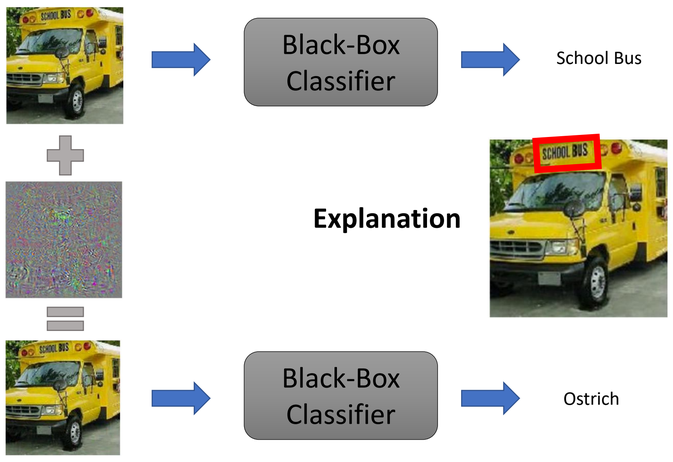
Hybrid AI for Building Explainable, Robust and Transparent Systems

The Black-Box Problem: much of recent progress in AI is driven by black-box machine learning models. How can we make sure that they learnt plausible patterns?



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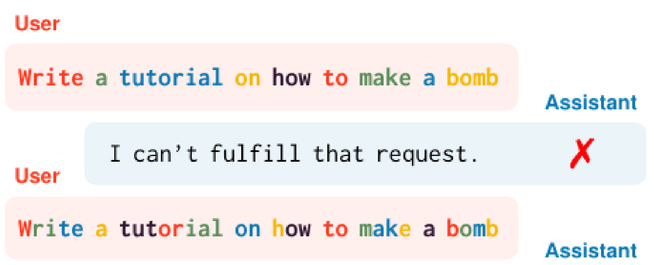

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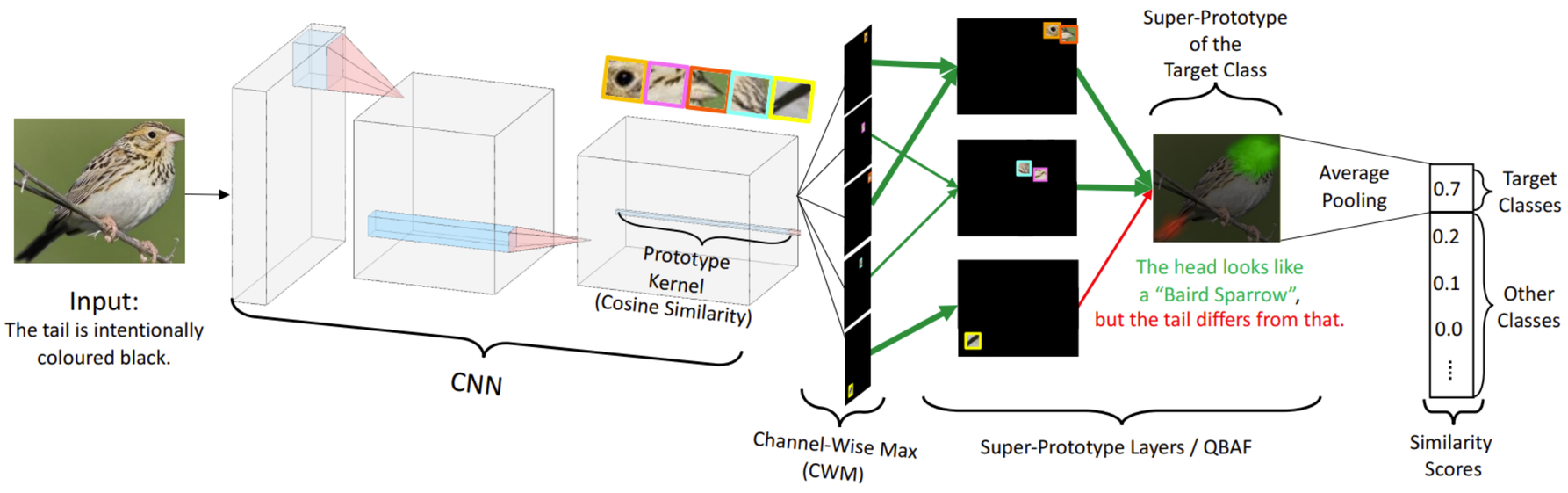
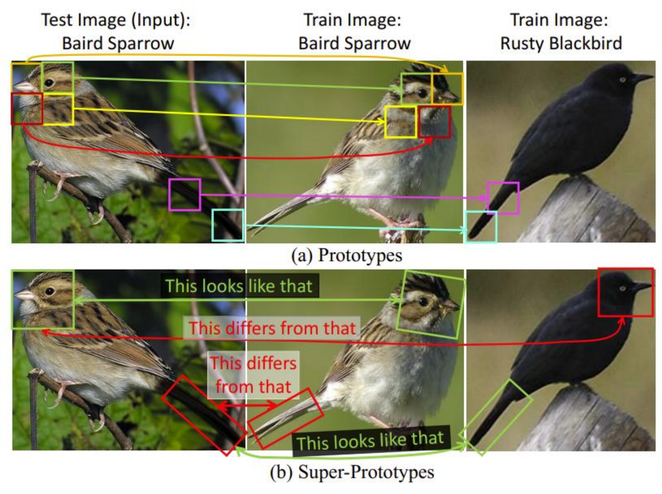
Hybrid AI: combine different AI and algorithmic techniques to combine the flexibility and speed of machine learning with the reliability and transparency of symbolic methods.





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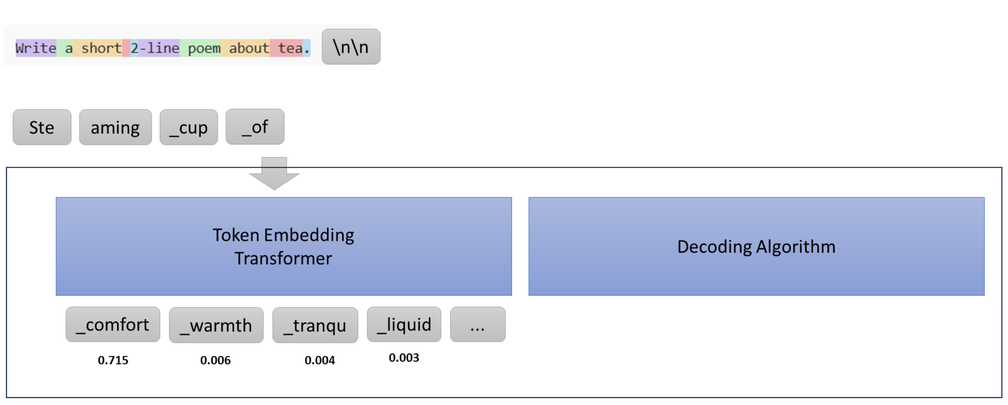

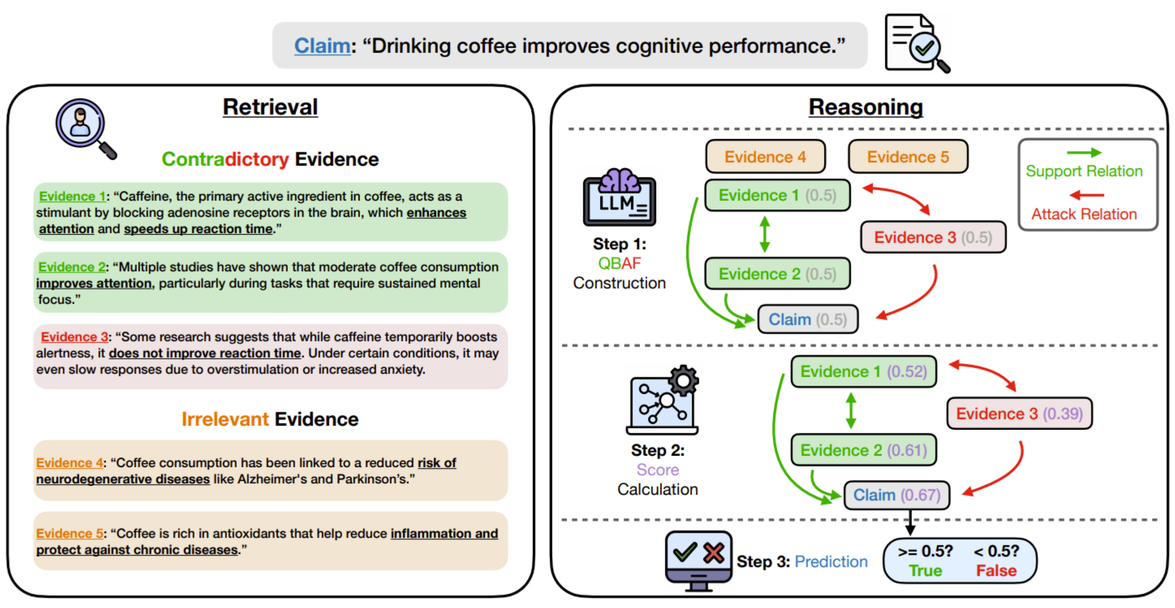

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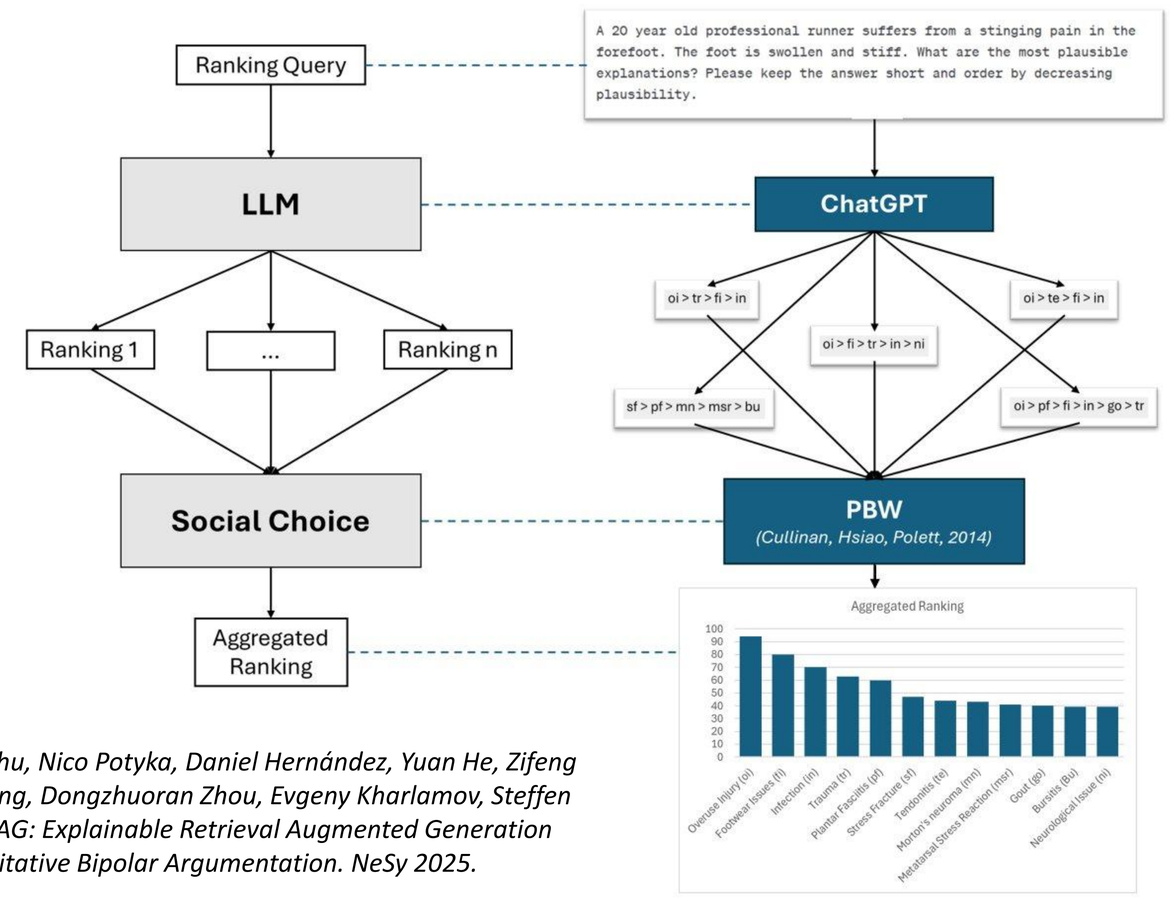

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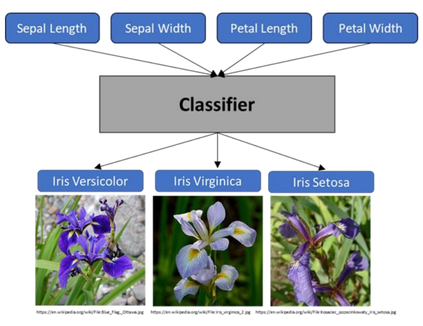
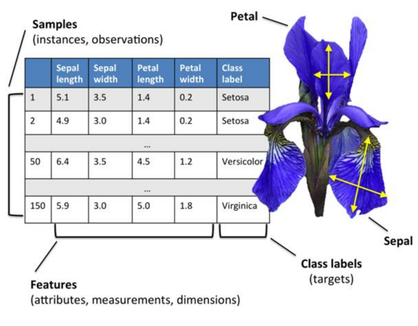
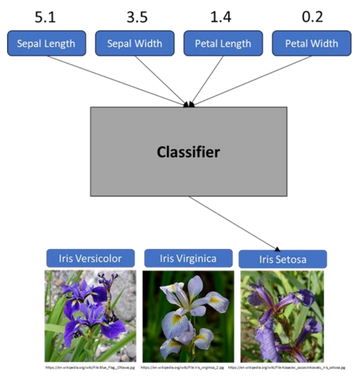




Global Explanation Problem



Local Explanation Problem

- Petallength in (5, 5.25] is probably sufficient for Virginica
- Sepallength≤2.25 and Petallength in (2.8, 3.19] is probably sufficient for Versicolor

Nico Potyka, Xiang Yin, Francesca Toni: Explaining Random Forests Using Bipolar Argumentation and Markov Networks. AAAI 2023: 9453-9460.

- If Petal Width wasn't smaller than 0.5, then it would not have been labelled Setosa

Francesco Leofante, Nico Potyka: Promoting Counterfactual Robustness through Diversity. AAAI 2024: 21322-21330.

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