

30% OF ADULTS



Common sleep-wake disturbances

Sleep apnea

Insomnia

Rem Behavior Disorder (RBD)

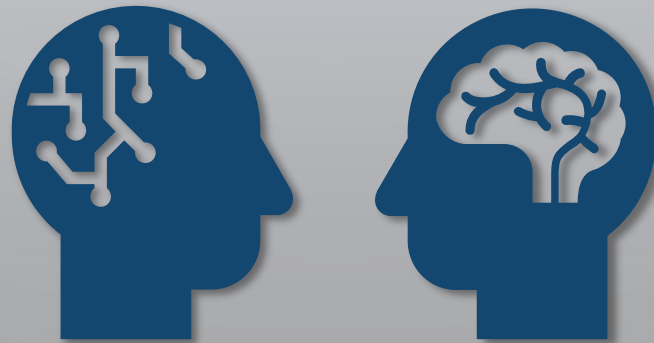
Associated with neurological/
psychiatric diseases



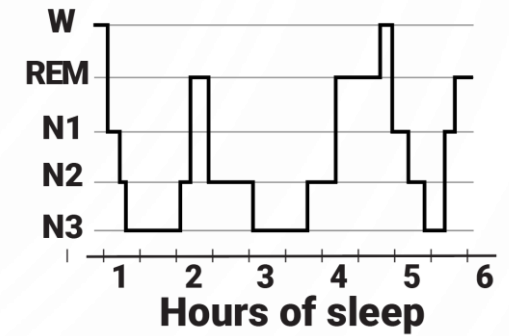
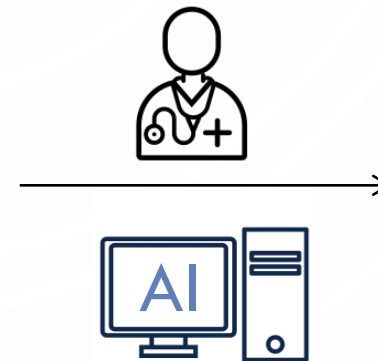
EXPLAINING UNCERTAINTY IN AI FOR CLINICAL DECISION SUPPORT

ELISABETH HEREMANS, MAARTEN DE VOS

09/22/2023 – ECML-PKDD '23

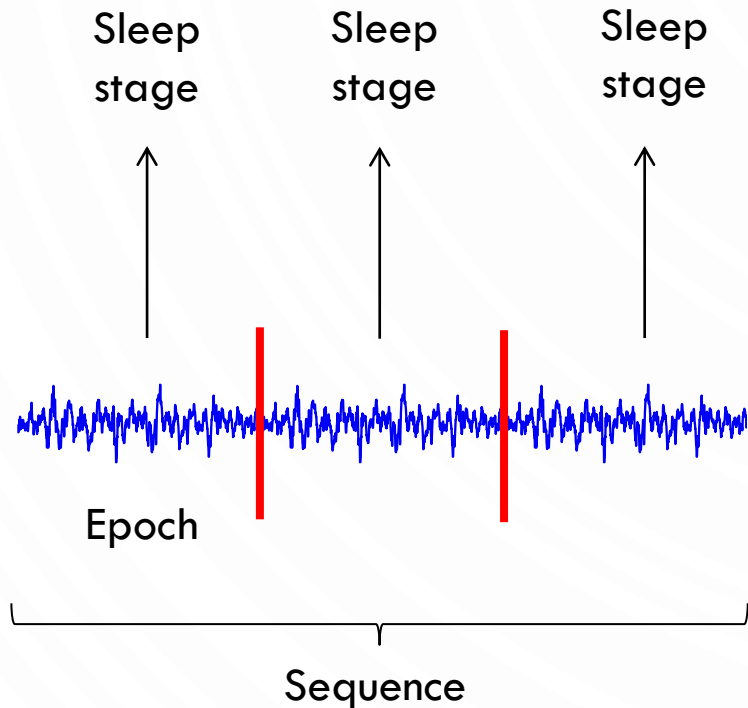


SLEEP MONITORING

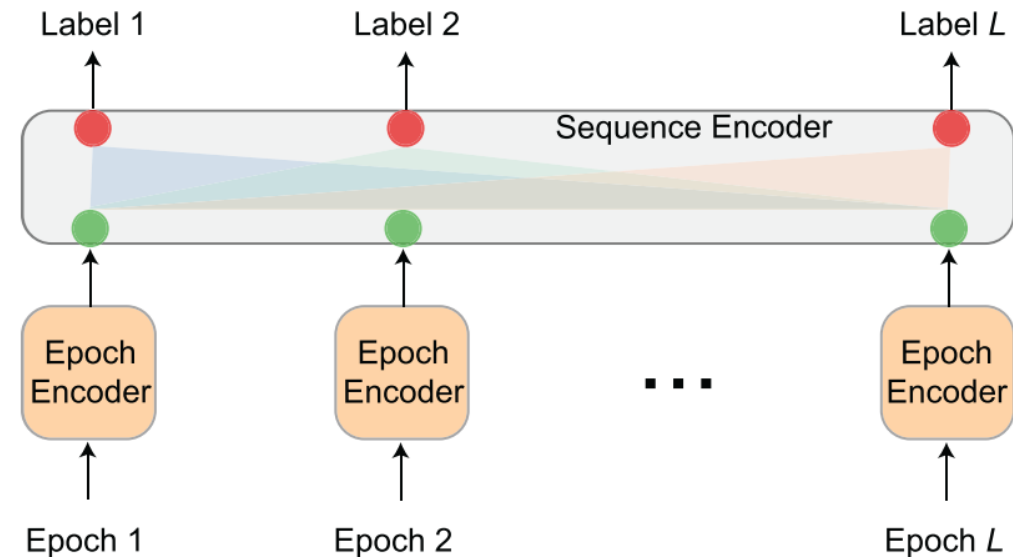


ELISABETH HEREMANS - KU LEUVEN

DEEP LEARNING METHODS FOR SLEEP STAGING

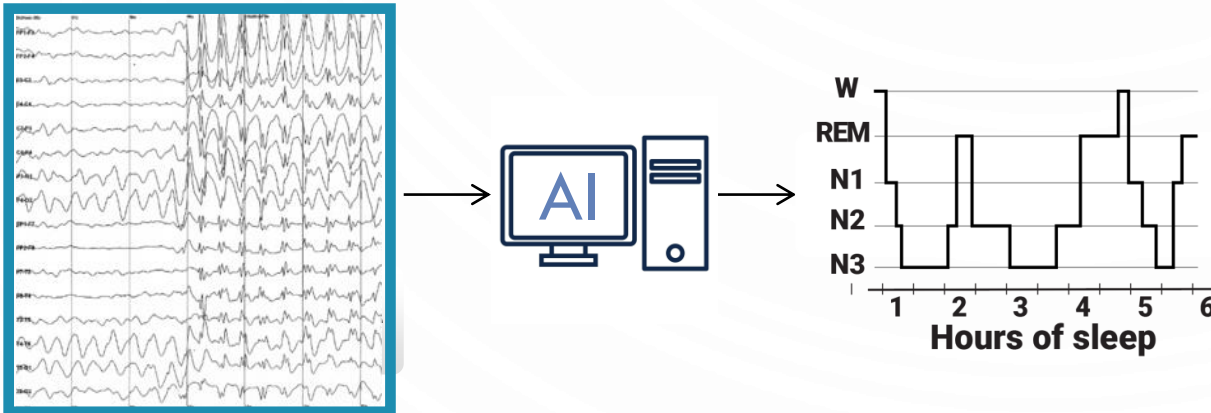


- Modeling long-range dependency
- Sequence-to-sequence frameworks



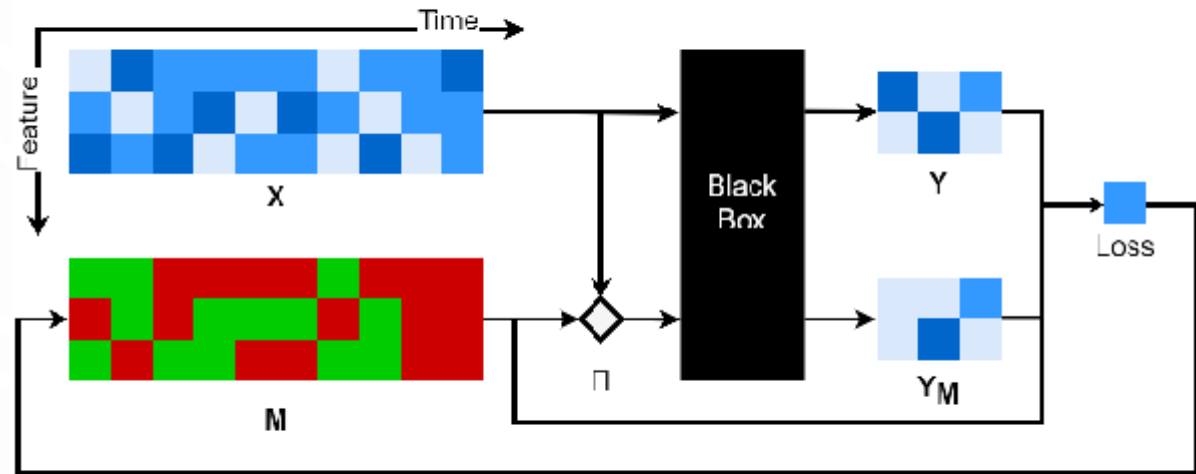
CAN DOCTORS TRUST DEEP LEARNING?

- High-stakes decisions
- AI needs to be explainable & reliable



EXPERIMENTS

- Deep learning model
- Dynamic masking



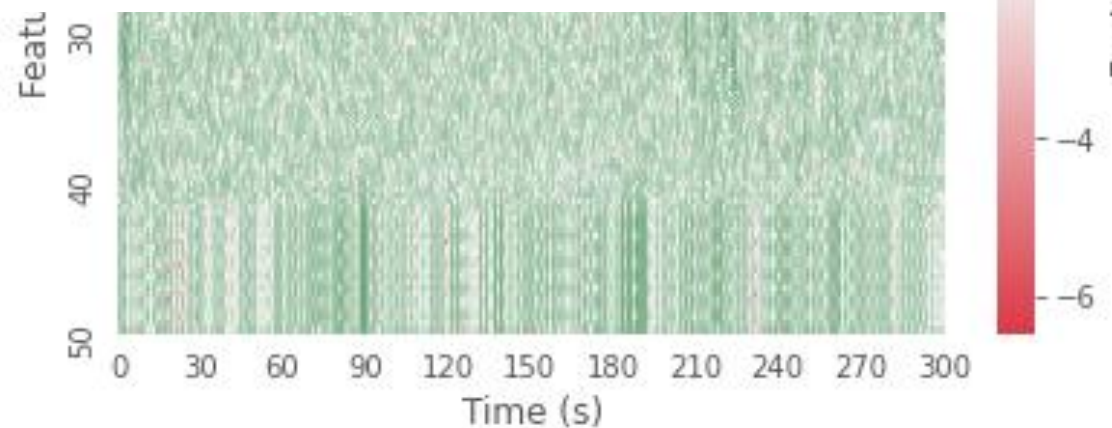
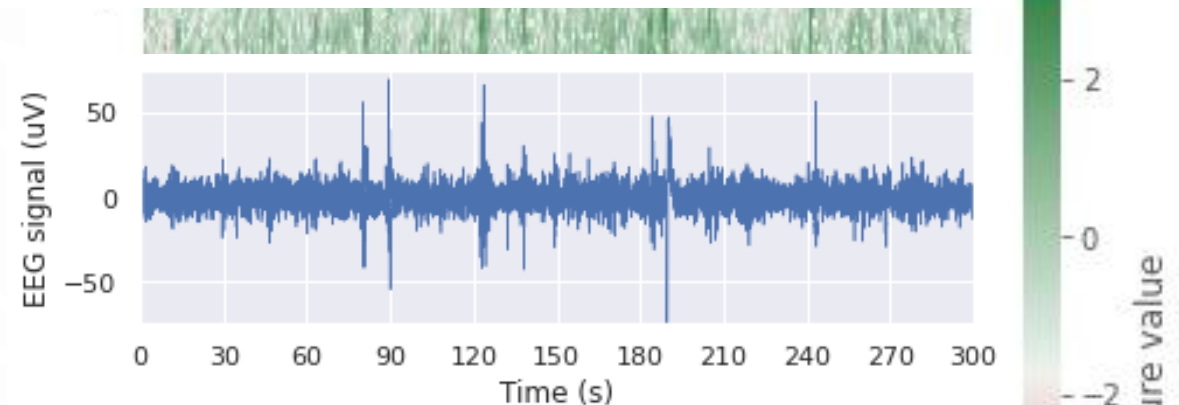
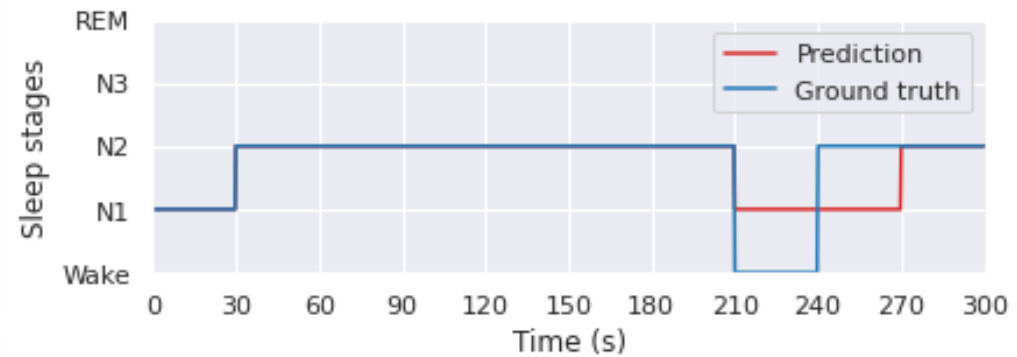
DATA

One test sample

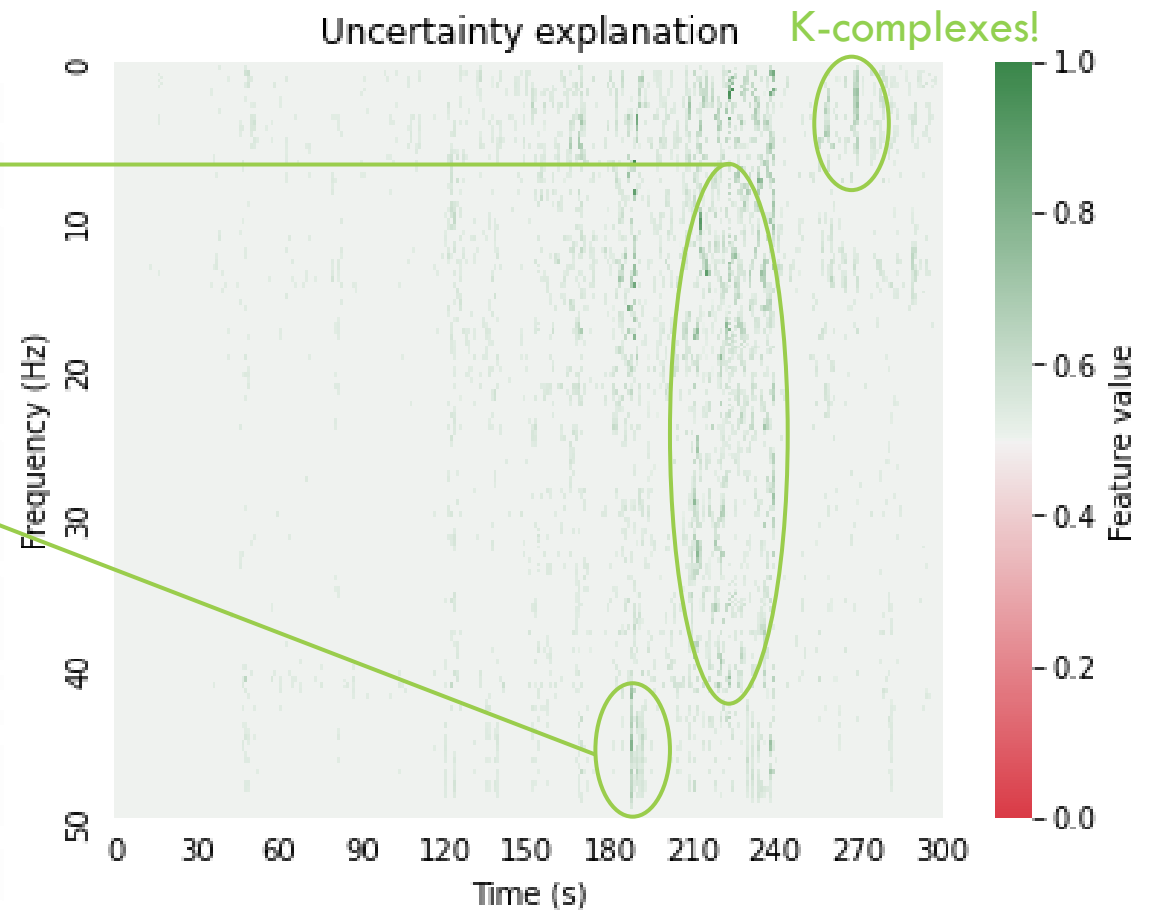
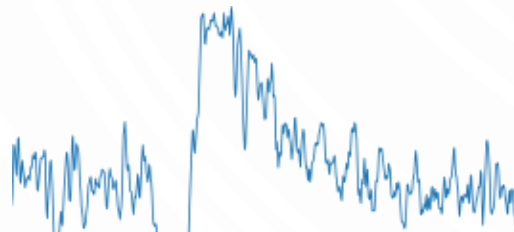
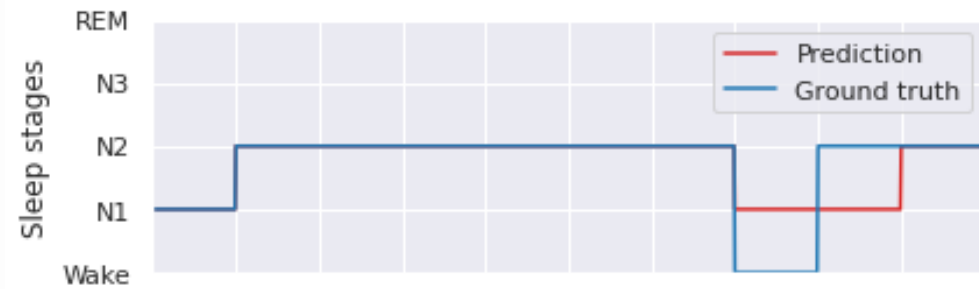
- Sequence of 10 30-sec segments
- EEG signal = time series



Time-frequency representation



UNCERTAINTY EXPLANATION



CONCLUSIONS

- Proof-of-concept experiments show promising results for uncertainty explanations on sleep data
- Future work
 - Quantitative & qualitative evaluations
 - Compare strategies of post-hoc explanations & uncertainty estimation metrics



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Thanks to Maarten De Vos,

