

Interactive comment on “A neural network approach to estimate a posteriori distributions of Bayesian retrieval problems” by Simon Pfreundschuh et al.

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The paper provides an important development in neural network algorithms, and is extremely well written. I enjoyed reading it and it certainly deserves to be published. In fact, I have only one minor issue and some trivial editorial comments.

P. 15: in the comparisons between QRNN and the BMCI, as the training data or a-priori get smaller, the BMCI uncertainties need to be increased beyond the sensor noise to account for a sparse a-priori. If that was not done, it likely explains the divergence in the performance for smaller training sets. That said, finding the uncertainty due to a sparse a-priori is not at all trivial so it might still be an advantage for the QRNN but

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perhaps slightly different than presented. A bit more explanation by the author on this topic would help the paper. The conclusion mentions this as well.

Editorial comments:

p.5, line 20: I really appreciate the author's explanation of why he used x and y in different ways for the two sections. I appreciate why he did that and the explanation makes clear what could otherwise have been a very confusing bit of text.

p. 12, line 12: Maybe I missed it but I don't think Rectilinear Linear Unit was ever defined in the paper.

I am quite certain that neither "Gaussianity" (p.3, line 2) nor "overproportionally" (p. 12, line 20) are real words.

p. 4, line 15: There is an extra "from" in front of "directly"

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