

# Fast Enhanced CWT Based Video Micro Movement Magnification

OMAR ELFAROUK MAMDOUH IBRAHIM FOUAD FAHMY, G. Fahmy ; M. F. Fahmy

## Abstract

Magnifying micro movements of natural videos that are undetectable by human eye have recently received considerable interests. This is due to its impact in numerous applications. In this paper, we present a new technique to estimate accurate phase changes between subsequent video frames at different spatial locations of Complex Wavelets CWT sub bands. This estimation is more accurate compared to recent literature techniques utilizing CWT in micro movement magnification. We also propose to speed up the magnification process through only amplifying small CWT local phase error intervals for each individual frame sub band. A simple block matching technique is also proposed to assess the quality of magnification and localize magnified regions. We applied our proposed technique on both Dual Tree Complex Wavelet Transform DT-CWT as well as Real two-dimensional Dual Tree DWT. Several simulations are given to show that the proposed technique competes very well with the existing micro magnification approaches such as steerable pyramids STR and Riesz Transform based steerable pyramids RT-STR. A detailed comparison of these techniques performance in micro movement magnification is illustrated. The attached video file demonstrates the superior video quality attained by the proposed technique.

2019 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT), Ajman, United Arab Emirates, United Arab Emirates. 2019, December