Compressed sensing for background substraction.

Paper title : Compressed sensing for background subtraction

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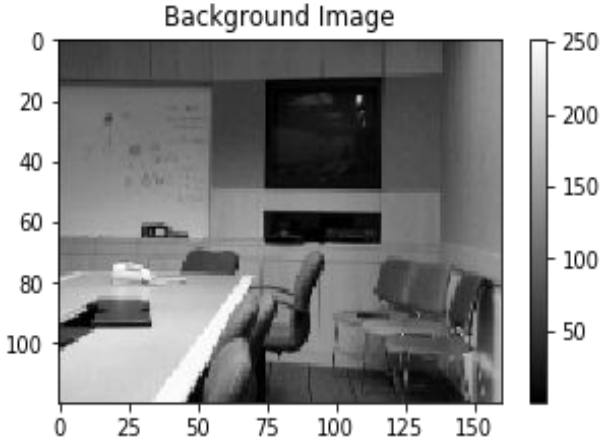
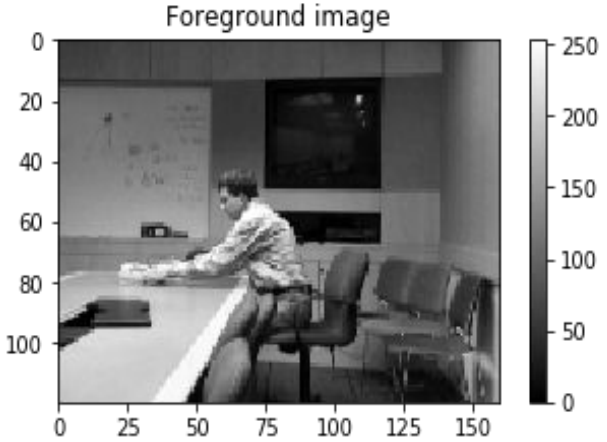
Objective

To recover the object silhouettes (binary background subtracted images) based on Compressed Sensing theory.

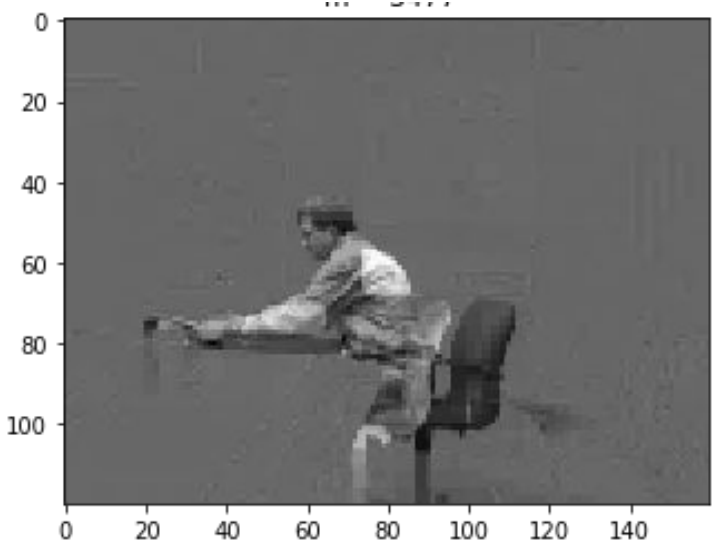
Given : The compressed samples of the background and test (foreground) images.





Objective

Output : Background subtracted image (foreground) using CS.



compressive sensing

- Compressed sensing is a signal processing technique for efficiently acquiring and reconstructing a signal, by finding solutions to underdetermined linear systems.
- The CS theory states that a signal can be perfectly reconstructed, or can be robustly approximated in the presence of noise, with sub-Nyquist data sampling rates, provided that it is sparse in some linear transform domain
- Then, according to the CS theory, by taking random projections of a scene onto a set of test functions that are incoherent with the wavelet basis vectors, it is possible to recover the scene by solving a convex optimization problem.

Background Subtraction

Direct subtraction of images gives the only the information about the positions and size of the foreground images

The proposed CS method can give the addition information of the appearance of the foreground.

Reference

1) Dataset : Test Images for Wallflower paper
(https://www.microsoft.com/en-us/research/people/jckrumm/#!downloads)

2) Cevher, V., Sankaranarayanan, A., Duarte, M. F., Reddy, D., Baraniuk, R. G., & Chellappa, R. (2008, October). Compressive sensing for background subtraction. In *European Conference on Computer Vision* (pp. 155-168). Springer, Berlin, Heidelberg.