Dear Editors,

We would like to submit a manuscript describing an analysis of feature extracton algorithms within the context of Spike Sorting in Neuroscience. In this work, linear, non-linear and manifold approaches to feature extraction are evaluated to identify the most adequate approach to spike sorting. Our proposition is that manifold approaches may allow for the creation of a more relevant feature space than other methods.

We assess the performance of a multitude of different variants of feature extraction algorithms that have been shown to have a high performance.These are analyzed on multiple synthetic datasets generated using real data using numerous metrics in order to assess the reliability of the method. Compared to traditional feature extraction algorithms, manifold approaches are able to better separate clusters visually as well as outperform the other methods with regard to the evaluation metrics. Therefore, when performance is key and the interest is to separate as many clusters as possible, manifold approaches are the most adequate.

Our analysis confirms that manifold approaches have the potential to increase the performance of feature extraction within spike sorting. Thus, bringing a valuable contribution to the field of feature extraction, in general, and more specifically spike sorting. We have shown that several algorithms are able to better separate clusters when extracting features into a low-dimensional space with regard to multiple performance evaluation metrics. With enthusiasm for the obtained results and the possibilities offered by this method, we would be grateful if you considered the submitted manuscript for review.

With best regards,

Eugen-Richard Ardelean

Email: [ardeleaneugenrichard@gmail.com](mailto:ardeleaneugenrichard@gmail.com)