# Title

Sorting Overlapped Spikes using Superimposed Template Correlation Matching

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# Significant Contributions

Designed and evaluated an algorithm to improve classification of non-isolated neural spikes.

# Poster

To add later

# Executive summary

A problem that is still present in modern day spike sorting is the classification of overlapping spikes. Resolving these waveforms would significantly improve spike sorting accuracy, precision and recall. In this paper, an add-on module approach that is capable of classifying and resolving overlapping spikes automatically at a higher accuracy is proposed. After detecting spikes from After constructing template waveforms from initial clustering of well-isolated spikes, a superimposed template generated from pair-wise combinations of those templates at all possible time shifts from each other is then implemented. Subsequently, overlapping waveforms were identified using a pseudo-correlation template matching method, and each spike waveform is assigned to their respective overlapping template label, and then automatically translated to the equivalent single-unit combination. This method was examined using simulated data from the SYNTH MONOTRODE dataset and the performance was evaluated using the Spike Forester accuracy metrics such as precision, recall and overall accuracy. It was found that the add-on module was able to resolve overlapping waveform at an average of 54% across the whole study, with various signal-to-noise ratios, an improvement of 4% from standard methods without the module. TALK ABOUT PRECISION AND RECALL TOO… As a result, this module is easily added as an extra step to improve standard low-dimensional clustering techniques such as k-means, dbscan, etc, in order to boost performance

# Introduction

# Literature Review

# Overview

# Detailed Discussions

# Evaluation

# Results

# Future Work

Try to implement overlapping techniques to multi-channel recordings due to the improvement of dense electrode arrays.

# Conclusion

# References

# Appendices