**pyDIC**

These tests were done on the provided 500x500 deformed image provided.

Pros and Cons

* PRO
  + Works.
  + Is open source. If necessary, we can use code as a template for certain functions if necessary.
* CON
  + The interface is very different from MATLAB. PyDIC runs off an interactive front, however this can be hard coded for each run by altering the code.
  + PyDIC doesn’t use the exact same attributes as MATLAB.
  + Certain values (especially too low values) cause the program to run out of memory. I am not sure if this is a problem with my computer, python, both, or some other factor.
  + For the program to give data over the entire image, required hard coding in the dimension of the image + grid value into the pydic.py file.
  + For some reason, sing window size 9,9 and grid size 3,3 prevents data from being created for only 500 pixels. Regardless of the dimensions changed in the code, the data will always be 498 or 501 pixels. This isn’t included in the “Failed Tests” section because the data still works, it is just not
* UNKNOWNS
  + Accuracy. This requires comparing the data for the same image and transformation between MATLAB and python.

Failed Tests

* Changing window size to 8, and grid size to 2 causes error. (wind:9, grid:3 is about as small as I can make the values)
  + Reason: RuntimeWarning: A theoretically impossible result when finding a smoothing spline
  + with fp = s. Probable causes: s too small or badly chosen eps. (abs(fp-s)/s>0.001)
* Changing window size to be less than or equal to 7 (keeping grid 20) causes errors and static data.
  + Reason: RuntimeWarning: The required storage space exceeds the available storage space.
  + Probable causes: nxest or nyest too small or s is too small. (fp>s)
* Changing the grid size to be 1 (keeping window 80) causes crash.
  + Reason: Memory Error
* Changing interpolation to "delaunnay" doesn't work at all.
  + Reason: ValueError: Unknown interpolation method 'delaunnay' for 2-dimensional data
* Changing interpolation to “log” gives errors.
  + ../../pydic.py:310: RuntimeWarning: divide by zero encountered in log deflog=np.log([[t11,t12],[t12,t22]])
  + ../../pydic.py:310: RuntimeWarning: invalid value encountered in log deflog=np.log([[t11,t12],[t12,t22]])

Succeeded Tests

* 1. Baseline
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 2. Changed: Window
  + Structured Grid
  + Window: 8, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 3. Changed: Grid
  + Structured Grid
  + Window: 80, Grid: 2
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 4. Changed: Window &Grid
  + Structured Grid
  + Window: 9, Grid: 3
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 5. Changed: Window
  + Structured Grid
  + Window: 200, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 6. Changed: Interpolation
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Raw
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 7. Changed: Interpolation
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Linear
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 8. Changed: Interpolation
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Cubic
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 9. Changed: Type
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: 2nd Order
  + Scale Disp: 10, Scale Grid: 25

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* 10. Changed: Structure
  + Unstructured Grid
  + Window: 80, Grid: 20
  + Interpolation: Cubic
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 25

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* 11. Changed: Scale Disp
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 1, Scale Grid: 25

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* 12. Changed: Scale Grid
  + Structured Grid
  + Window: 80, Grid: 20
  + Interpolation: Spline
  + Interpolation Type: Cauchy
  + Scale Disp: 10, Scale Grid: 1

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