$25,000 • 45 teams

American Epilepsy Society Seizure Prediction Challenge

Enter/Merge by

Mon 25 Aug 2014 — Mon 17 Nov 2014 (2 months to go)

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Leaderboard

1. Nick Stupich
2. spacemanspiff
3. Jose M.
4. QMS
5. disgon
6. UMN
7. Michael Hills
8. Vilen Jumutc
9. Alexandre
10. d00

Forum (8 topics)

number of test clips
4 minutes ago

Classification label problem
17 hours ago

Additional Data
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Fields in Matlab file - can't find 'data' etc
4 days ago

Preictal data from Dog 4
5 days ago

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5 days ago

teams

players

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Predict seizures in intracranial EEG recordings

Seizure forecasting systems hold promise for improving the quality of life for patients with epilepsy.

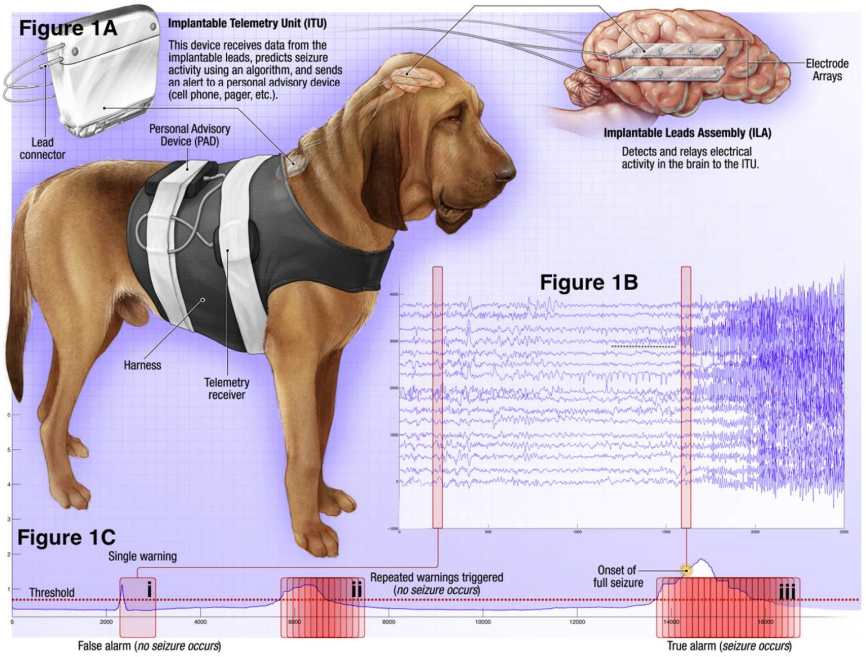
Epilepsy afflicts nearly 1% of the world's population, and is characterized by the occurrence of spontaneous seizures. For many patients, anticonvulsant medications can be given at sufficiently high doses to prevent seizures, but patients frequently suffer side effects. For 20-40% of patients with epilepsy, medications are not effective -- and even after surgical removal of epilepsy-causing brain tissue, many patients continue to experience spontaneous seizures. Despite the fact that seizures occur infrequently, patients with epilepsy experience persistent anxiety due to the possibility of a seizure occurring.

Seizure forecasting systems have the potential to help patients with epilepsy lead more normal lives. In order for EEG-based seizure forecasting systems to work effectively, computational algorithms must reliably identify periods of increased probability of seizure occurrence. If these seizure-permissive brain states can be identified, devices designed to warn patients of impeding seizures would be possible. Patients could avoid potentially dangerous activities like driving or swimming, and medications could be administered only when needed to prevent impending seizures, reducing overall side effects.

There is emerging evidence that the temporal dynamics of brain activity can be classified into 4 states: Interictal (between seizures, or baseline), Preictal (prior to seizure), Ictal (seizure), and Post-ictal (after seizures). Seizure forecasting requires the ability to reliably identify a preictal state that can be differentiated from the interictal, ictal, and postictal state. The primary challenge in seizure forecasting is differentiating between the preictal and interictal states. The goal of the competition is to demonstrate the existence and accurate classification of the preictal brain state in dogs and humans with naturally occurring epilepsy.

The Competition

Intracranial EEG was recorded from dogs with naturally occurring epilepsy using an ambulatory monitoring system. EEG was sampled from 16 electrodes at 400 Hz, and recorded voltages were referenced to the group average. These are long duration recordings, spanning multiple months up to a year and recording up to a hundred seizures in some dogs.



In addition, datasets from patients with epilepsy undergoing intracranial EEG monitoring to identify a region of brain that can be resected to prevent future seizures are included in the contest. These datasets have varying numbers of electrodes and are sampled at 5000 Hz, with recorded voltages referenced to an electrode outside the brain. The challenge is to distinguish between ten minute long data clips covering an hour prior to a seizure, and ten minute iEEG clips of interictal activity. Seizures are known to cluster, or occur in groups. Patients who typically have seizure clusters receive little benefit from forecasting follow-on seizures. For this contest only lead seizures, defined here as seizures occurring four hours or more after another seizure, are included in the training and testing data sets. In order to avoid any potential contamination between interictal, preictal, and post-ictal EEG signals interictal segments in the canine training and test data were restricted to be at least one week before or after any seizure. In the human data, where the entire monitoring session may last less than one week, interictal data segments were restricted to be at least four hours before or after any seizure. Interictal data segments were chosen at random within these restrictions for both canine and human subjects.

Participants are invited to visit the NIH-sponsored International Epilepsy Electrophysiology portal (http://ieeg.org) to review and download annotated interictal and preictal data from other patients and animal subjects. Using ieeg.org data for additional algorithm training is permitted.

Acknowledgements

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Started: 4:15 pm, Monday 25 August 2014 UTC
Ends: 11:59 pm, Monday 17 November 2014 UTC (84 total days)
Points: this competition awards standard ranking points
Tiers: this competition counts towards tiers