



CENTER FOR MEDICAL DATA SCIENCE
MEDICAL UNIVERSITY OF VIENNA
Institute of Artificial Intelligence

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MEDICAL UNIVERSITY OF VIENNA
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Christoph Bock

Machine Learning in Biomedicine



Georg Dorffner

Machine Learning for Prediction
and Signal Processing

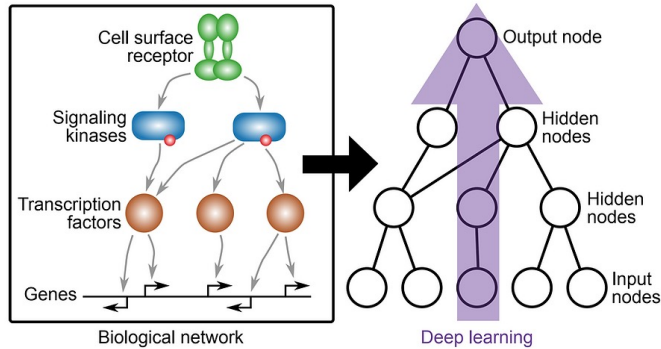


Matthias Samwald

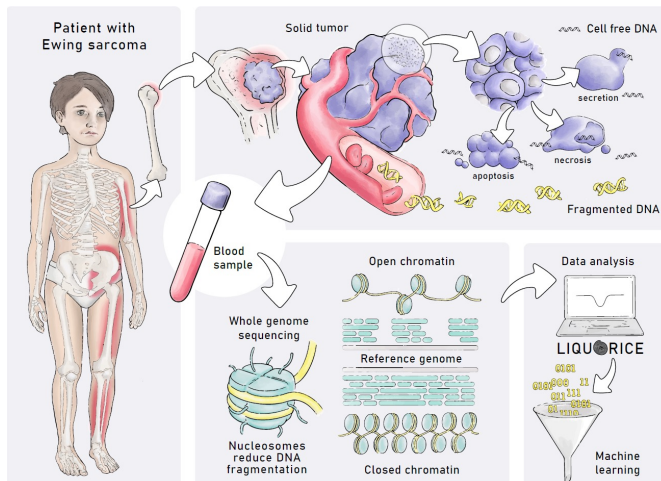
Generative AI

Bock Group: Machine Learning in Biomedicine


Interpretable Deep Learning with Knowledge Primed Neural Networks¹




Machine Learning for Precision Medicine²




¹Fortelny et al. (2020) *Genome Biology*; ²Peneder et al. (2021) *Nature Communications*; ³Bednarsky et al.; ⁴Schaefer et al.



Christoph Bock

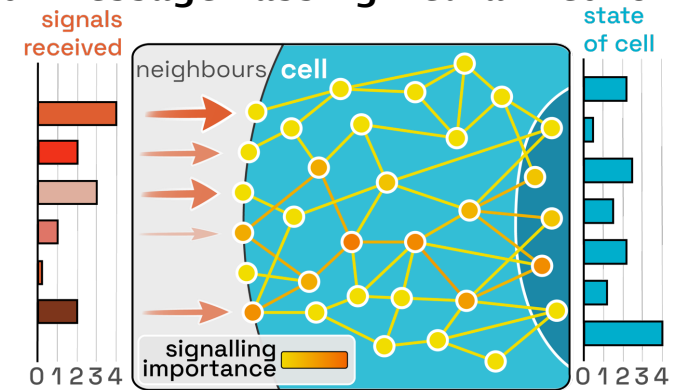


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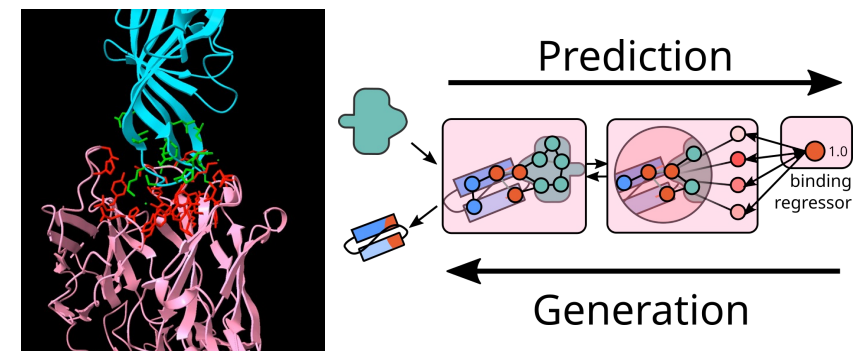


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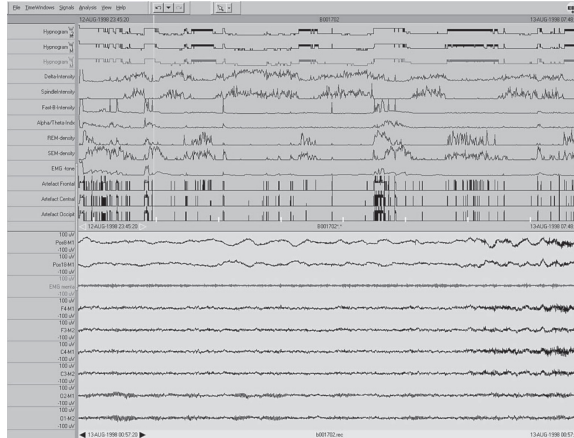
Modeling Cell Communication Signal Flow with Message Passing Neural Networks³



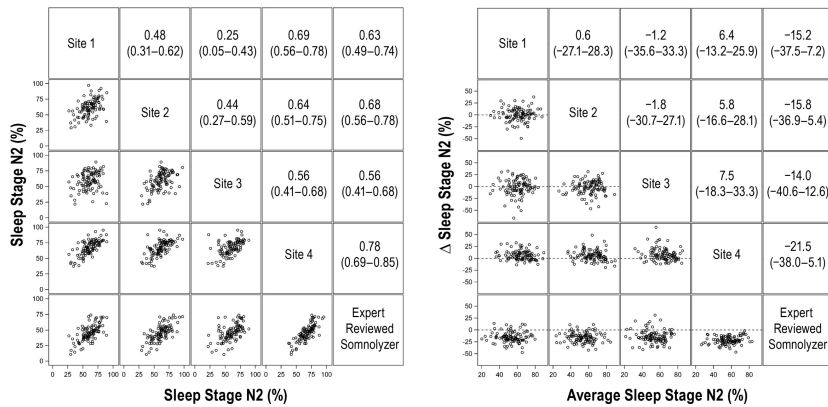
Generative Modeling for Protein Design⁴



Dorffner Group: Machine Learning for Prediction and Signal Processing



Somnolyzer
AI for Automated Sleep Staging^{1,2}

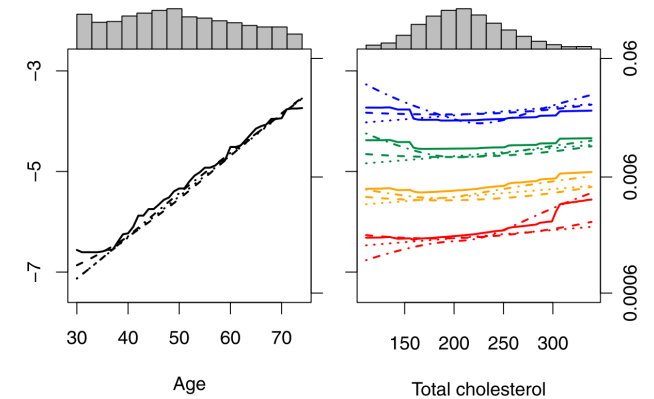


Georg Dorffner

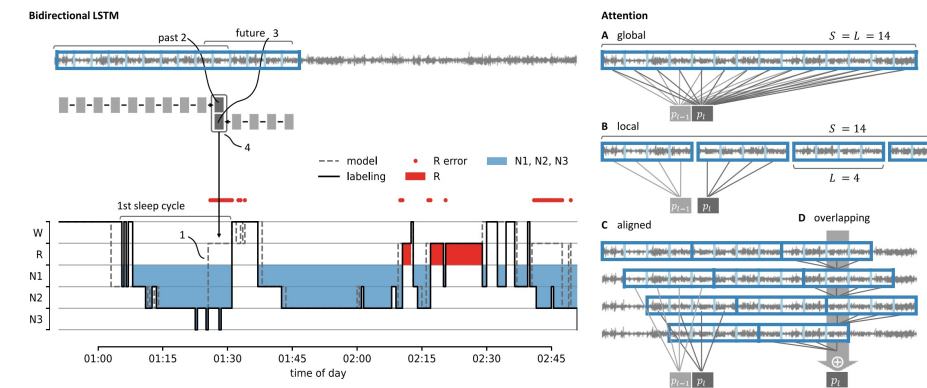


www.meduniwien.ac.at/user/georg.dorffner

Cardiovascular Risk Prediction³



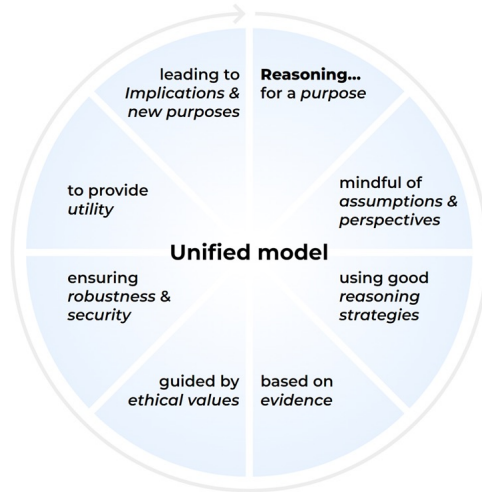
Transformers for EEG Processing⁴



¹Anderer et al. (2010) *Neuropsychobiology*, ²Punjabi et al. (2015) *Sleep*, ³Wallisch et al. (2021) *BMC Med Res Meth*, ⁴Brandmayer et al. (2022) *Neural Networks*

Samwald Group: Generative AI

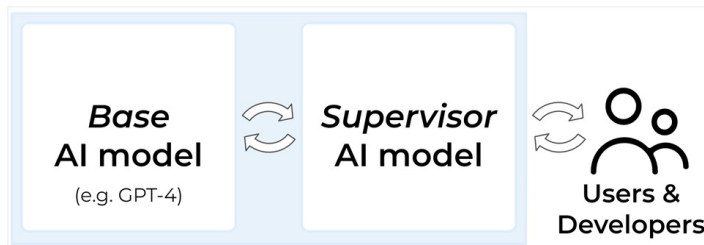
- AI safety & security
- Structured reasoning
- Self-evaluation & self-reflection
- Explainability
- Human critical thinking
- Ethical & regulatory guidelines
- ...



A unified model for self-reflective reasoning in AI systems

Hundreds of principles from literature on AI, human cognition, ethics and other disciplines

Self-reflection and self-improvement in language-based foundation models



Matthias Samwald

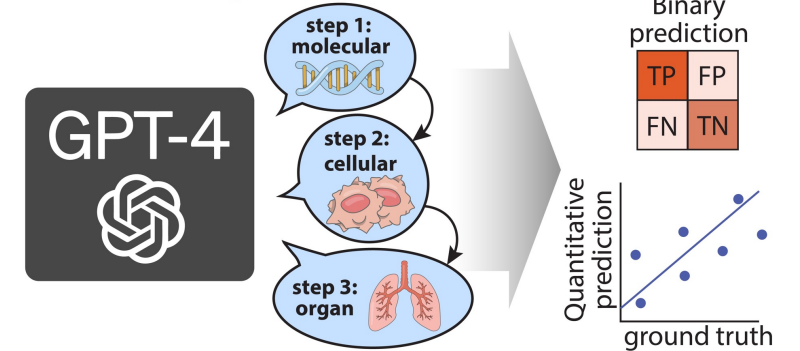


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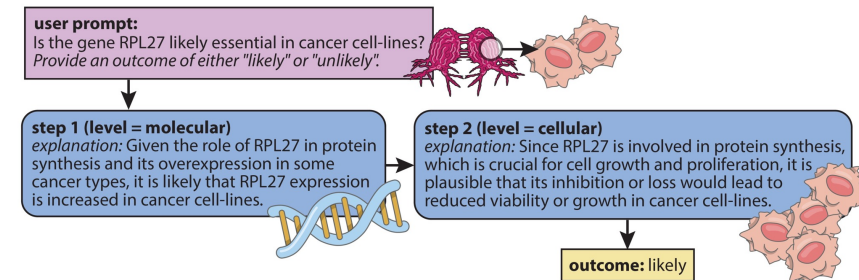


@matthiassamwald

SimulateGPT



Large language models as universal biomedical simulators¹



¹Schaefer, Reichl, ter Horst, Nicolas, Krausgruber, Piras, Stepper, Bock, Samwald. Large language models are universal biomedical simulators. (2023) *bioRxiv*

Interested in joining?

How to find and contact us?

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Deep Learning
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