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## MRI images multi-level thresholding based on PSO: Real-time hardware implementation

(Article)

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### Abstract

MRI images provide useful and valuable amount of information's about brain anatomy allowing doctors to analyze and diagnose diseases. To successfully succeed the diagnosis of a brain tumor, several types of sequences and images will be taken and their processes require massive time. This diagnosis will detect, locate, measure and evaluate the consequences of brain tumor. MRI brain image reproduces the internal structure of the human head. It is a multimodal structure. It is mainly composed of three regions: the gray matter, white matter, and cerebrospinal fluid. Therefore, tumor detection requires segmenting MRI image into levels equal to region numbers of MRI image. In this paper, we try to provide an automatic hardware tool for the diagnosis of brain structures using the Xilinx System Generator (XSG) which consists of a realtime MRI images multi-level thresholding based on hybridization of PSO and Otsu method. The performances of the proposed hardware architecture are demonstrated and validated using a set of MRI medical images. © 2016 by IJIR (CESER PUBLICATIONS).

### Author keywords

MRI images; Multi-level theresholffing; Otsu method; PSO; Real-time architecture

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*International Review of Automatic Control, IRECO*, 4, pp. 115-123. *Cited 9 times.*

2

☐

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**Distributed collision avoidance method based on consensus among mobile robotic agents**  
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<http://www.ceser.in/ceserp/index.php/ijir/article/download/3459/3433>

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Eklundh, J.O.  
Vision in robotics: How a robot can segment figure from ground  
*ECAI*, pp. 689-693. *Cited 2 times.*

4

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Hamdaoui, F., Khalifa, A., Sakly, A., Mtibaa, A.  
**Real time implementation of medical images segmentation based on PSO**  
*2013 International Conference on Control, Decision and Information Technologies, CoDIT 2013*, art. no. 6689516, pp. 36-42. *Cited 8 times.*  
ISBN: 978-142449796-6  
doi: 10.1109/CoDIT.2013.6689516  
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**Hardware implementation of PSO-architecture for image segmentation on FPGA**  
*Asian Journal of Applied Sciences*, 7 (1), pp. 1-12. *Cited 5 times.*  
<http://scialert.net/gredirect.php?doi=ajaps.2014.1.12&linkid=pdf>  
doi: 10.3929/ajaps.2014.1.12  
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Hamdaoui, F., Ladgham, A., Sakly, A., Mtibaa, A.

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Gtifa, W. , Hamdaoui, F. , Sakly, A.  
(2017) *International Journal of Tomography and Simulation*

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(2015) *International Journal of Imaging Systems and Technology*

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(2015) *2015 4th International Conference on Systems and Control, ICSC 2015*

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<http://www.praiseworthyprize.it/public/SUBSCRIBERS/IRECOS.html>
- ☐ Hamdaoui, F., Ladgham, A., Sakly, A., Mtibaa, A.
- 7 **A new images segmentation method based on modified particle swarm optimization algorithm**  
*International Journal of Imaging Systems and Technology*, 23 (3), pp. 265-271. Cited 11 times.  
doi: 10.1002/ima.22060  
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- ☐ Ladgham, A., Hamdaoui, F., Sakly, A., Mtibaa, A.
- 8 **Fast MR brain image segmentation based on modified Shuffled Frog Leaping Algorithm**  
*Signal, Image and Video Processing*, 9 (5), pp. 1113-1120. Cited 8 times.  
<http://www.springerlink.com/content/1863-1703>  
doi: 10.1007/s11760-013-0546-y  
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- ☐ Hammouche, K., Diaf, M., Siarry, P.
- 9 **A multilevel automatic thresholding method based on a genetic algorithm for a fast image segmentation**  
*Computer Vision and Image Understanding*, 109 (2), pp. 163-175. Cited 118 times.  
doi: 10.1016/j.cviu.2007.09.001  
[View at Publisher](#)
- ☐ Robu, R., Holban, S.
- 10 **Data classification with the genetic algorithm AGR**  
*International Journal of Artificial Intelligence*, 13 (2), pp. 89-108.  
<http://www.ceser.in/ceserp/index.php/ijai/article/download/3874/3971>
- ☐ Zhang, Y., Wu, L.
- 11 **Optimal multi-level thresholding based on maximum Tsallis entropy via an artificial bee colony approach**  
*Entropy*, 13 (4), pp. 841-859. Cited 91 times.  
<http://www.mdpi.com/1099-4300/13/4/841/pdf>  
doi: 10.3390/e13040841  
[View at Publisher](#)
- ☐ Mousa, A.A., El-Desoky, I.M.
- 12 **Stability of Pareto optimal allocation of land reclamation by multistage decision-based multipheromone ant colony optimization**  
*Swarm and Evolutionary Computation*, 13, pp. 13-21. Cited 7 times.  
doi: 10.1016/j.swevo.2013.06.003  
[View at Publisher](#)
- ☐ Hamdaoui, F., Sakly, A., Mtibaa, A.
- 13 **An efficient multi level thresholding method for image segmentation based on the hybridization of modified PSO and otsu's method**  
*Studies in Computational Intelligence*, 575, pp. 343-367. Cited 8 times.  
<http://www.springer.com/series/7092>  
doi: 10.1007/978-3-319-11017-2\_14  
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- ☐ Ladgham, A., Hamdaoui, F., Sakly, A., Mtibaa, A.
- 14 Real Time Implementation of Detection of Bacteria in Microscopic Images Using System Generator  
*J Biosens Bioelectron*, 3, p. 127. Cited 8 times.
- ☐ Xilinx System Generator v2.1 for Simulink User's Guide Online, white paper
- 15 [www.mathworks.com/applications/dsp\\_comm/xilinx\\_ref\\_guide.pdf](http://www.mathworks.com/applications/dsp_comm/xilinx_ref_guide.pdf)
- ☐ Kennedy, James, Eberhart, Russell
- 16 **Particle swarm optimization**  
*IEEE International Conference on Neural Networks - Conference Proceedings*, 4, pp. 1942-1948. Cited 27649 times.
- ☐ Reynolds, Craig W.
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*Computer Graphics (ACM)*, 21 (4), pp. 25-34. Cited 3204 times.  
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- ☐ Eberhart, Russell, Kennedy, James
- 18 **New optimizer using particle swarm theory**  
*Proceedings of the International Symposium on Micro Machine and Human Science*, pp. 39-43. Cited 7026 times.
- ☐ Kennedy, James

19

Particle swarm: Social adaptation of knowledge

*Proceedings of the IEEE Conference on Evolutionary Computation, ICEC*, pp. 303-308. Cited 956 times.

○

Eberhart, R.C., Shi, Y.

20

Comparing inertia weights and constriction factors in particle swarm optimization

*Proceedings of the 2000 Congress on Evolutionary Computation, CEC 2000*, 1, art. no. 870279, pp. 84-88. Cited 1555 times.

doi: 10.1109/CEC.2000.870279

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