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A Window in the Brain: Applying data science to quantitatively detect seizures with minimal-density EEG montage

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BrainsView

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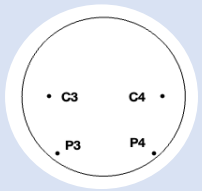
TAKE-HOME MESSAGE

Epileptic seizures can be detected with as few as **four** EEG channels with **above 70 %** accuracy.

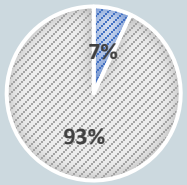
1. BACKGROUND

- Up to 74% of seizure in PCCU do not have clear clinical marker.
- Gold-standard seizure detection using multi-channels EEG needs:
  - Highly specialised neurologist
  - Trained clinical physiologists
  - Round-the clock service
- PCCU team can reliably apply a 4-channels montage shown here.

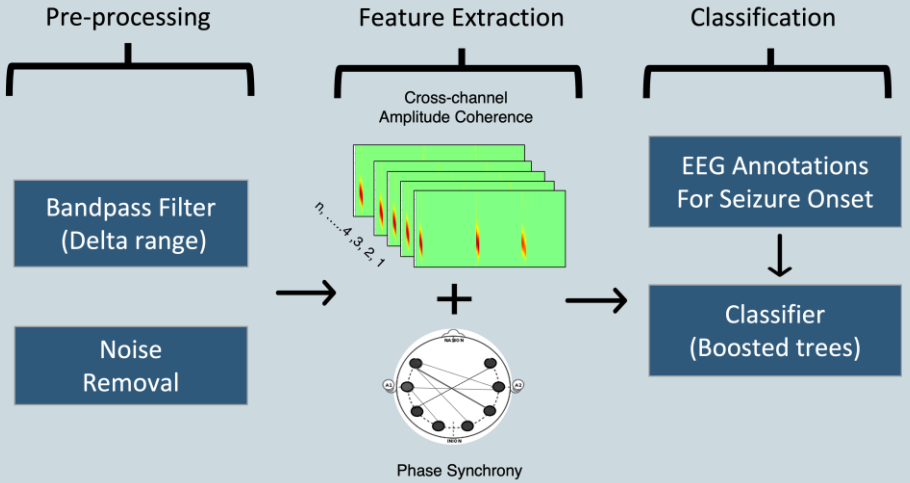


2. METHODS

- Forty fully anonymised routinely collected EEG provided by the Royal Hospital for Children and Young People
  - Age range: 1 -12 years old
  - Total duration: 38.5
  - No. Seizures: 236

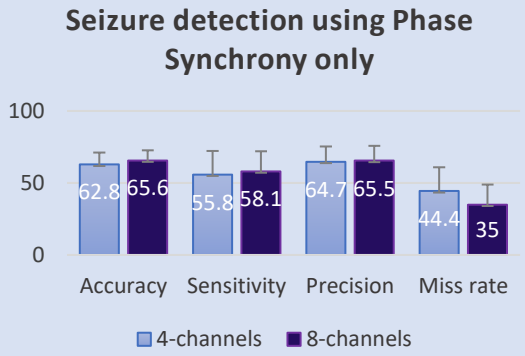


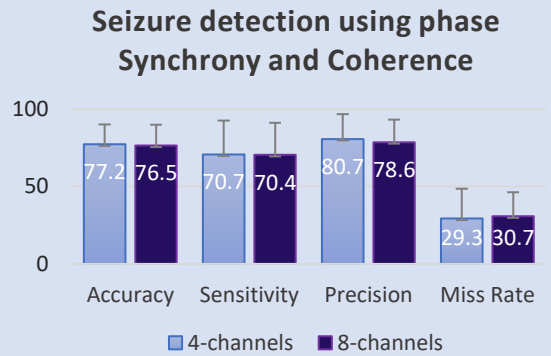
Seizure Onset Duration Background EEG



3. RESULTS

- Both features capture the number of connections between the pairs of channels .
- Using two features improved the accuracy for both 8 and 4-channels seizure detection.





5. FUTURE WORK

- **Multi -centre** recruitment of **data**
- **Improving the accuracy** and reducing the miss-rate
- Developing a user-friendly and **accurate seizure detection** tool for **frontline clinicals**