Point-by-point comment reply

Nicholas Asendorf and Raj Rao Nadakuditi

T-SP-13946-2012.R1 - IEEE Transactions on Signal Processing - "The Performance of a Matched Subspace Detector that Uses Subspaces Estimated from Finite, Noisy, Training Data"

We thank the reviewers for their decision of publication and for their excellent comments. We have incorporated the provided comments in the attached manuscript. In particular the first paragraph in the introduction now highlights previous work in more depth. We also provided more discussion of the Claim in the appendix, including a proof sketch to provide more intuition. Because of these additions, for space considerations, we removed old Figures 6 and 8b. These figures were for the deterministic setting and showcase the same phenomenon as the stochastic setting. We have also fixed minor typos throughout the paper and particularly in the bibliography.

Reviewer 1

1. *Although requirements of my question 5 has not been implemented, I understand this could be matter of future work. Hence I consider that all my questions have been properly solved*

   Thank you. Comparing these results with a supervised linear discriminant would be interesting future work.

Reviewer 2

1. *There are a few typos in the text that though can be corrected by the authors in the preparation of the final version of the manuscript.*

   Thank you for bringing these to our attention. Minor typos and spelling mistakes throughout the paper have been corrected.

2. *The first paragraph of the introduction (from "Many signal processing [1]" to "signal-bearing training data" is not completely satisfactory: the contribution of the several cited papers should be better indicated; to this end, notice that [3-5] refer to processing several returns; [9-10] deal with a second-order model while [3] considers a first-order model, etc;)*

   The beginning of this paragraph has been changed to provide more insight and showcase the contributions of the cited works.

3. *In references [1,3,4,6,9,11] L. Scharf should be L.L.Scharf.*

   Thank you for pointing this out. This has been changed.

4. *In [14] there is a typo in the title: databse should be database*

   Thank you for bringing this to our attention - this has been corrected.

Reviewer 3

No comments provided.

Reviewer 4

1. *The paper is well organized and the covered topic is of relevant interest to the community. However, I would recommend the authors to provide somewhat more detailed explanation in support of the main Claim, either numerical or proofskecth-alike. Indeed, the paper is well written but not completely self-consistent, due to the recurrent references to mathematical results in [19] and [20], and this has caused my novelty ranking to be a bit lower than the average ranking the paper has been provided by me. To be honest, I don't immediately understand a direct link between the eigenvalues' spacing characterization and the eventual validity of the Claim. If it is claimed, there is no need for an actual proof, but nevertheless the hints, where given, should be at least suggesting a raw roadmap to be followed in order the link between proven results and conjectured ones to be catched.*

   We have provided a more in depth discussion of the Claim in the appendix. The discussion provides the fundamentals for the proof of the Claim in the rank-1 setting. This roadmap highlights the importance of the spacing of the eigenvalues.