Using Speech to Follow-up Sleep Disorders
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Sleep disorders and speech

Sleep disorders affect 1/3 of the world’s population and impact their daily and professional quality of life. It is also a major public health problem (20% of car accidents were caused by sleepiness).

Clinicians use the Ecological Momentary Assessment method to follow-up patients’ symptoms evolution in ecological conditions.

Speech is a useful modality because its collection is non-invasive and passive.

Previous results: read speech

**Multiple Sleep Latency Test corpus (MSLTc)**
- Recorded at the Bordeaux sleep clinic (France)
- 135 patients (675 recordings)
- Subjective and objective sleepiness
- Patients’ characteristics and comorbidities

**Results (UAR)**

- **Subjective sleepiness**
  - KSS: 67.8%
- **Objective sleepiness**
  - ESS: 75.4%
  - MSLT: 84.6%

Speech biomarkers extracted:
- Acoustic features [1]
- Location and duration of pauses in read speech [2]
- Errors in Automatic Speech Recognition [3]

Pathological sleepiness can be automatically detected using speech biomarkers specific to read speech.

But we need more ecological data collection → spontaneous speech.

Objectives of my thesis: spontaneous speech

**Medispeech corpus**

Similar to the MSLTc but:
- Recordings with a smartphone
- 2 new tasks:
  - Semi-spontaneous speech
    - “Describe the rules of a game of your choice”
  - Spontaneous speech
    - “Is it difficult for you to get out of bed?”

New speech biomarkers:
- Phonetical and phonological analysis of speech [4]
- Validation of the previous biomarkers on spontaneous speech

Perspectives:
- Biomarkers of sleepiness in spontaneous speech
- Integrate speech analysis in clinical practice using mobile devices
- Other symptoms (fatigue, depression, anxiety…)

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[1] V. P. Martin et al., “Sleepiness detection on read speech using simple features”, IEEE, 2019