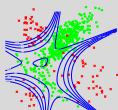**Lars Gabriel, Felix Becker, Mario Stanke**

KIBlock Introduction

Lecture *Machine Learning* vom March 15, 2022

Lars Gabriel, Felix Becker, Mario Stanke
Institut für Mathematik und Informatik
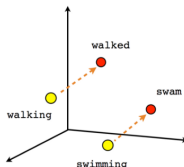Universität Greifswald

1.1

Lars Gabriel, Felix Becker, Mario Stanke
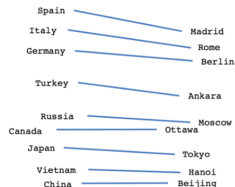
Natural Language Processing

- *GPT-3*[1]: 175 billion parameters
- Pretraining on large text corpus (transfer learning)
- Task-agnostic (can be used for many purposes e.g. translation or text generation)
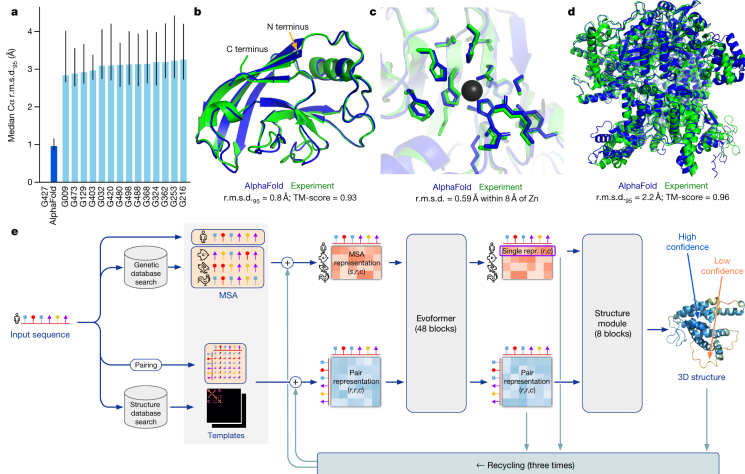- word embeddings:
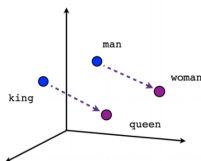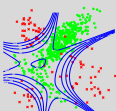

Male-Female

Verb tense

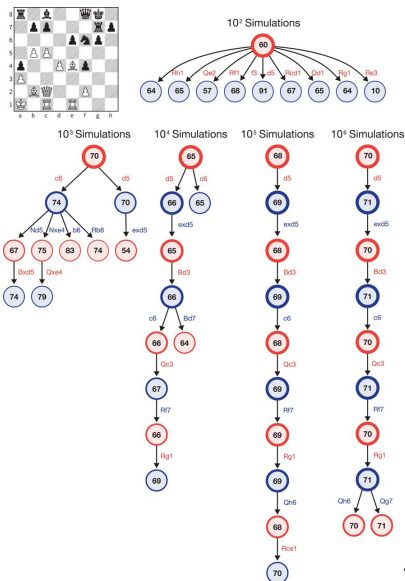Country-Capital   2

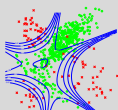[1] Language Models are Few-Shot Learners, Brown et al., 2020
[2] towardsdatascience.com/creating-word-embeddings-coding-the-word2vec-algorithm-in-python-using-deep-learning

AlphaFold

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[3]Highly accurate protein structure prediction with AlphaFold, Brown Mann
Ryder Subbiah et al., 2020

AlphaZero

- Reinforcement learning by self-playing symmetric games millions of times in parallel
- Beat the top ranked Go player in the world
- Uses neural networks to make an educated guess on the best actions (policy) and their expected outcome

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[4]A general reinforcement learning algorithm that masters chess, shogi, and Go through self-play, Silver et al., 2018

1.4

ResNet

- ResNet [5] are very deep networks with great performance in image classification

- Introduced a very useful trick (residual connections) for stable training with large numbers of layers

[5] Deep residual learning for image recognition, He et al., 2016