



Explanatory machine learning for sequential human teaching

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Operational quantification of comprehension

Effects of sequential interactions

Meta-interpretive learning (MIL)

rule= { grandfather(X,Y) :- father(X,Z), parent(Z,Y). }

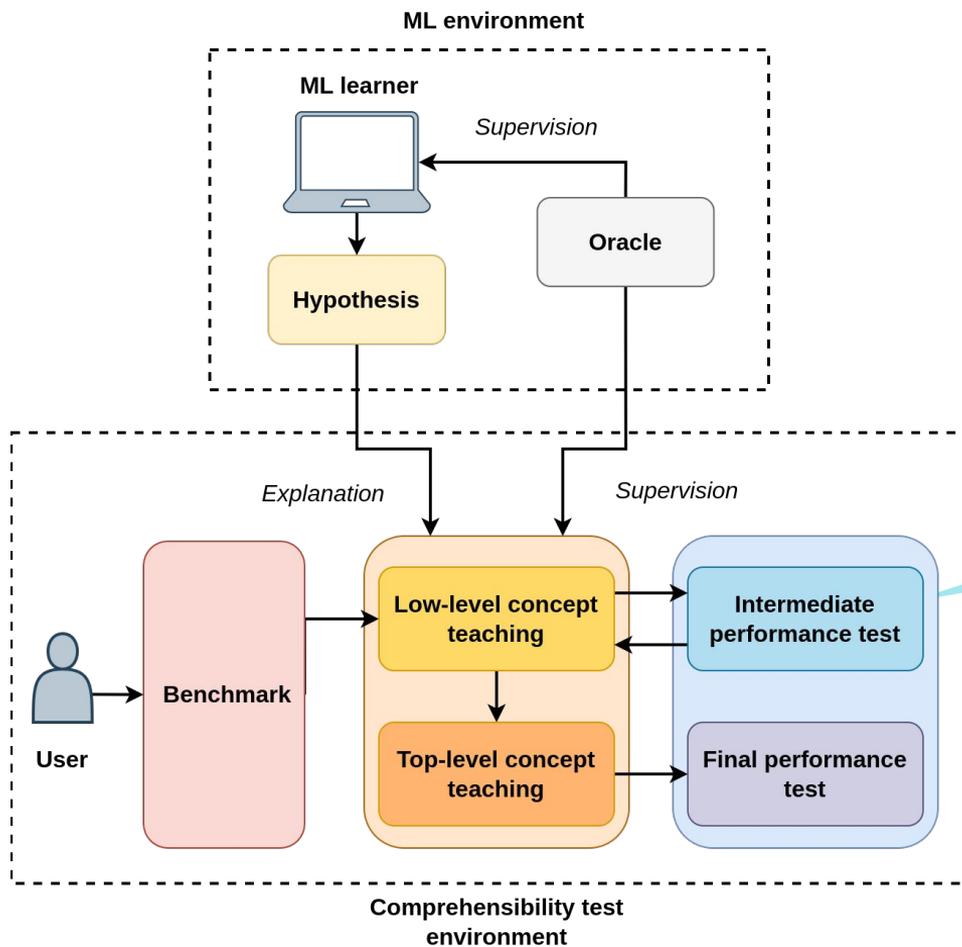
background= { father(john,susan). parent(susan,sam). }

metarule= { P(X,Y) :- Q(X,Z), R(Z,Y). }

example= { grandfather(john,sam). }

E.g. Why is John the grandfather of Sam?

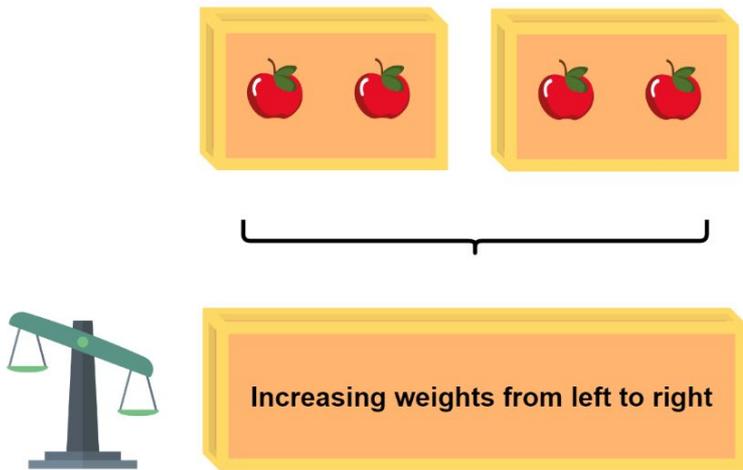
“John is the father of Susan and Susan is a parent of Sam”



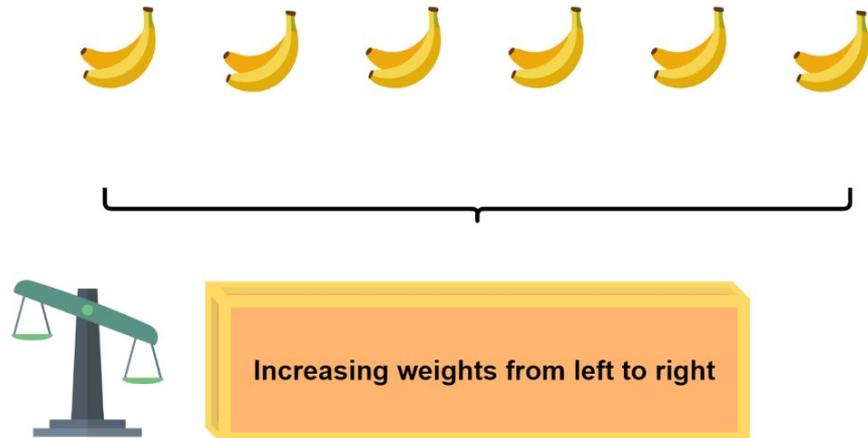
Explanatory effect =

Explanation-learning performance

— *Example-learning performance*

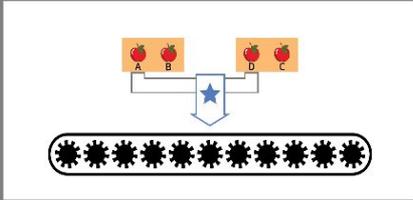


Merge

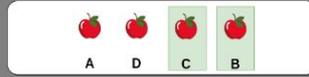


Sort

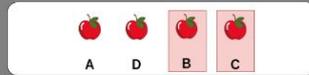
You answer is **WRONG!**



Initial state



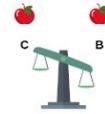
This answer is **CORRECT!**



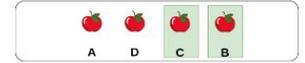
SELECTED >>>
This answer is **WRONG!**

Read the feedback and continue
whenever you are ready (60 SECS)

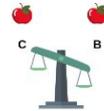
Item C is lighter than item B; append item C



Append remaining item(s): B



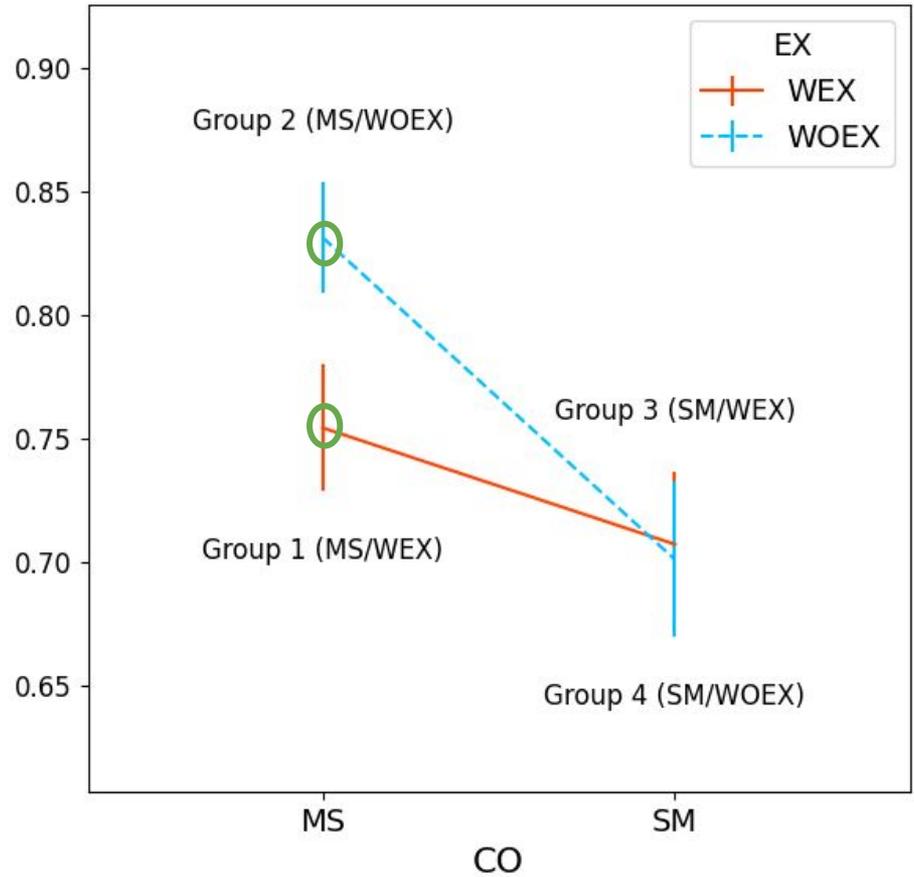
Item C is lighter than item B **SO** item C should be appended



Continue

Merge-then-sort curriculum
(MS): **beneficial effect.**

Performance



Human trace vs. sorting algorithms

Explanations and incremental learning:

Rediscovery of an efficient algorithm

Improvement of performance

Future work

Human trace analysis

Assisting human discovery

Q & A