

Literature Review

CS-109A Data Science

Team Pivotal

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[Project Selection Guidelines](#)

Exploring various factor that might affect epilepsy and/or seizure recurrence that could be useful for the population.

Summary of Source 1: [The Association Between Childhood Seizures and Later Childhood Emotional and Behavioral Problems: Findings From a Nationally Representative Birth Cohort](#)

This study explores the social disadvantages of children afflicted with epilepsy. Primarily the study focuses on understanding the linkages between: 1.) perinatal complications with seizures and emotional/behavioral disorders, 2.) the association of seizure disorders with emotional/behavioral disorders, 3.) social disadvantage and fetal risk indicators as risk factors for seizures and emotional/behavioral disorders

This study found suggestions from the data that social disadvantage and a history of fetal vulnerability should not be a barrier to accessing care in children with mental health problems.

Summary of Source 2: [National Child Development Study \(NCDS - 1958 British Birth Cohort Study\)](#)

The original study aimed to identify social and obstetric factors linked to stillbirth and neonatal death. The study charts many aspects of the health, educational, and social development of cohort members as they passed through childhood into adolescence. The original sample was from 17,000 births in England, Wales, and Scotland, during the first week in 1958.

The measurements relevant to this project were taken at 7 year intervals. The medical data covered epileptic fits, tics and habit spasms. Sociodemographic information was also collected at each age. The cohort studies have added to our understanding the extent to which childhood illness and deficits in development persist into adult life. Also, that smoking is bad for you and your unborn child. Strengths include the large study sample, extensive data coverage, eight ages studied, use of objective measures, and standardized tests or scales, especially in the earliest phases of follow-up (e.g. for height and cognition). Simultaneous coverage of physical, cognitive, emotional, and behavioural development is a great strength of the childhood data. However, the cohort does not have the ethnic diversity of today's population

Summary of Source 3: [Management of a First Seizure](#)

Medical professionals frequently fail to distinguish *acute symptomatic* seizures from *unprovoked* seizures. Patients with *acute symptomatic* seizures are seldom referred to neurologists for long-term follow-up and often unnecessarily given an electroencephalographic evaluation. The critical factors and threshold for diagnosis based on these tools is not hard and fast.

However, education of Healthcare Providers about the distinctions between these two types of seizure disorders is critical to effective diagnostics and treatments.

Summary of Source 4: [Application of machine learning to epileptic seizure onset detection and treatment](#)

Epilepsy causes sudden burst of electricity in the brain that can cause unexpected seizures. Seizures can also be caused by conditions not related to epilepsy. Identifying if a seizure is due to epilepsy or due to other causes is a big challenge. Our goal in this project is to study the EEG (Electroencephalograms) dataset from the Children's Hospital of Boston for various subjects. These recording were taken on subjects whose anti-seizure medication were withdraw.

EEG captures brain electric signals using various probes that sit on the head. By studying the brain signals at normal behavior and during a seizure for epilepsy patients, we can help to classify brain signals from new patients with seizures to come up with a conclusion if they have epilepsy or not. Dataset [2] is from Children's Hospital Boston and contains 24 cases of children who have epilepsy. They range in age from 1.5 to 19 and their EEG readings were collected at different time frames in their life. Files that contain the EEG readings are in .edf format. These files contain the raw signal readings and we can convert this data to a columnar dataset using Python. Readings when the patient had seizures are marked separately.

Datasets We Intend to Use

Organization for Economic Co-operation and Development Health Statistics

[1] <https://discover.ukdataservice.ac.uk/?q=epilepsy&sf=Data+catalogue&searchType=data>

EEG data from Children's Hospital Boston

[2] <https://physionet.org/physiobank/database/chbmit/>

References

<http://www.webmd.com/epilepsy/>

<https://en.wikipedia.org/wiki/Epilepsy>

https://en.wikipedia.org/wiki/Epileptic_seizure

https://en.wikipedia.org/wiki/Seizure_types