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ESPS PEER REVIEW REPORT

Name of journal: World Journal of Radiology

ESPS manuscript NO: 12135

Title: artial volume effect modeling for segmentation and tissue classification of brain magnetic resonance images: a review

Reviewer code: 00289559

Science editor: Fang-Fang Ji

Date sent for review: 2014-06-25 09:09

Date reviewed: 2014-06-25 09:38

| CLASSIFICATION | LANGUAGE EVALUATION | RECOMMENDATION | CONCLUSION |
|---|--|-------------------------------------|--|
| <input type="checkbox"/> Grade A: Excellent | <input type="checkbox"/> Grade A: Priority publishing | Google Search: | <input type="checkbox"/> Accept |
| <input type="checkbox"/> Grade B: Very good | <input type="checkbox"/> Grade B: Minor language polishing | <input type="checkbox"/> Existing | <input type="checkbox"/> High priority for publication |
| <input type="checkbox"/> Grade C: Good | <input type="checkbox"/> Grade C: A great deal of language polishing | <input type="checkbox"/> No records | <input type="checkbox"/> Rejection |
| <input type="checkbox"/> Grade D: Fair | <input type="checkbox"/> Grade D: Rejected | BPG Search: | <input type="checkbox"/> Minor revision |
| <input type="checkbox"/> Grade E: Poor | | <input type="checkbox"/> Existing | <input type="checkbox"/> Major revision |
| | | <input type="checkbox"/> No records | |

COMMENTS TO AUTHORS

The author performs a review of partial volume segmentation for brain MRI's. The author presents several real world clinical examples such as Alzheimers and Multiple Sclerosis where partial volume effects could have profound implications for clinical decisions. The manuscript is well written but could benefit from some additional clinical examples or even a case illustration.



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ESPS PEER REVIEW REPORT

Name of journal: World Journal of Radiology

ESPS manuscript NO: 12135

Title: artial volume effect modeling for segmentation and tissue classification of brain magnetic resonance images: a review

Reviewer code: 00289512

Science editor: Fang-Fang Ji

Date sent for review: 2014-06-25 09:09

Date reviewed: 2014-07-24 17:48

| CLASSIFICATION | LANGUAGE EVALUATION | RECOMMENDATION | CONCLUSION |
|--|---|-------------------------------------|---|
| <input type="checkbox"/> Grade A: Excellent | <input type="checkbox"/> Grade A: Priority publishing | Google Search: | <input type="checkbox"/> Accept |
| <input checked="" type="checkbox"/> Grade B: Very good | <input checked="" type="checkbox"/> Grade B: Minor language polishing | <input type="checkbox"/> Existing | <input checked="" type="checkbox"/> High priority for publication |
| <input type="checkbox"/> Grade C: Good | <input type="checkbox"/> Grade C: A great deal of language polishing | <input type="checkbox"/> No records | <input type="checkbox"/> Rejection |
| <input type="checkbox"/> Grade D: Fair | <input type="checkbox"/> Grade D: Rejected | BPG Search: | <input type="checkbox"/> Minor revision |
| <input type="checkbox"/> Grade E: Poor | | <input type="checkbox"/> Existing | <input type="checkbox"/> Major revision |
| | | <input type="checkbox"/> No records | |

COMMENTS TO AUTHORS

Paper is generally well-written and topic is important, especially for automatic processing of MRI images. It would be good to use images to show the effects of the proposed solution. This would improve readability and understanding.



ESPS PEER REVIEW REPORT

Name of journal: World Journal of Radiology

ESPS manuscript NO: 12135

Title: artial volume effect modeling for segmentation and tissue classification of brain magnetic resonance images: a review

Reviewer code: 02156299

Science editor: Fang-Fang Ji

Date sent for review: 2014-06-25 09:09

Date reviewed: 2014-07-30 00:03

| CLASSIFICATION | LANGUAGE EVALUATION | RECOMMENDATION | CONCLUSION |
|--|--|-------------------------------------|--|
| <input type="checkbox"/> Grade A: Excellent | <input checked="" type="checkbox"/> Grade A: Priority publishing | Google Search: | <input checked="" type="checkbox"/> Accept |
| <input checked="" type="checkbox"/> Grade B: Very good | <input type="checkbox"/> Grade B: Minor language polishing | <input type="checkbox"/> Existing | <input type="checkbox"/> High priority for publication |
| <input type="checkbox"/> Grade C: Good | <input type="checkbox"/> Grade C: A great deal of language polishing | <input type="checkbox"/> No records | <input type="checkbox"/> Rejection |
| <input type="checkbox"/> Grade D: Fair | <input type="checkbox"/> Grade D: Rejected | BPG Search: | <input type="checkbox"/> Minor revision |
| <input type="checkbox"/> Grade E: Poor | | <input type="checkbox"/> Existing | <input type="checkbox"/> Major revision |
| | | <input type="checkbox"/> No records | |

COMMENTS TO AUTHORS

On the topic of partial volume effect modelling in brain MRI. The author discussed the statistically-based approaches and mainly focused on the mixel model. The author highlighted the advantage of an two-step algorithm and parameter estimation for the solution of the mixel model. The author did a great job to provide a tutorial-like overview for partial volume estimation in brain MRI. One of my major concerning is that the Markov random field (MRF) was proposed and integrated for solving the mixel model in both of direct solution and two-step algorithm. As Gonzalez-Ballester et al. [22] argued that this would introduce the typical problems of MRFs, i.e. determining the correct parameters and the weighting between the prior and the data, as well as huge computational cost. Please add information or discuss it as limitation for these problems of MRF. The partial volume effect (PVE) was caused by the limited resolution of the imaging in brain MRI. However, a higher resolution will decrease this effect, as it better resolves the tissue. However, as a review on partial volume effect nowadays, please discuss the influence of resolution on PVE and potential effect for the parameter estimation in the investigated approach. As the authored mentioned, the partial volume estimations is very important for volume quantification and cortical thickness analysis. In the view of cortical thickness calculation, it's meaningless to state "cortical thickness measures can be shown to be improved if the partial volume effect is taken into account" only. Please elaborate it in more details. Please correct the formats references in 3rd, 17th, 20th.



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Please add explanations to Figure 3. Did the color-bar apply for all brains in Figure 2? If not, please correct it. References: [22] Gonzalez Ballester MA, Zisserman A, Brady M (2002) Estimation of the partial volume effect in MRI. *Medical Image Analysis* 6: 389 – 405.