tabula-py

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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*.

CHAPTER

ONE

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
```

If you want to leverage faster execution with jpype, install with *jpype* extra.

```
pip install tabula-py[jpype]
```

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.

CHAPTER

TWO

FAQ

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?

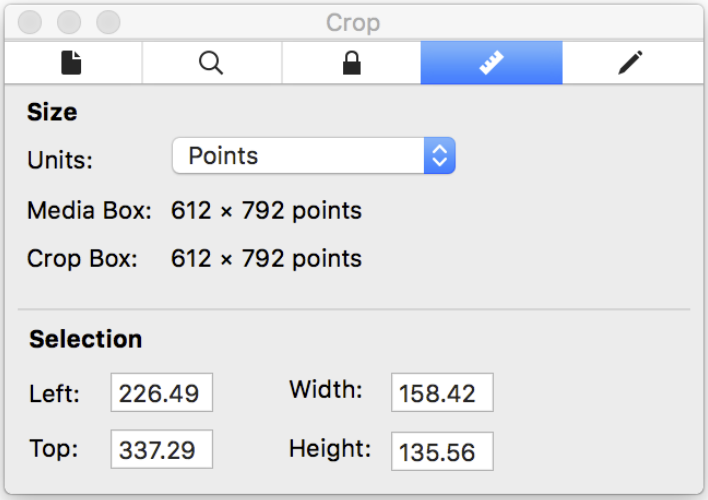
In short, you can extract with `area` and `spreadsheet` options.

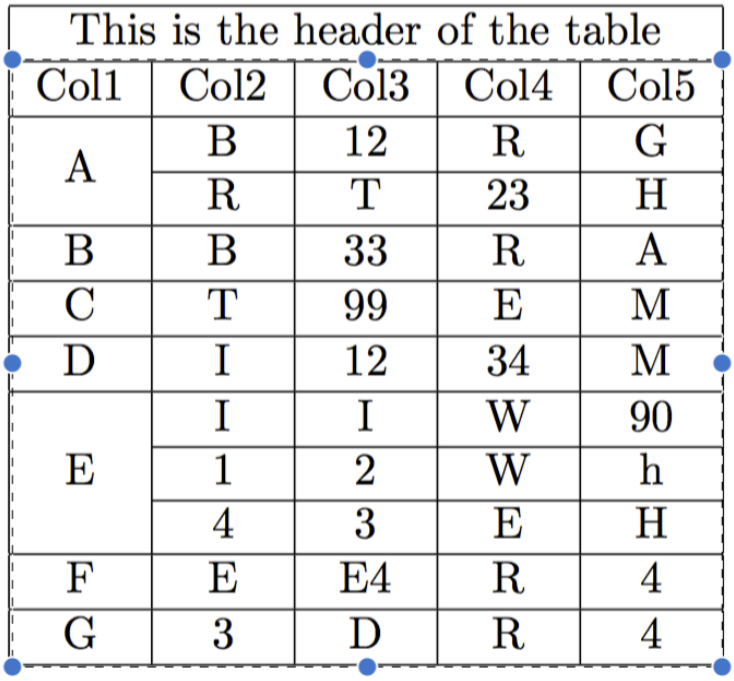
```
In [4]: tabula.read_pdf('./table.pdf', spreadsheet=True, area=(337.29, 226.49, 472.85,␣
↪384.91))
Picked up JAVA_TOOL_OPTIONS: -Dfile.encoding=UTF-8
Out[4]:
  Unnamed: 0 Col2 Col3 Col4 Col5
0          A    B   12    R    G
1        NaN    R    T   23    H
2          B    B   33    R    A
3          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
x1 = left
```

(continues on next page)

(continued from previous page)

```
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
↪" 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 `java_options` is ignored once `read_pdf` or similar funcion is called.

Since jpype doesn't support changing JVM options after the JVM is started, `java_options` is ignored once `read_pdf` or similar funcion is called. If you want to change JVM options, you need to restart the Python process. See also: https://jpype.readthedocs.io/en/latest/api.html#jpype.shutdownJVM

2.16 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/

CHAPTER

THREE

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.

CHAPTER

FOUR

TABULA

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 via jpype.

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
>>> dfs = 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*, *force_subprocess: bool = False*, *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. This option will be ignored once JVM is launched.

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.
- **force_subprocess** (*bool*) – Force to use tabula-java subprocess mode. If you have some issue with jpype, try this option with same environment. Default False.
- **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*, *force_subprocess: bool = False*, *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*. This option will be ignored once JVM is launched.
- **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"`)
- **force_subprocess** (*bool*) – Force to use tabula-java subprocess mode. If you have some issue with jpype, try this option with same environment. Default `False`.
- **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.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*, *force_subprocess: bool = False*, *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. This option will be ignored once JVM is launched.

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.
- **force_subprocess** (*bool*) – Force to use tabula-java subprocess mode. If you have some issue with jpype, try this option with same environment. Default `False`.
- **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 ␣
```

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```
↪ 2
19       Toyota Corolla  33.9    4   71.1   65  4.22  1.835  19.90   1   1     4  ␣
↪ 1
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
```

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```
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
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*, *force_subprocess: bool = False*, *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"]`. This option will be ignored once JVM is launched.
- **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.
- **force_subprocess** (*bool*) – Force to use tabula-java subprocess mode. If you have some issue with jpype, try this option with same environment. Default `False`.
- **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 is 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)

CHAPTER

FIVE

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.

CHAPTER

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