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Description and usage

- `src/scripts/compute_features.py` Run this script to compute the features. At the end of the process the resulting features will be stored in the `cache/feature.db` file. The calculation may require from a few minutes to several hours depending on the number of features and the combinations of parameters requested. The main paramers are:
  - `features_to_compute` the radiomics features to compute (see `feature_lut` in `src/functions` for accepted values);
  - `CT_window` a tuple of two elements (CTmin, CTmax) used to window the input CT signal. Values less or equal than CTmin are set to CTmin; those greater or equal than CTmax to CTmax;
  - `number_of_levelss` a list of positive integers each representing the number of levels used to resample the CT signal between CTmin and CTmax;
  - `noise_scales` a list of non-negative floats each representing the amplitude of the Gaussian noise as a percentage of the spread (standard deviation) of the input signal.
- `src/scripts/patient_population.py` Use this script to retrieve data about the study population at the scan level (*patient id*, *age*, *gender*, *in-plane pixel spacing*, *slice thickness* and *slice spacing*) and at the nodule level (*patient id*, *nodule id*, *number of annotations*) and at the annotation level (*annotation id*, *subtetly*, *internal structure*, *calcification*, *sphericity*, *margin*, *lobulation*, *spiculation*, *texture* and *malignancy* - see pylidc documentation for details about the maing of each parameter). The results will be stored in the `cache/scans_metadata.csv` and `cache/noduless_metadata.csv` files, respectively.
- `src/scripts/stability_analysis_delineation.py` Use this script to assess the features' stability to lesion delineation. The results will be stored in the `cache/stability_against_delineation.csv` file. The main parameters are:
  - `num_requested_annotations` limit the analysis to those nodules that have exactly the requested number of annotations (default = 4);
  - `noise_scale` the noise scale at which the analysis is carried out (the value needs to have been included during feature calculation - parameter `noise_scales` of `src/scripts/compute_features.py`, default = 0.0);
  - `num_levels` the number of discretization levels at which the analysis is carried out (the value needs to have been included during feature calculation - parameter `num_levelss` of `src/scripts/compute_features.py`, default = 256).

NOTE: Any of the `src/scripts/stability_analysis_delineation.py` scripts can be launched **only** after the features have been computed via `src/scripts/compute_features.py` make sure the … and can

Dependencies

- NumPy 1.18.5
- Pandas 1.1.3
- pinguoin 0.3.10
- pylidc 0.2.2
- pynrrd 0.4.2
- pyradiomics 3.0.1
- SQLite

How to cite this work

- Bianconi, F., Palumbo I., Fravolini M.L. *et al*. **Radiomics analysis of lung lesions on CT: experimental evaluation of the stability of texture features against delineation, intensity discretisation and noise** (to appear)

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