AI Detecting Infant Seizures (AIDIS)

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Background

• It is a neurological disorder characterized by abnormal, sudden, and excessive electrical discharges in the brain.

• According to CDC, 1.2% of the US population have active epilepsy (3 million adults and 470,000 children).

• Pediatric epilepsy typically manifests in childhood, and seizures may occur at any age during childhood, from infancy to adolescence.
CAUSES OF SEIZURES (BY AGE)

**NEONATES**
- CNS infection
- Developmental disorders
- Drug withdrawal
- Genetic disorders
- Intracranial hemorrhage and trauma
- Metabolic disturbances (hypoglycemia, hypocalcemia, hypomagnesemia, pyridoxine deficiency)
- Perinatal hypoxia and ischemia

**INFANTS AND CHILDREN**
- CNS infection
- Developmental disorders
- Febrile seizures
- Genetic disorders (metabolic, degenerative, primary epilepsy syndromes)
- Trauma

**ADOLESCENTS**
- Brain tumor
- Genetic disorders
- Illicit drug use
- Infection
- Trauma

**YOUNG ADULTS**
- Alcohol withdrawal
- Autoantibodies
- Brain tumor
- Illicit drug use
- Trauma

**OLDER ADULTS**
- Alcohol withdrawal
- Alzheimer’s disease and other degenerative CNS diseases
- Autoantibodies
- Brain tumor
- Cerebrovascular disease

Source: Lowenstein, Daniel H. Harrison’s Principles of Internal Medicine, 20e, Chapter 418: Seizures and Epilepsy. McGraw Hill; 2021.
Current Diagnostic tools: electroencephalogram EEG, MRI, CT scan

Type of seizure

- Focal onset
  - Moton
    - Non-motor
  - Bilateral tonic-clonic

- Generalized onset
  - Motor
    - Mal Tonic-clonic
  - Non-motor
    - Absent

NO Available non-invasive tool
Motor/Jerk movement (hallmark symptom)

Bilateral movement

Creating active diagnostic tool

AI Detecting Infant Seizures (AIDIS)
AIDIS

- Wearable device designed to assist in detecting jerking movements associated with epileptic episodes in pediatric patients, utilizing AI-generated movement sensor data
AIDIS design

• **Data storage:** in SDS card (within the device) plus the application tracker

• **Target age:** 0-2 (age that are not able to express their feeling)

• **Power source:** charge

• **Weight:** 10-12 g (~0.02 lb.)
AIDIS generation

Data Collection
- dataset includes examples of normal and seizure-related body movements

Define Features
- speed of movement, unusual body postures, repetitive motions

Movement Sensor
- accelerometer data stored in wearable devices

Label movement and model selection
- Annotate dataset with labels indicating normal vs seizure-related movements using algorithmic models

Training

Real-time Monitoring
AIDIS

Measure abnormal jerk movement using AI sensor
Thank you

Questions !