**Trust Sensor Interface for Improving Reliability of EMG-based User Intent Recognition**

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**Problem Statement**

- **Objective**
  - To develop a trustworthy neural-machine interface (NMI) that accurately interprets the user’s intended movements for neural control of artificial legs.

**Challenges**

- Diverse disturbances may:
  - Distort the recorded Electromyographic (EMG) signals
  - Cause sensor failure
  - Lead to errors in user intent identification
  - Cause tumbles/falls of the amputees

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**Key Components of Trust Evaluation Interface**

- **Abnormal Detector**
  - Detect diverse disturbances

- **Sensor Trust Evaluation**
  - Evaluate trustworthiness of EMG sensors based on their “disturbance history”.

- **System Trust Evaluation (Future Work)**
  - Evaluate reliability of NMI system

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**Performance**

**Trust Evaluation Interface Demonstration for Subject Sitting and Standing**

- Sit(no disturbance)
- Sit(disturbance)
- Stand(no disturbance)
- Stand(disturbance)

**Demonstration of Abnormal Detector and Sensor Trust Evaluation**

- **EMG Signal with Unrecoverable Disturbance (Loss of Contact)**
  - **Loss of Contact**
  - **Data Sample Detection Result**
  - **Sliding Window Trust Value**

- **EMG Signal with Recoverable Disturbances (Motion Artifacts and Baseline Noise)**
  - **Detection Results**
  - **Threshold Detection Delay**
  - **Sliding Window Trust Value**

**Impact**

- **A trust sensor interface (TSI) addresses disturbances from a new angle:**
  - Detect disturbances
  - Evaluate EMG sensor reliability based on its “disturbance history”
  - Help NMI system to dynamically adjust its operations.

- **TSI demonstrates a great potential in:**
  - Improving the reliability of deciphering user intent
  - Improving the safety of amputees.

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