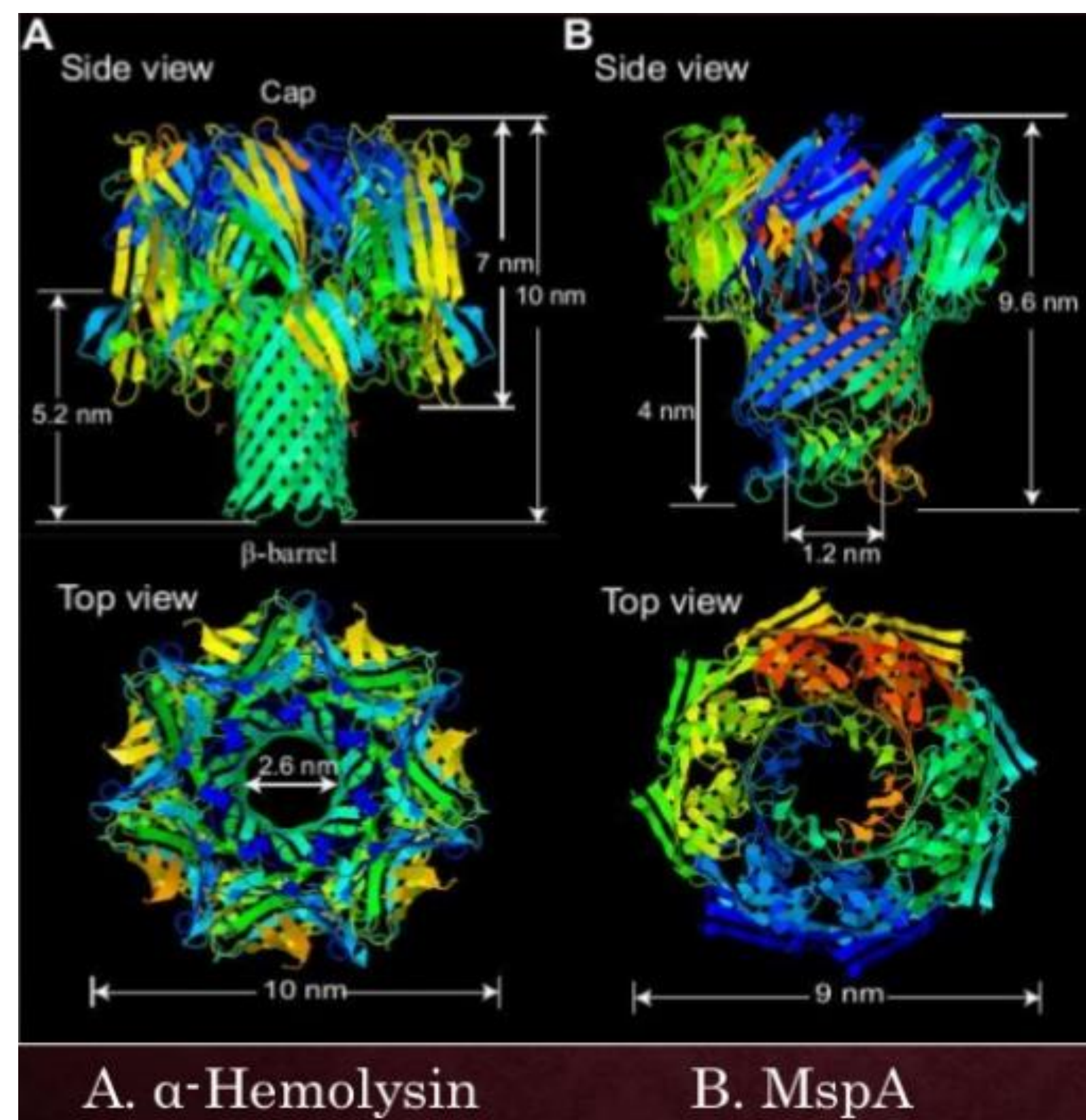


## MOTIVATION

- Ion channel based biosensors are engineered for DNA sequencing.
- Detection of biothreats, water contaminants, health monitoring.
- Highly sensitive and can determine concentration and identity of an analyte.

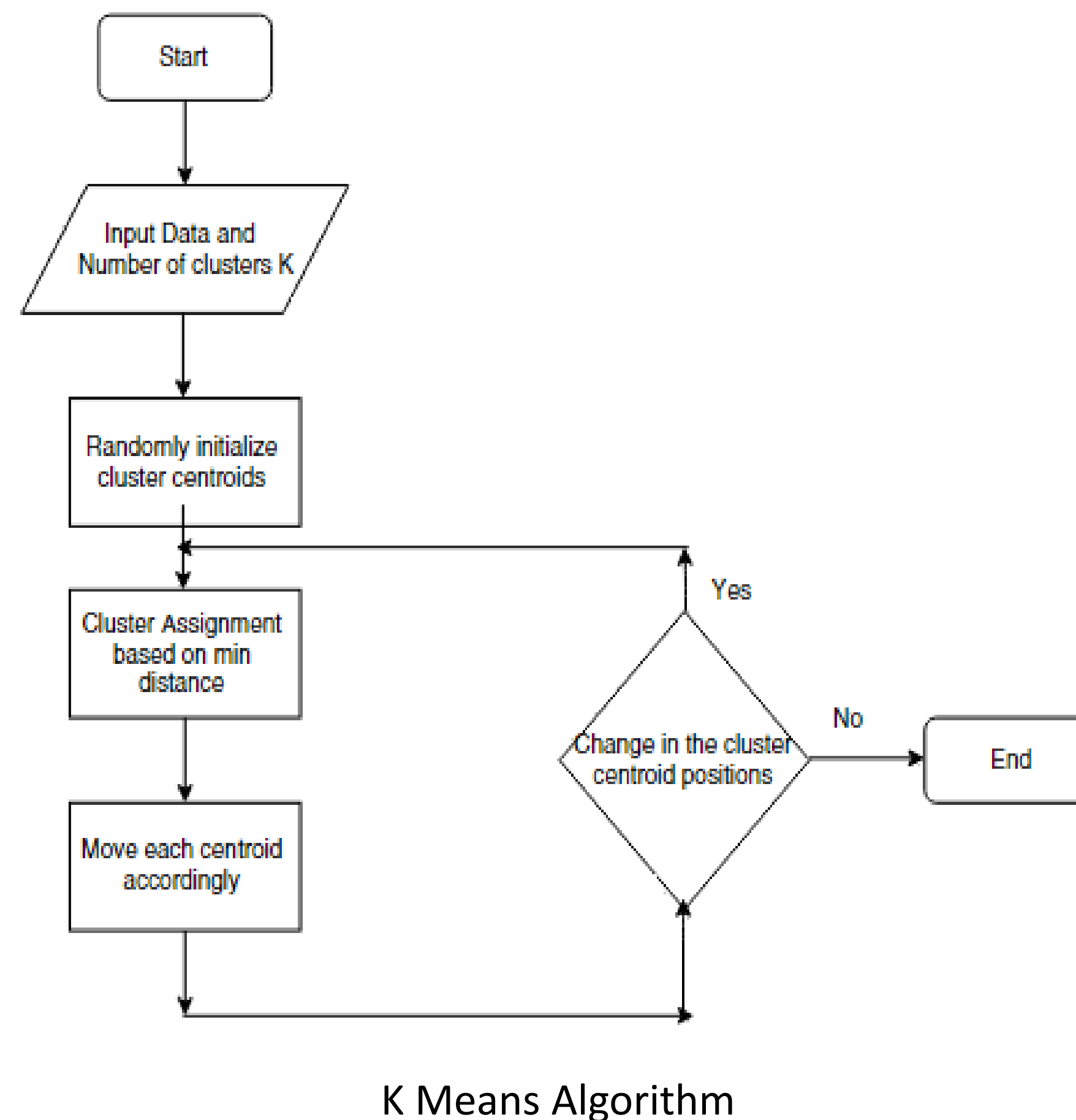
## PROJECT AIM

- Acquisition of signals from the bio sensor
- Implement machine learning algorithms for analyte classification
- Improve robustness by using sensor fusion.



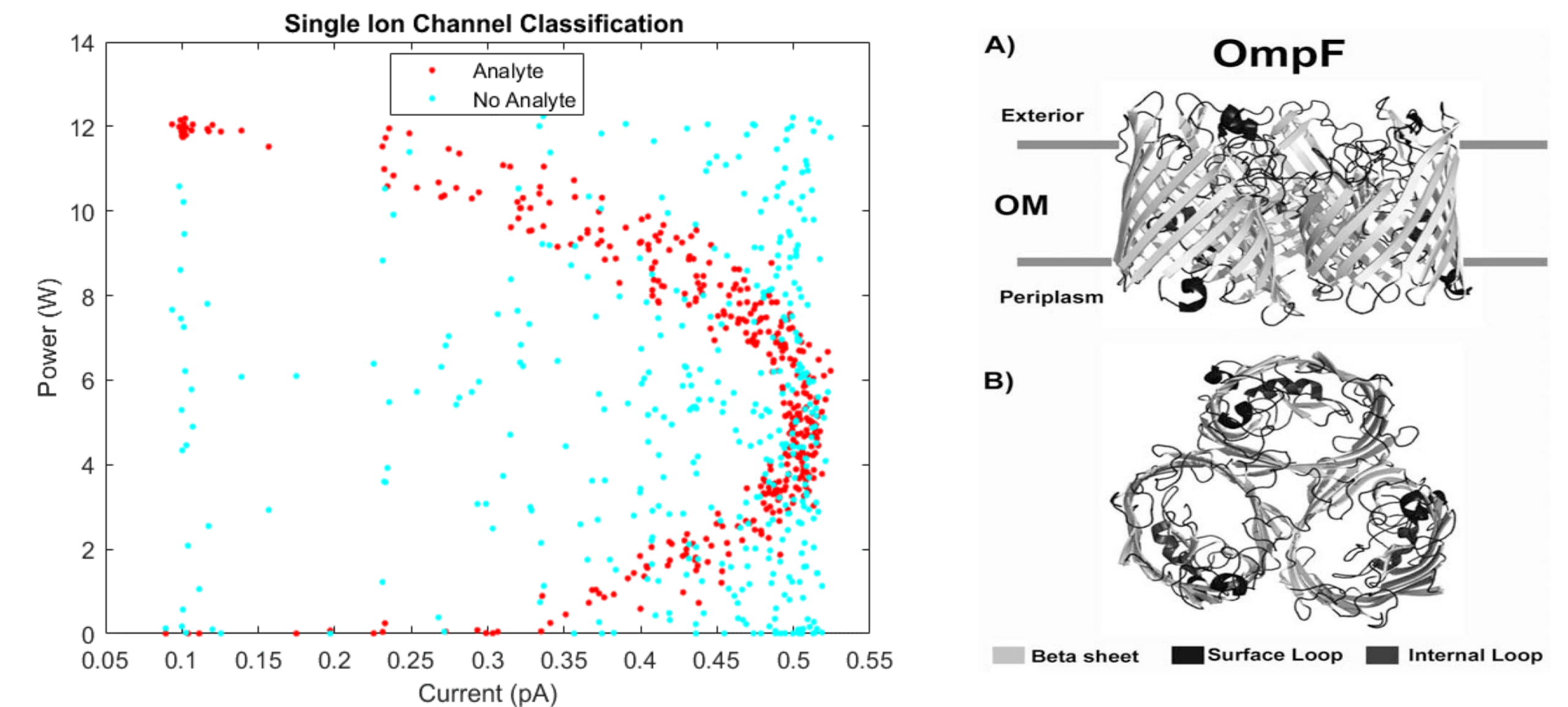
## EXPERIMENTAL METHODS

- Generation and acquisition of simulated and real data.
- Denoising and feature extraction using :
  - Transform domain features
  - Dwell Time Analysis
  - Wavelet decomposition
- Using various machine learning algorithms, such as SVM, K-means, Multilayer Perceptron etc., for classification of analytes.
- Deep Learning techniques will be explored.



## PRELIMINARY RESULTS

- PSD based feature extraction successfully classified simulated ion channel signals with an analyte present and signals without an analyte present



## ONGOING & PLANNED WORK

- Verify supervised, unsupervised and semi-supervised machine learning techniques for analyte classification using OmpF ion channels.
- Acquire data from multiple sensors at the same time.
- Reduce the susceptibility of channels to the external noise using sensor fusion.

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