Default: `True`

area: `Iterable[float] | Iterable[Iterable[float]] | None = None`

batch: `str | None = None`

build_option_list() `→ List[str]`

Convert to `tabula-java` option list

columns: `Iterable[float] | None = None`

format: `str | None = None`

guess: `bool = True`

lattice: `bool = False`

merge(*other: TabulaOption*) → *TabulaOption*

Merge two TabulaOption. self will overwrite other fields' values.

multiple_tables: `bool = True`

options: `str | None = ''`

output_path: `str | None = None`

pages: `str | int | Iterable[int] | None = None`

password: `str | None = None`

relative_area: `bool = False`

relative_columns: `bool = False`

silent: `bool | None = None`

stream: `bool = False`

`tabula.util.environment_info()` → None

Show environment information for reporting.

Returns

Detailed information like Python version, Java version, or OS environment, etc.

Return type

str

`tabula.util.java_version()` → str

Show Java version

Returns

Result of `java -version`

Return type

str

4.2 Internal interfaces

4.2.1 tabula.template

`tabula.template.load_template(path_or_buffer: IO | str | PathLike)` → List[*TabulaOption*]

Build tabula-py option from template file

Parameters

path_or_buffer (*str, path object or file-like object*) – File like object of Tabula app template.

Returns

tabula-py options

Return type

dict

4.2.2 tabula.file_util

`tabula.file_util.is_file_like(obj: IO | str | PathLike) → bool`

Check file like object

Parameters

obj – file like object.

Returns

file like object or not

Return type

bool

`tabula.file_util.localize_file(path_or_buffer: IO | str | PathLike, user_agent: str | None = None, suffix: str = '.pdf', use_raw_url=False) → Tuple[str, bool]`

Ensure localize target file.

If the target file is remote, this function fetches into local storage.

Parameters

- **path_or_buffer** (*str*) – File path or file like object or URL of target file.
- **user_agent** (*str*, *optional*) – Set a custom user-agent when download a pdf from a url. Otherwise it uses the default `urllib.request` user-agent.
- **suffix** (*str*, *optional*) – File extension to check.
- **use_raw_url** (*bool*) – Use *path_or_buffer* without quoting/dequoting.

Returns

tuple of str and bool, which represents file name in local storage and temporary file flag.

Return type

(str, bool)

TABULA.ERRORS

exception `tabula.errors.CSVParseError` (*message: Any, cause: Any*)

Bases: `ParserError`

Error represents CSV parse error, which mainly caused by pandas.

exception `tabula.errors.JavaNotFoundError`

Bases: `Exception`

Error represents Java doesn't exist.

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