Wijesinghe, P., Sampson, D.D. & Kennedy B.F. 2017 Computational optical palpation: A finite-element approach to micro-scale tactile imaging using a compliant sensor. *Journal of the Royal Society Interface*

Data accessibility

The computational optical palpation method, and the data used herein, is available online at https://github.com/philipwijesinghe/computational-optical-palpation, under a GNU General Public Licence (GPL) version 3. This release also includes input files (./inp_files/), which can be used to reproduce all of the results presented in this paper, and compressed compliant layer thickness files (./thickness_files/).

Software requirements:

(Software versions listed here were used in this paper; compatibility with other versions was not tested.)

Matlab R2013a, including 'gridfit.m' function (available at: http://au.mathworks.com/matlabcentral/fileexchange/8998-surface-fitting-using-gridfit)

Abaqus/Explicit FEA solver 6.13

Python 2.7

Hardware:

Computational optical palpation was performed on a laptop computer (ASUS N56JR), with following key specifications: Intel i7-4700HQ Processor, 2.4 GHz, and DDR3L 16GB SDRAM, and a workstation PC: Intel i7-3820, 3.6GHz, and DDR3 32GB SDRAM. Average processing time for 100k elements (~50-μm resolution, 5-mm field of view) was 30 minutes for the laptop computer, and 15 minutes for the workstation PC.

Usage:

Computational optical palpation is run though the 'main_cop_explicit.m' Matlab function, whose usage is detailed in its header comment block. An example of its use is presented in 'example_run_cop.m' Matlab script. Computational optical palpation can be performed with the minimal knowledge of, at least, initial compliant layer thickness, preloaded compliant layer thickness, and its mechanical properties, which makes it adaptable to other imaging techniques.