Good idea to step back periodically and reread. Let me know what you think of these points. Our submission was certainly able to communicate the importance of the problem our method looks to address. However, I think the clearest takeaway from these reviews is that we need to

clarify our choice of entropy as the primal objective, clearly enumerate the predominant types of model analyses available with the method, and do a comparative analysis with other candidate methodologies.

**Writing:**

1 . When we introduce the method, and the optimization, we should be more confident and decisive with our choice of entropy as the primal objective. Anything less engenders doubt and confusion even with our expert machine learning reviewer. We have a lot of good reasons for choosing entropy, and that should really be at the forefront of motivation and explanation in section 3.1-3.2. Comments about alternative primal objective can be saved for the methods.

2. R2, theoretical neuroscientist part of our user-base, was confused about how to use EPI to gain model insight (see NN response). I think the paper would benefit greatly from a paragraph listing the different ways the method can be used to understand models and their behavior, with references to a supplementary figure about a toy model (maybe 2D LDS?). We originally thought of organizing our paper this way, so having a thoughtful exposition on this idea early as a guide for people who are (understandably) confused would probably go a long way.

**Science:**

1. It’s hard to say whether the science is adequate, because it’s evident that 0 reviewers got past Fig. 3, and our most compelling example is Fig. 4. R2 says that the scientific findings aren’t impressive, and I think that V1, which is elaborated on, could certainly go further. I’ll make some brief comments about logical scientific improvements of the four applications.

a.) STG: this is gnarly from a methods validation standpoint. I don’t think we need to really claim that there is new scientific insight above and beyond what is already known. We may want to apply it again to an additional regime to highlight the redundancy in this model.

b.) V1: if we tied this in to literally any of the theoretical work on V1 -- paradoxical effect, surround suppression, etc. – it would go a long way.

c.) SC: this is pretty clean.

d.) LRRNN: We could have the network solve the task over a range of inputs rather than a single input.

**Analysis:**

1. I don’t think we can be confident about an accept without any sort of methodological comparison to random search. I think we should also compare to ABC, LFVI, and SNPE. We can then have a table on the side with check marks and Xs indicating what you have and lack with each method.

2. Perhaps we should have a supp fig demonstrating that EPI scales with the dimensionality of z.

**NN response**

As I went back over the reviews today, I became a bit disappointed with R2.

E.g. point #2 by R2: False claim a.) the only way to gain insight from this method is by applying EPI to a model at multiple statistic levels (invalid by demonstration in STG and LRRNN application), and that b.) this comparative use of EPI isn’t done anywhere in the manuscript (invalid by V1 and SC applications).

R3 gets confused about why entropy is the right primal objective, and the lack of explanation. Then, they’re flummoxed by the lack of comparison to an alternative method, explanations of efficiency, etc.

In our response to the editor (if our interest is Nat Comm), we could say:

1. Ignore R1, and remove him from process.

2. All reviewers identified the importance of the problem, and the utility to neuroscience of the method described.

3. The technical details and specific use cases of the method were not communicated clearly enough, leading to reviewer confusion, and their eventual inaccurate assessment of the effectiveness of the method and scientific merit of the theoretical findings.

4. We can easily add the methodological comparisons R2 and R3 asked for.

5. With the improved writing and method comparisons, R2 and R3 are likely to approve.

eLife submit edits with line numbers

* Clarify choice of entropy (163-183)
* Choice of W (202-203)
* Emphasize proof-of-concept and generality of approach V1 (252-257)
* Macke refs moved to 677-684