CSG Dicoms Anonymizer

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Advantages of CSG Dicoms Anonymizer

- **Automatically** detect name and **remove** it from any field, even **hidden ones**
- **Uniformize names** (invariant to typos & words switching)
- Can anonymize **demographics** along (same anon ids)
- Can use same demographics file for any set of dicom –> anonymization will shorten to pertinent subjects
- Can continue a partial anonymization (eg, bug, access denied, …)
- Deterministic anonymization → Can **update** anonymized demographics
- Generate list of **missing** demographics (ie, dicom files are present but no demographics for them).
- Generate a set of csv files to **deanonymize**.
  Tip: These files can be encrypted in a 7z (not zip) archive with password and sent to the collaborator, he'll send it back if need more infos (ie, less work and files storage for us).

Dicoms Anonymizer – Algorithm

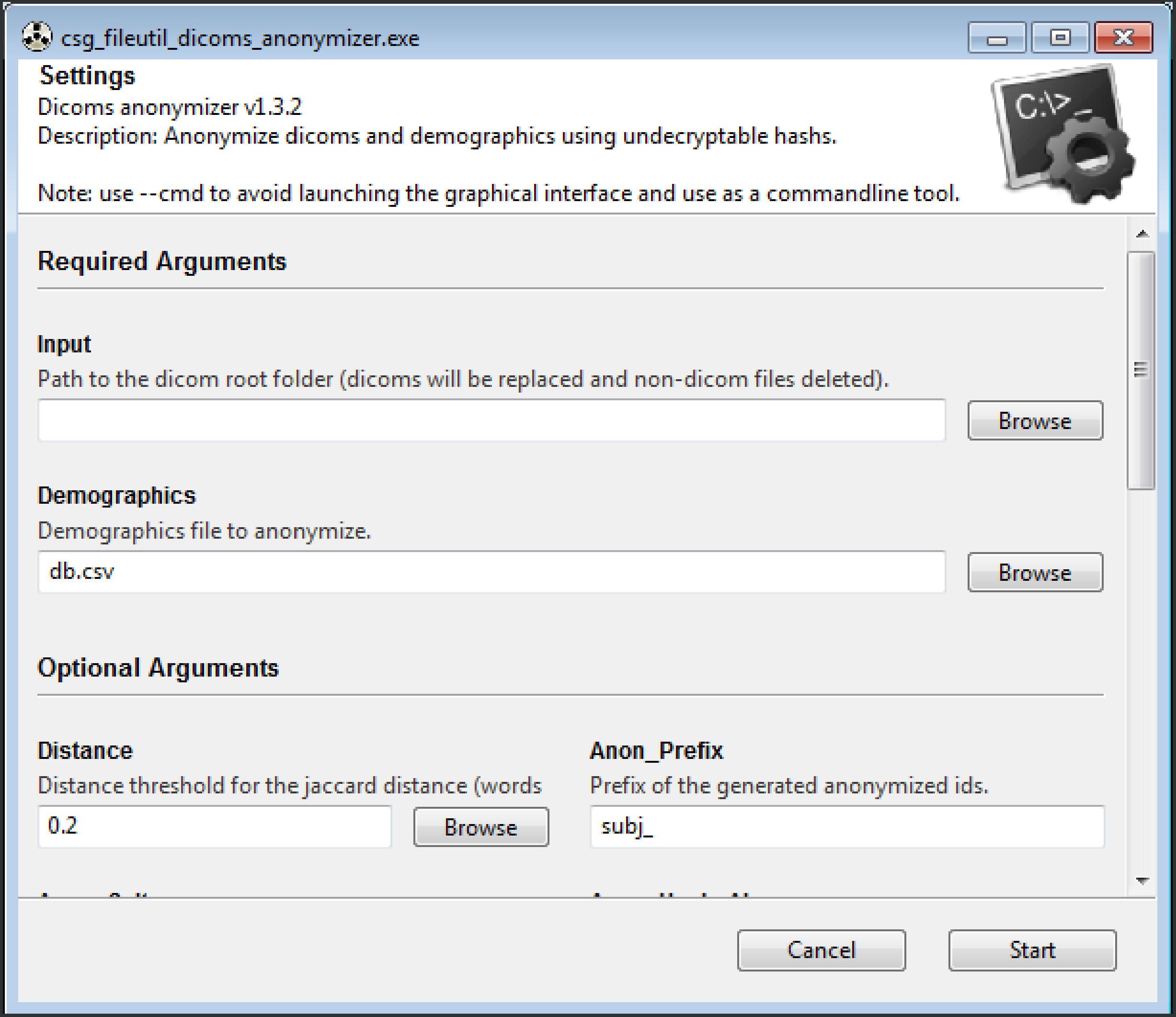
1. Generate list of patient names from dicoms (folders and zips)
2. Generate unique list of names (disambiguate similar names)
→ dicom_names.csv
3. Generate MD5 hash from names (with salt if provided → each lab can generate unique deterministic ids by tweaking the salt)
4. anonymized id = Shortened MD5 hash
→ idtonames.csv
5. If demographics: merge with dicoms names (compute distance matrix using disambiguation based on letters + words normalized levenshtein distance)
6. Apply anonymized id to dicoms files, folders names and demographics → anonymized dicoms & demographics
7. Delete non dicom files (pdf, doc, docx, txt, etc.)

Dicoms Anonymizer – Usage

1. Copy **all dicom** folders/zips in one folder
2. Get **demographics** file (optional)
3. Open **csg-fileutil dicoms anonymizer** (using Jupyter Notebook).
4. **Replace parameters** (dicom rootpath, demographics file path) **under each Part x**.
5. Click **Kernel > Restart & Run All**

→ Result: anonymized dicoms & demographics

Dicoms Anonymization – GUI



Settings

Dicoms anonymizer v1.3.2

Description: Anonymize dicoms and demographics using undecryptable hashs.

Note: use --cmd to avoid launching the graphical interface and use as a commandline tool.

Required Arguments

Input

Path to the dicom root folder (dicoms will be replaced and non-dicom files deleted).

Demographics

Demographics file to anonymize.

db.csv

Optional Arguments

Distance

Distance threshold for the jaccard distance (words

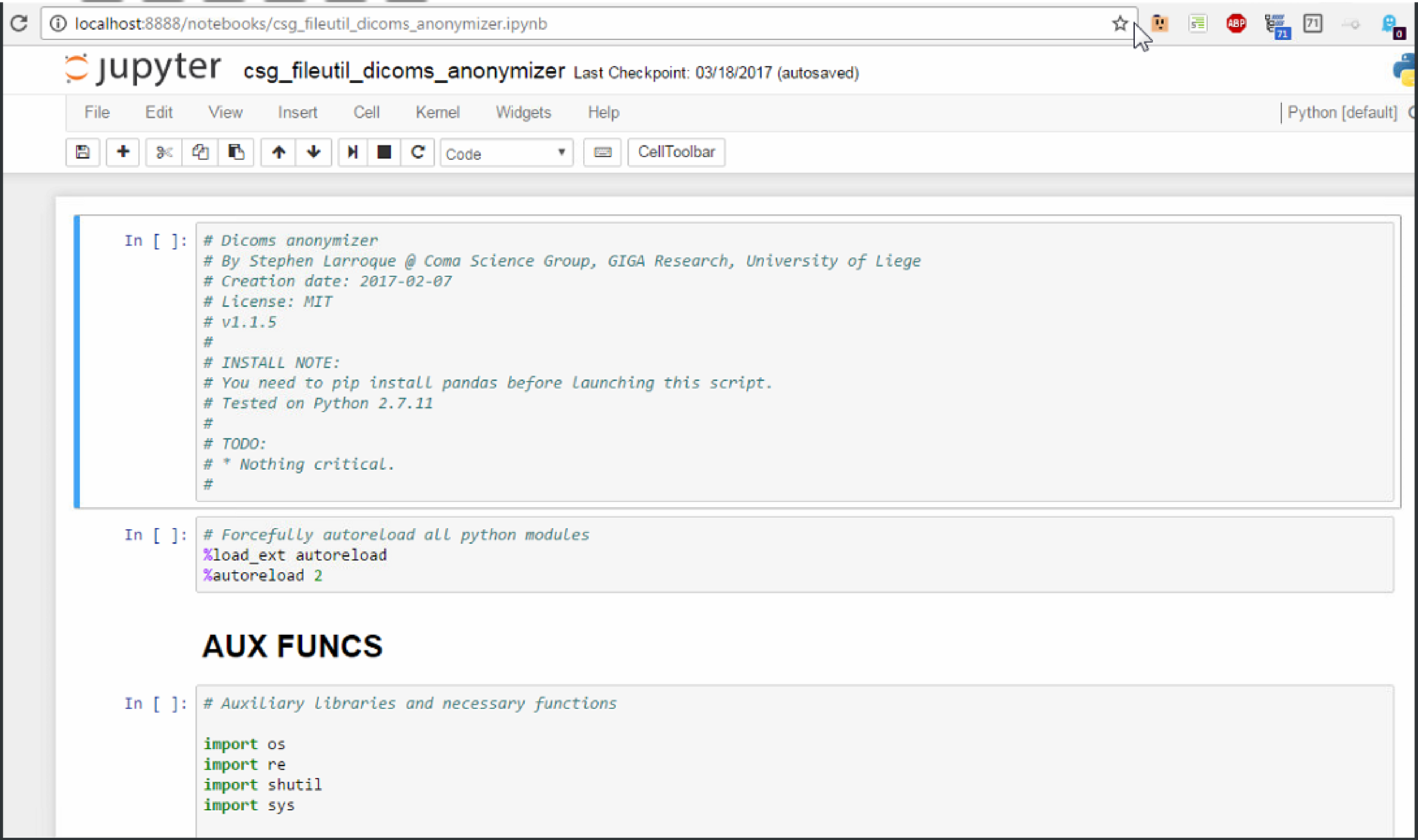
0.2

Anon_Prefix

Prefix of the generated anonymized ids.

subj_

Dicoms Anonymization – Jupyter Notebook (old, please use GUI now)


localhost:8888/notebooks/csg_fileutil_dicoms_anonymizer.ipynb
jupyter
csg_fileutil_dicoms_anonymizer Last Checkpoint: 03/18/2017 (autosaved)
File
Edit
View
Insert
Cell
Kernel
Widgets
Help
Python [default]
Code
CellToolbar

In [ ]:

```
# Dicoms anonymizer
# By Stephen Larroque @ Coma Science Group, GIGA Research, University of Liege
# Creation date: 2017-02-07
# License: MIT
# v1.1.5
#
# INSTALL NOTE:
# You need to pip install pandas before launching this script.
# Tested on Python 2.7.11
#
# TODO:
# * Nothing critical.
#
```

In [ ]:

```
# Forcefully autoreload all python modules
%load_ext autoreload
%autoreload 2
```

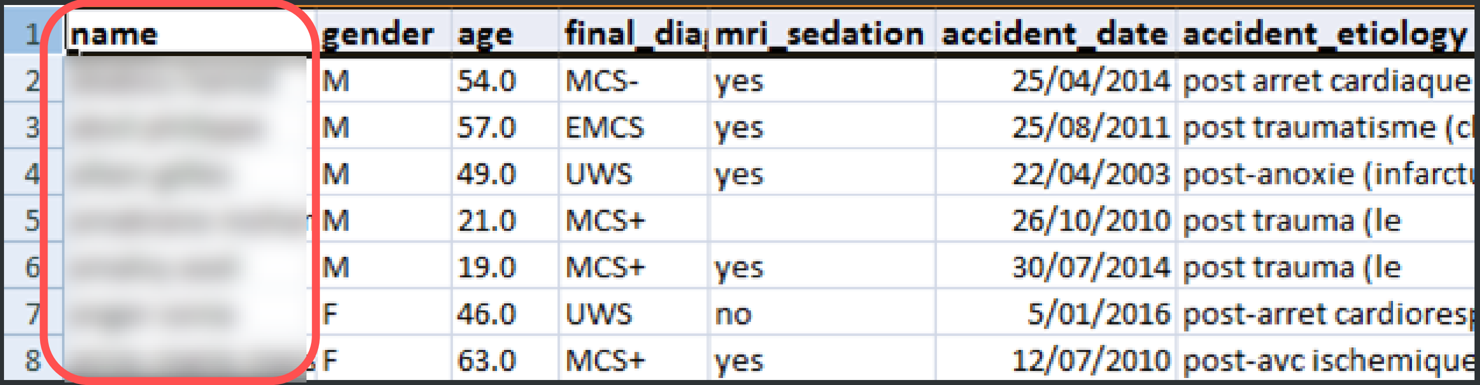
AUX FUNCS

In [ ]:

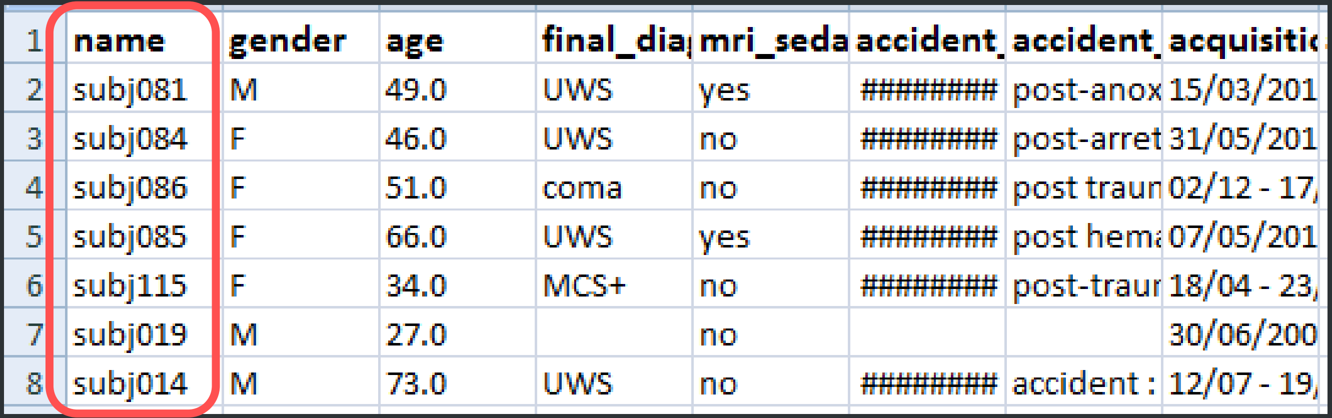
```
# Auxiliary libraries and necessary functions

import os
import re
import shutil
import sys
```

Anonymized demographics



	name	gender	age	final_dia	mri_sedation	accident_date	accident_etiology
2	[redacted]	M	54.0	MCS-	yes	25/04/2014	post arret cardiaque
3	[redacted]	M	57.0	EMCS	yes	25/08/2011	post traumatisme (cl
4	[redacted]	M	49.0	UWS	yes	22/04/2003	post-anoxie (infarctu
5	[redacted]	M	21.0	MCS+		26/10/2010	post trauma (le
6	[redacted]	M	19.0	MCS+	yes	30/07/2014	post trauma (le
7	[redacted]	F	46.0	UWS	no	5/01/2016	post-arret cardioresp
8	[redacted]	F	63.0	MCS+	yes	12/07/2010	post-avc ischemique



	name	gender	age	final_dia	mri_seda	accident_	accident_	acquisitic
2	subj081	M	49.0	UWS	yes	#########	post-anox	15/03/201
3	subj084	F	46.0	UWS	no	#########	post-arret	31/05/201
4	subj086	F	51.0	coma	no	#########	post traun	02/12 - 17,
5	subj085	F	66.0	UWS	yes	#########	post hema	07/05/201
6	subj115	F	34.0	MCS+	no	#########	post-traur	18/04 - 23,
7	subj019	M	27.0		no			30/06/200
8	subj014	M	73.0	UWS	no	#########	accident :	12/07 - 19,

Resulting files

What you can send:

□ Anonymized dicoms

□ Anonymized demographics (demographics_anonymized_shortened.csv)

□ Missing demographics anonymized (missing_demo_anonymized.csv)

What you need to keep (but not send):

□ **idtoname.csv → anonymization mapping**, if collaborator might need more info about 1 subject

□ dicom_names.csv → to regen anon (eg, to update demo)

□ missing_demo.csv → missing demographics

□ demographics_shortened.csv (optional)

Dicom Anonymization – Tips & tricks

- □ **Dicoms will be replaced**, advised to **backup (zip)** before anonymization (in case something went wrong and you need to restart)
- □ Anonymization can be continued if error or stopped (but disadvised)
- □ Demographics automatically **shortened** to subjects present in dicoms → can use the same demographics for all anonymizations
- □ Script divided in **3 independent parts**: 1. extract dicom names, 2. generate anonymization mapping, 3. anonymize dicoms & demographics.
  → **Can restart at any part (eg, to update demo)**

Thank you for your attention

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Dicoms Anonymizer – Old Algorithm

1. Generate list of patient names from dicoms (folders and zips)
2. Generate unique list of names (disambiguate similar names)
   → dicom_names.csv
3. Generate MD5 hash from names
4. Reorder names by MD5 hash
5. New order = anonymized id
   → idtonames.csv
6. If demographics: merge with dicoms names (compute distance matrix using disambiguation based on letters + words normalized levenshtein distance)
7. Apply anonymized id to dicoms files, folders names and demographics → anonymized dicoms & demographics
8. Delete non dicom files (pdf, doc, docx, txt, etc.)

□ Future: add salt for anonymized id (so that each lab can generate its own unique deterministic ids)