



Sustainable Advanced Computing, pp 381–394

Region-Based Stabilized Video Magnification Approach

[Sanket Yadav](#) , [Prajakta Bhalkare](#) & [Usha Verma](#)

Conference paper | [First Online: 31 March 2022](#)

96 Accesses

Part of the [Lecture Notes in Electrical Engineering](#) book series (LNEE, volume 840)

Abstract

Eulerian video magnification (EVM) is used to magnify the imperceptible signals inside the video in the form of color. For this, it requires the jitter-free stable video of the target occupying the major part of the frame. And most of the time, the real-world/real-time videos cannot satisfy the above requirements completely. This is where EVM lacks optimal results. And this thought motivated authors to develop a new region-based stabilized video magnification (RSVM) approach. This preprocesses the input by stabilization of video, then detection–tracking–cropping of ROI, to get the motion-free-modulated input which satisfies requirements of EVM. Further, performance of both methods is

analyzed for different inputs and amplification factor with performance metrics as PSNR, elapsed time, extents of color, and motion magnification. Results reveal that the RSVM approach performs better than EVM to handle motions and also fasten the process.

Keywords

Video stabilization Region of interest

Eulerian video magnification

This is a preview of subscription content, [access via your institution](#).

▼ Chapter

EUR 24.95

Price excludes VAT (India)

- DOI: 10.1007/978-981-16-9012-9_31
- Chapter length: 14 pages
- Instant PDF download
- Readable on all devices
- Own it forever
- Exclusive offer for individuals only
- Tax calculation will be finalised during checkout

Buy Chapter

> eBook

EUR 128.39

> Hardcover Book

EUR 159.99

[Learn about institutional subscriptions](#)

References

1. Wu H-Y, Rubinstein M, Shih E, Guttag J, Durand F, Freeman W (2012) Eulerian video

magnification for revealing subtle changes in the world. *ACM Trans Graph* 31(4):1–8

2. Liu L, Lu L, Luo J, Zhang J, Chen X (2014) Enhanced Eulerian video magnification. In: 2014 7th international congress on image and signal processing. Dalian, pp 50–54, <https://doi.org/10.1109/CISP.2014.7003748>
-

3. Alzahrani A, Whitehead A (2015) Preprocessing realistic video for contactless heart rate monitoring using video magnification. In: 2015 12th conference on computer and robot vision. Halifax, NS, pp 261–268. <https://doi.org/10.1109/CRV.2015.41>
-

4. Zhang K, Jin X, Wu A (2017) Accelerating Eulerian video magnification using FPGA. In: 2017 19th international conference on advanced communication technology (ICACT). Bongpyeong, pp 554–559, <https://doi.org/10.23919/ICACT.2017.7890151>
-

5. Yu H, Lin H, Zhang E, Li J, Chen G (2017) Region-based euler video amplification algorithm. In: 2017 10th international congress on image and signal processing, BioMedical Engineering and Informatics (CISP-BMEI). Shanghai, pp 1–5, <https://doi.org/10.1109/CISP-BMEI.2017.8302082>
-

6. Wu X, Yang X, Jin J et al (2018) PCA-based magnification method for revealing small signals in video. *SIViP* 12:1293–1299.
<https://doi.org/10.1007/s11760-018-1282-0>

7. Al-allaq ZJ, Shahadi HI, Albattat HJ (2019) Powerful and low time phase-based video magnification enhancing technique. In: 2019 4th scientific international conference Najaf (SICN). Al-Najef, Iraq, pp 133–138,
<https://doi.org/10.1109/SICN47020.2019.9019338>

8. Moya-Albor E, Brieva J, Ponce H, Martínez-Villaseñor L (2020) A non-contact heart rate estimation method using video magnification and neural networks. *IEEE Instrum Meas Mag* 23(4):56–62.
<https://doi.org/10.1109/MIM.2020.9126072>

9. Zhang J, Zhang K, Yang X, Wen C (2020) Heart rate measurement based on video acceleration magnification. In: 2020 Chinese control and decision conference (CCDC). Hefei, China, pp 1179–1182,
<https://doi.org/10.1109/CCDC49329.2020.9164451>

10. Zhang Y, Pintea SL, Van Gemert JC (2017) Video acceleration magnification. In: 2017 IEEE conference on computer vision and pattern

recognition (CVPR). Honolulu, HI, pp 502–510,
<https://doi.org/10.1109/CVPR.2017.61>

11. Yadav S, Bhalkare P, Shingde S, Verma U (2020) Performance analysis of video magnification methods. In: 2020 third international conference on smart systems and inventive technology (ICSSIT). Tirunelveli, India, pp 1293–1301,
<https://doi.org/10.1109/ICSSIT48917.2020.9214167>
-

12. Li B, Chen Y, Ren J, Cheng L (2017) A fast video stabilization method based on feature matching and histogram clustering. In: Balas V, Jain L, Zhao X (eds) Information technology and intelligent transportation systems. Advances in intelligent systems and computing, vol 455. Springer, Cham.
https://doi.org/10.1007/978-3-319-38771-0_31
-

13. Viola P, Jones M (2001) Rapid object detection using a boosted cascade of simple features. In: Proceedings of the 2001 IEEE computer society conference on computer vision and pattern recognition. CVPR 2001, Kauai, HI, USA, pp I–I,
<https://doi.org/10.1109/CVPR.2001.990517>
-

14. Tomasi C, Kanade T (1991) Shape and motion from image streams: a factorization method-2. point features in 3D motion. Technical Report

CMU-CS-91–105, Carnegie Mellon University,
Pittsburgh, PA

15. Senigagliesi L, Ricciuti M, Ciattaglia G, Santis AD, Gambi E (2021) Comparison of video and radar contactless heart rate measurements. In: Communications in computer and information science information and communication technologies for ageing well and e-health, pp 96–113. https://doi.org/10.1007/978-3-030-70807-8_6

16. Kassab LY, Law A, Wallace B, Larivière-Chartier J, Goubran R, Knoefel F (2021) Effects of region of interest size on heart rate assessment through video magnification. IEEE Int Symp Med Meas Appl (MeMeA) 2021:1–6. <https://doi.org/10.1109/MeMeA52024.2021.9478596>

17. Sharma P, Kokare PM, Kolekar MH (2019) Performance comparison of KLT and CAMSHIFT algorithms for video object tracking. In: Khare A, Tiwary U, Sethi I, Singh N (eds) Recent trends in communication, computing, and electronics. Lecture notes in electrical engineering, vol 524. Springer, Singapore. https://doi.org/10.1007/978-981-13-2685-1_31

18. Lucas BD, Kanade T (1981) An iterative image

registration technique with an application to stereo vision. In: Proceedings of the 7th international joint conference on artificial intelligence – vol 2 (IJCAI'81). Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, pp 674–679

19. Zhao J, Zhang W, Chai R, Wu H, Chen W (2021) Non-contact physiological parameters detection based on MTCNN and EVM. In: Communications in computer and information science cognitive systems and signal processing, pp 507–516.
https://doi.org/10.1007/978-981-16-2336-3_48
-

20. Coachkriengsak “Steve jobs passion in work,” YouTube, 2 Aug 2011 [Video file]. Available: <https://www.youtube.com/watch?v=PznJqxon4zE>. [Accessed: 15 Jan 2020]
-

Author information

Authors and Affiliations

School of Electrical Engineering, MIT Academy of Engineering, Pune, India

Sanket Yadav, Prajakta Bhalkare & Usha Verma

Corresponding author

Correspondence to [Sanket Yadav](#).

Editor information

Editors and Affiliations

**Department of Computer Science, CHRIST
(Deemed to be University), Bengaluru,
Karnataka, India**

Dr. Sagaya Aurelia

**Department of Mechanical Engineering, Indian
Institute of Technology Madras, Chennai, Tamil
Nadu, India**

Dr. Somashekhar S. Hiremath

**Department of Information Technology,
University of Technology and Applied Science,
Sultanate of Oman, Oman**

Dr. Karthikeyan Subramanian

**Department of Computer Science Engineering,
National Institute of Technology Silchar, Silchar,
Assam, India**

Dr. Saroj Kr. Biswas

Rights and permissions

[Reprints and Permissions](#)

Copyright information

© 2022 The Author(s), under exclusive license to
Springer Nature Singapore Pte Ltd.

About this paper

Cite this paper

Yadav, S., Bhalkare, P., Verma, U. (2022). Region-Based
Stabilized Video Magnification Approach. In: Aurelia, S.,
Hiremath, S.S., Subramanian, K., Biswas, S.K. (eds)

Sustainable Advanced Computing. Lecture Notes in
Electrical Engineering, vol 840. Springer, Singapore.

https://doi.org/10.1007/978-981-16-9012-9_31

[.RIS](#)  [.ENW](#)  [.BIB](#) 

DOI

https://doi.org/10.1007/978-981-16-9012-9_31

Published	Publisher Name	Print ISBN
31 March 2022	Springer, Singapore	978-981-16- 9011-2

Online ISBN	eBook Packages
978-981-16- 9012-9	Intelligent Technologies and Robotics Intelligent Technologies and Robotics (R0)

Not logged in - 43.227.20.34

Not affiliated

SPRINGER NATURE

© 2022 Springer Nature Switzerland AG. Part of [Springer Nature](#).