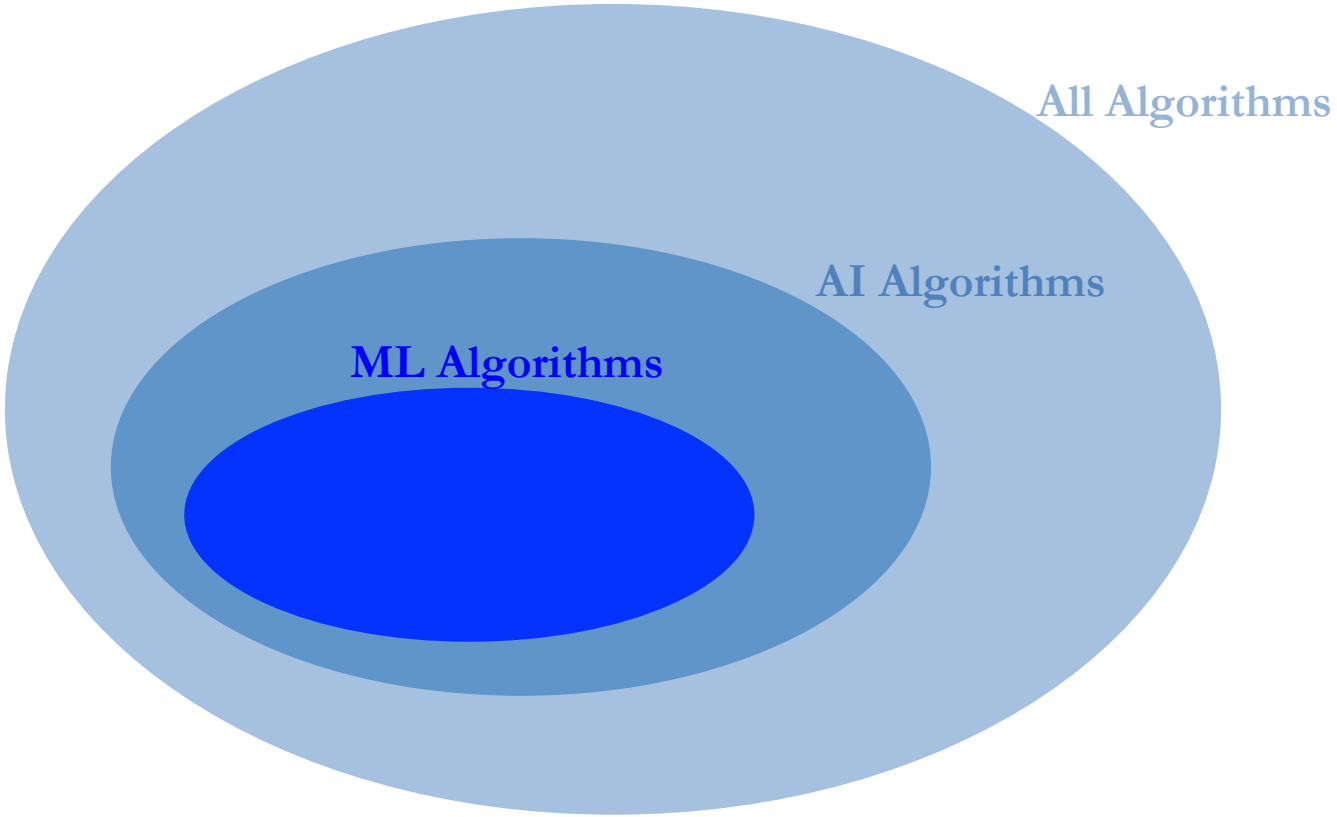
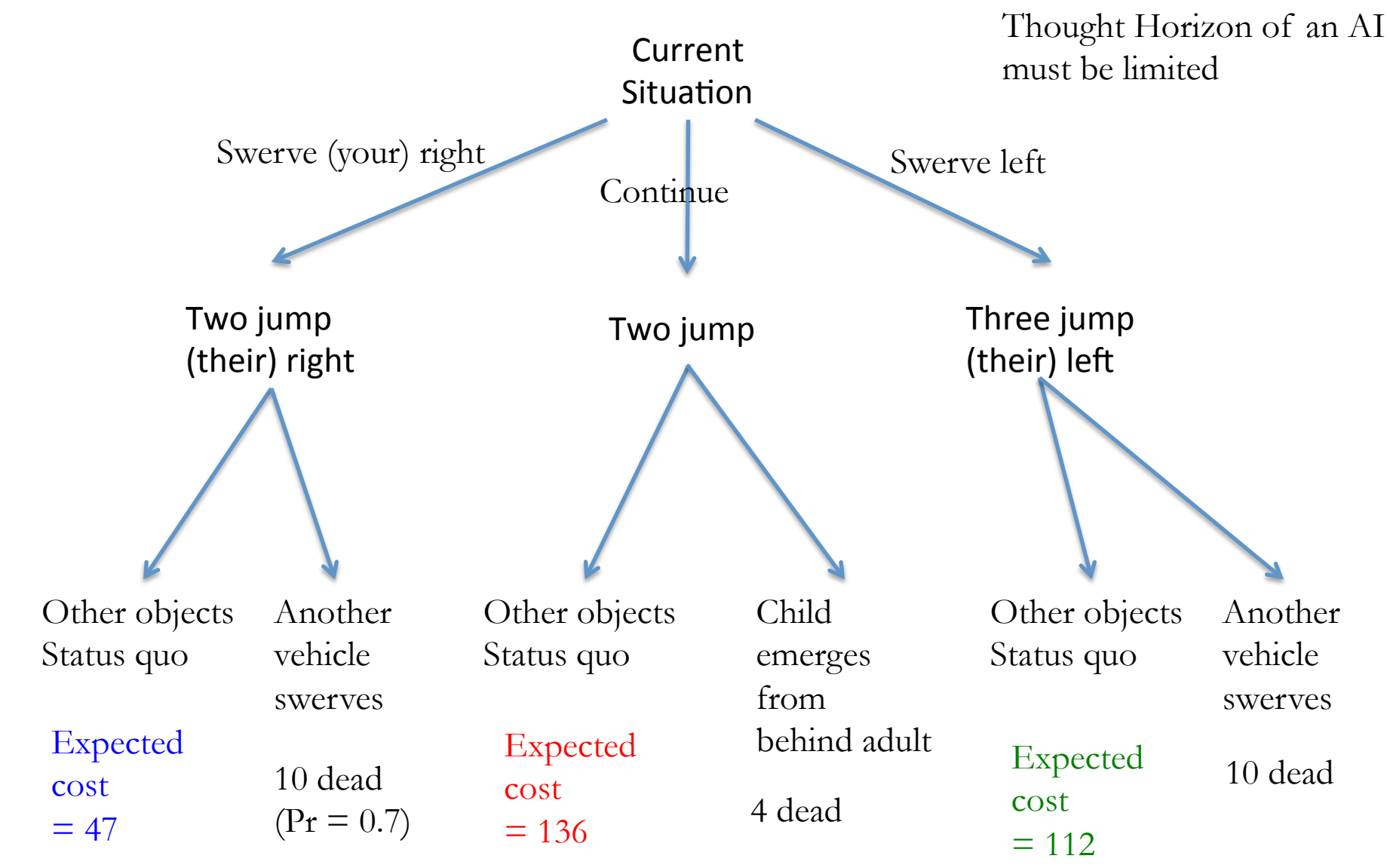
Under the hood
Exploration, Translation,

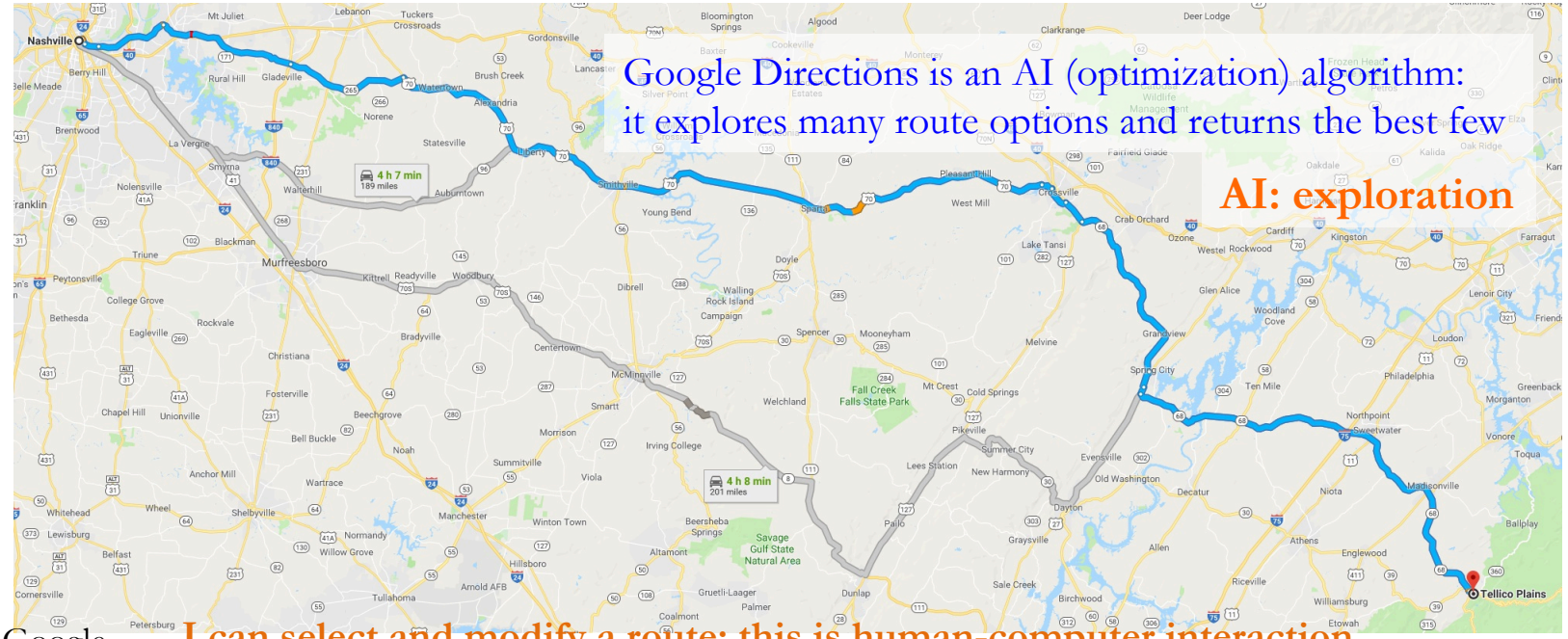
Survey AI applications and Near-Term Predictions



Lookahead (projecting into the future)



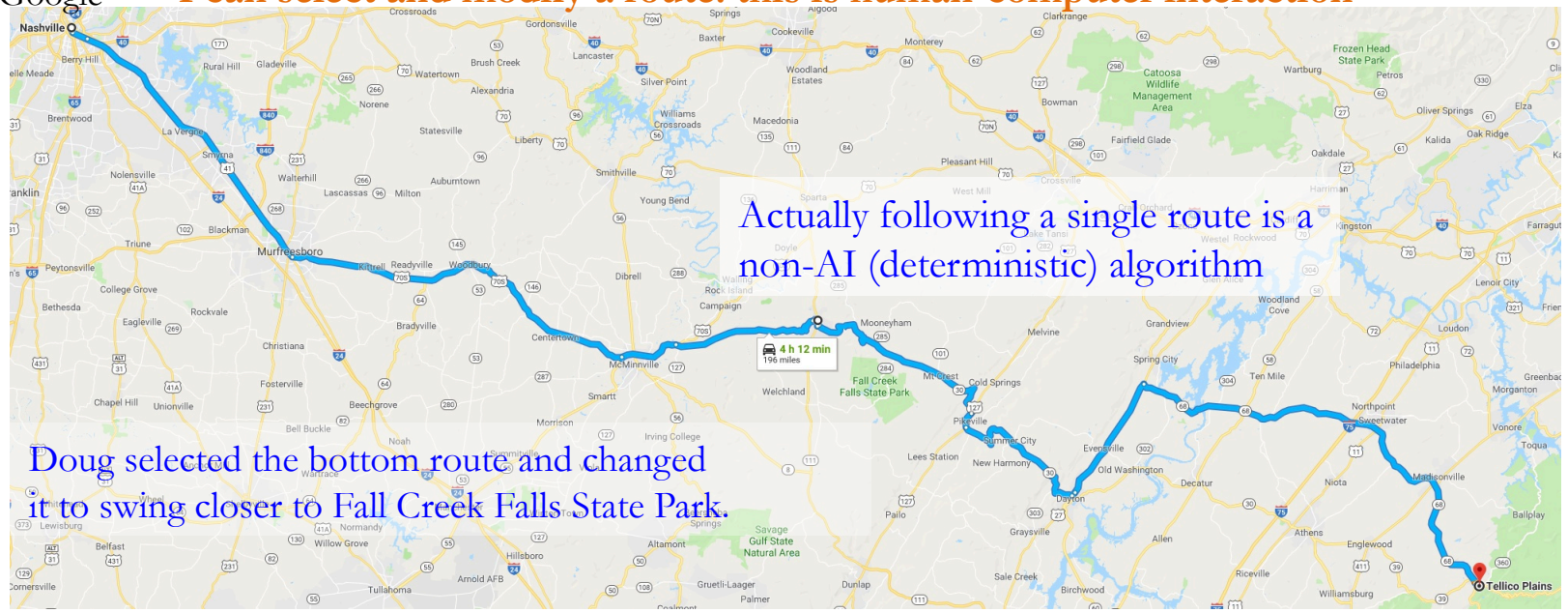
Illustrating an AI algorithm, a non-AI algorithm, and a ML algorithm



Google Directions is an AI (optimization) algorithm:
it explores many route options and returns the best few

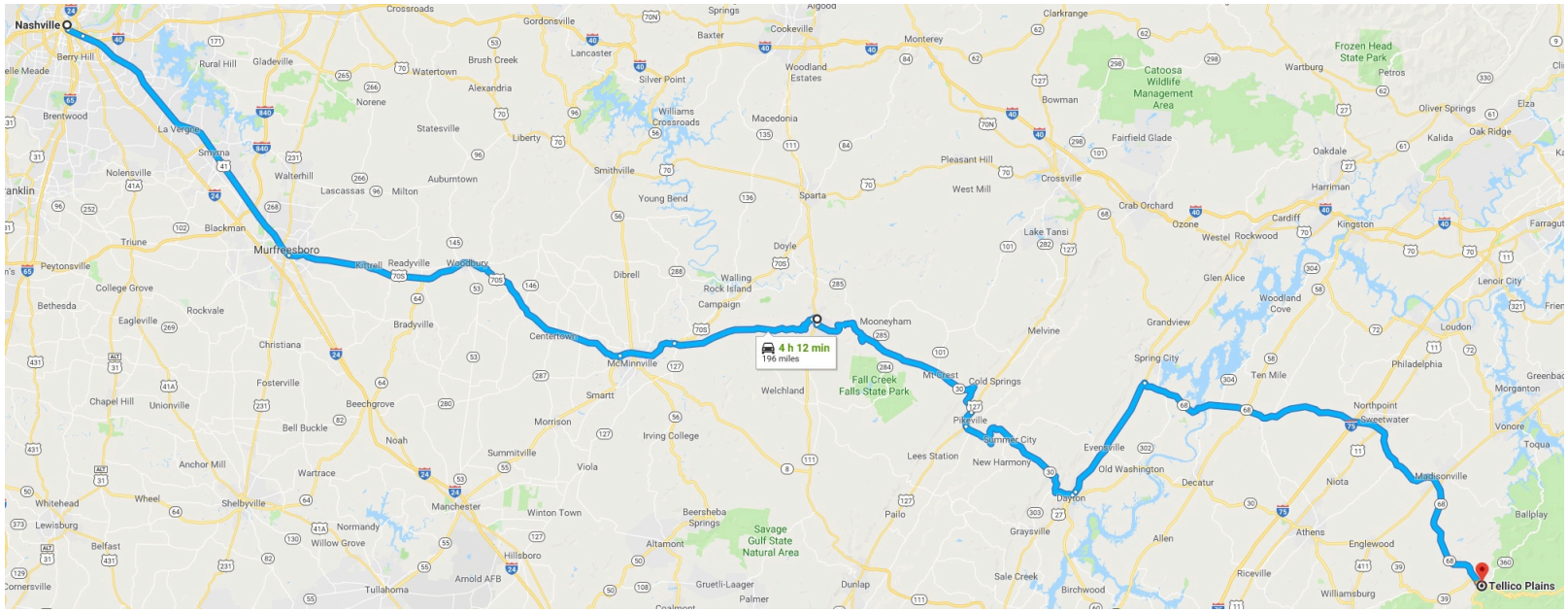
AI: exploration

I can select and modify a route: this is human-computer interaction

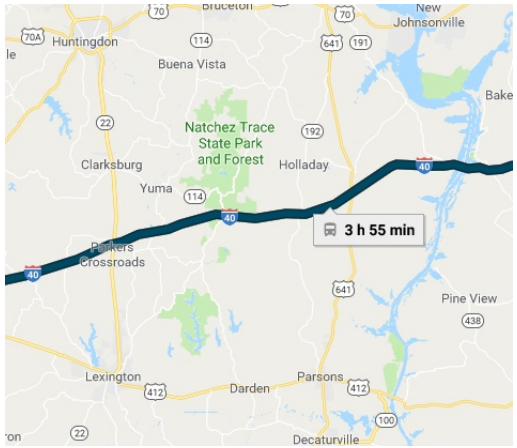


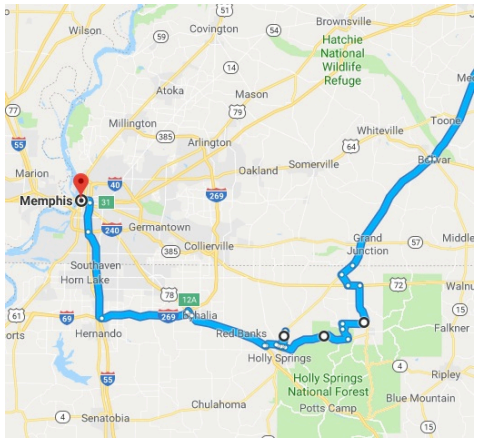
Actually following a single route is a
non-AI (deterministic) algorithm

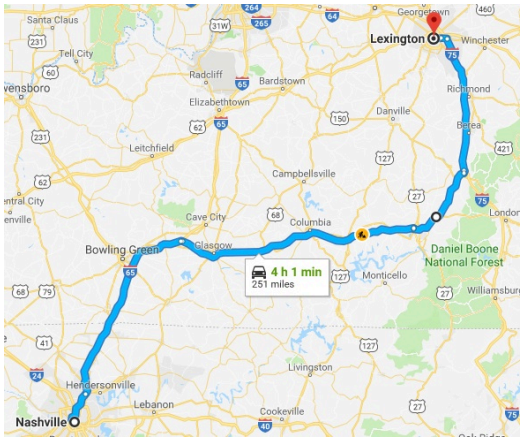
Doug selected the bottom route and changed
it to swing closer to Fall Creek Falls State Park.



© Google

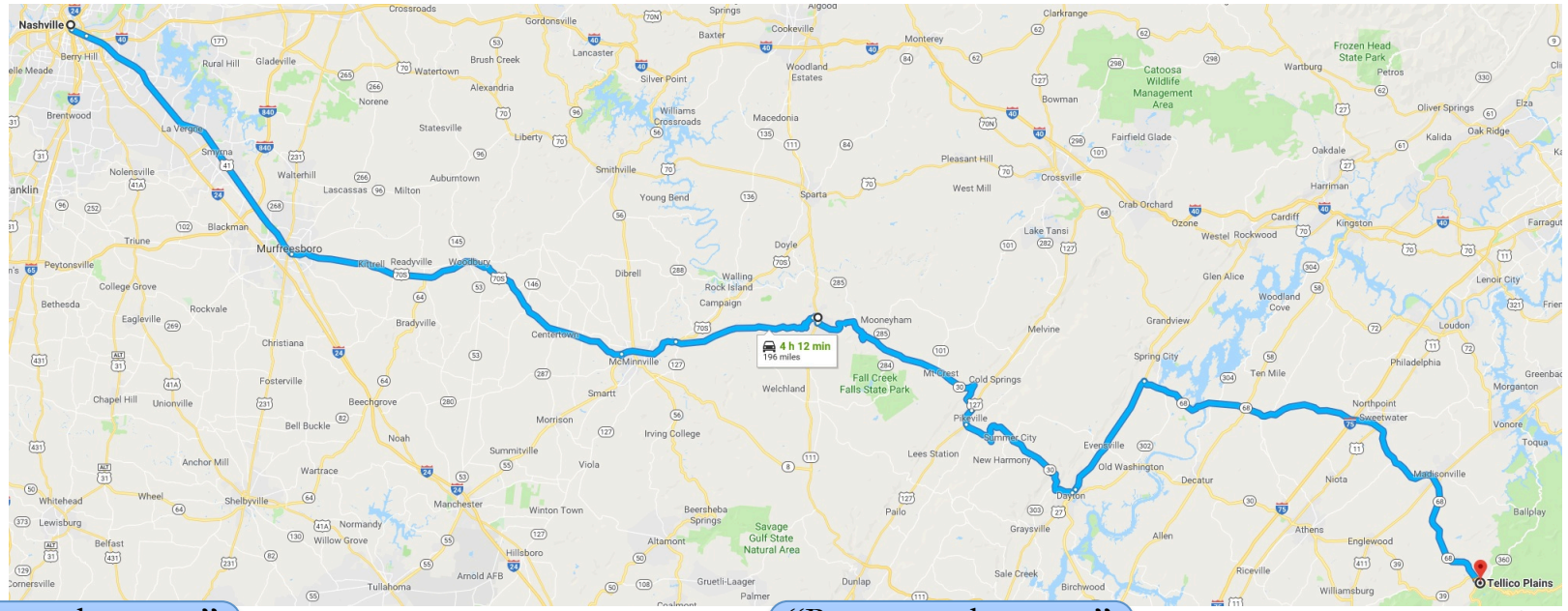






In fact, Doug more often than not chooses routes that swing close to state and national parks. I will start favoring routes that swing past wilderness parks when searching for Doug – this is Machine Learning!

Adding flexibility to an inflexible (aka deterministic) algorithm



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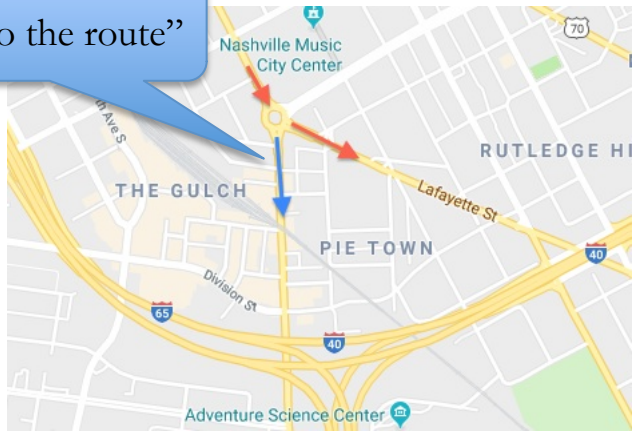
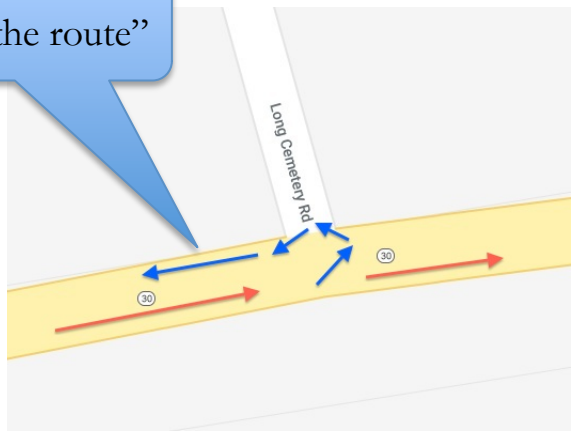
"Return to the route"
"Return to the route"



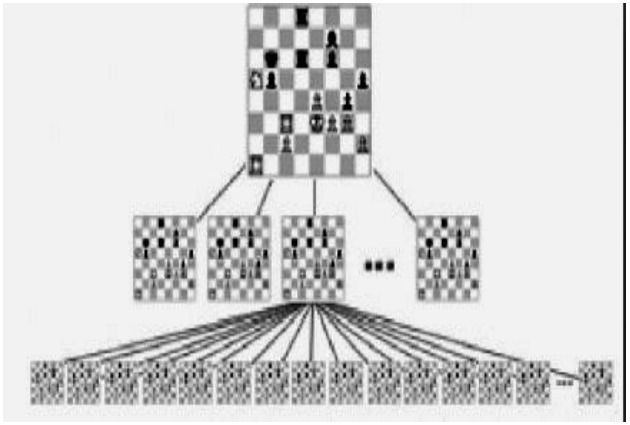
"Return to the route"
"Return to the route"



The algorithm will evaluate likelihood that original route is intended and likelihood that new route is intended (What is user intent?)

Game AI
Clearly about exploring alternatives

http://www.extremetech.com/extreme/196554-a-new-computer-chess-champion-is-crowned-and-the-continued-demise-of-human-grandmasters

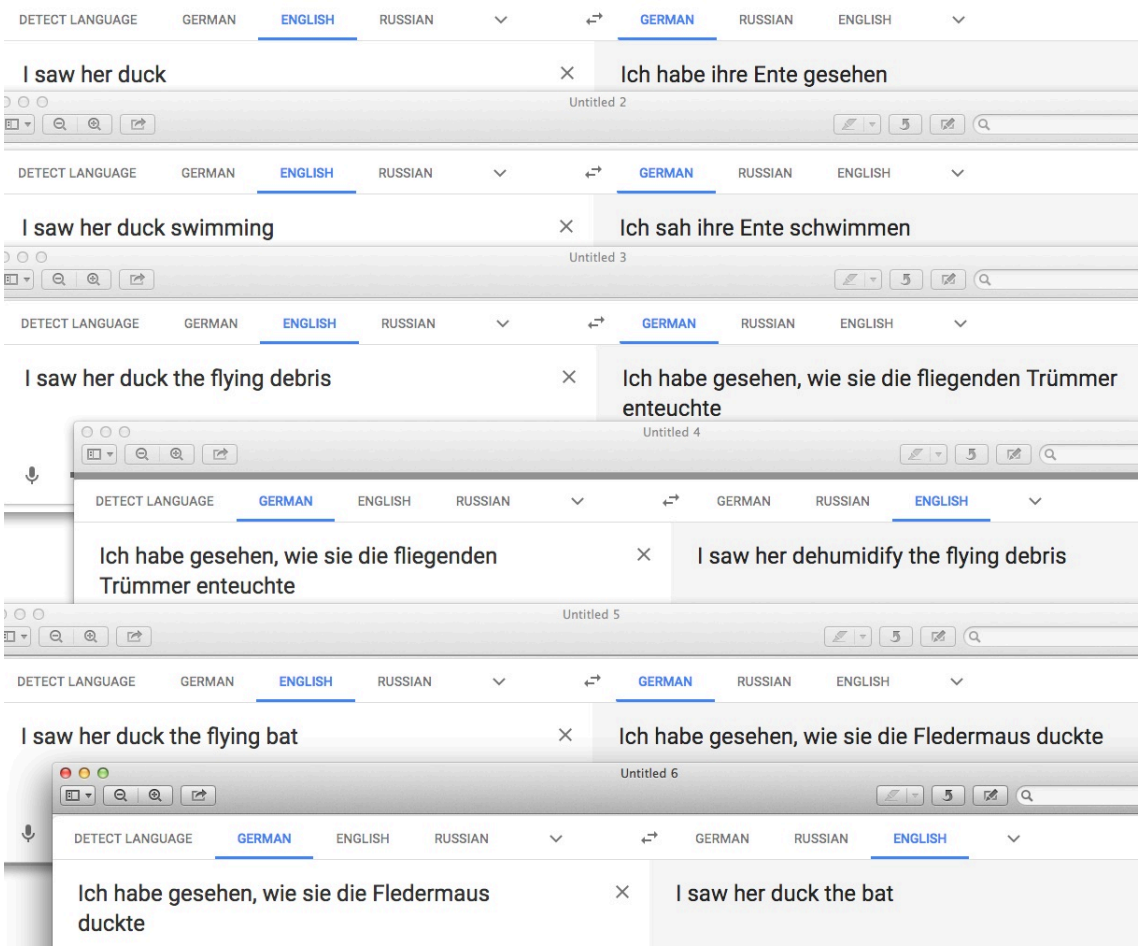


http://chesstroid.blogspot.com/2014/03/how-deep-can-brute-force-dive.html

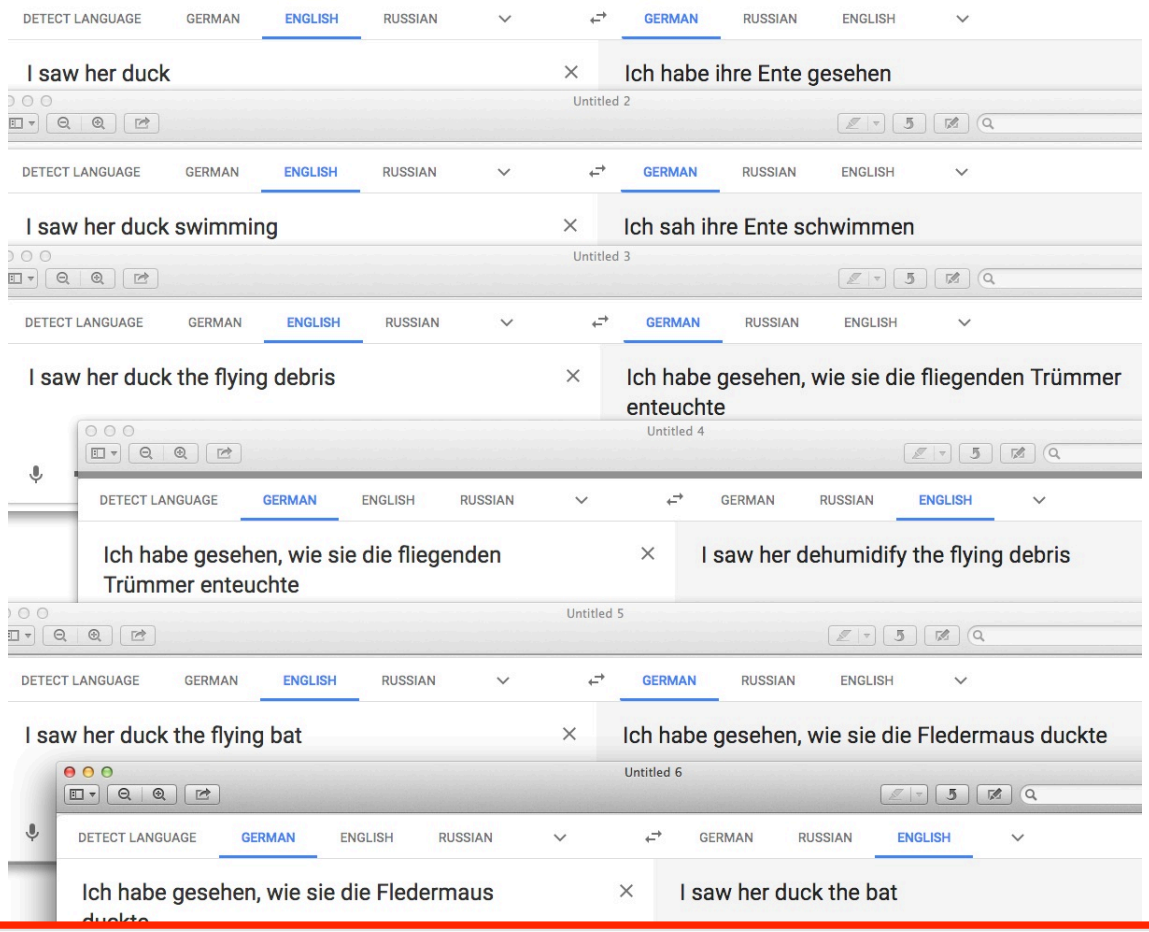
https://www.flickr.com/photos/amitrajit/5356032927

Translation is about exploring alternatives too

There will be multiple translations for even the simplest of sentences



Translation is about exploring alternatives too



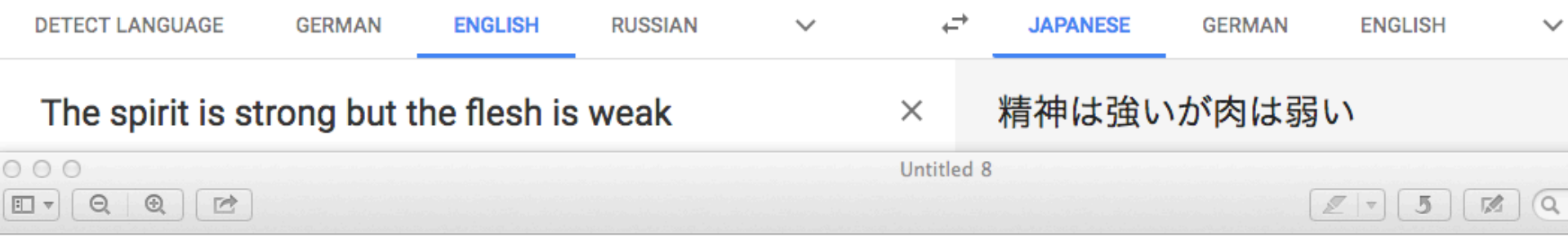
DETECT LANGUAGE JAPANESE ENGLISH GERMAN

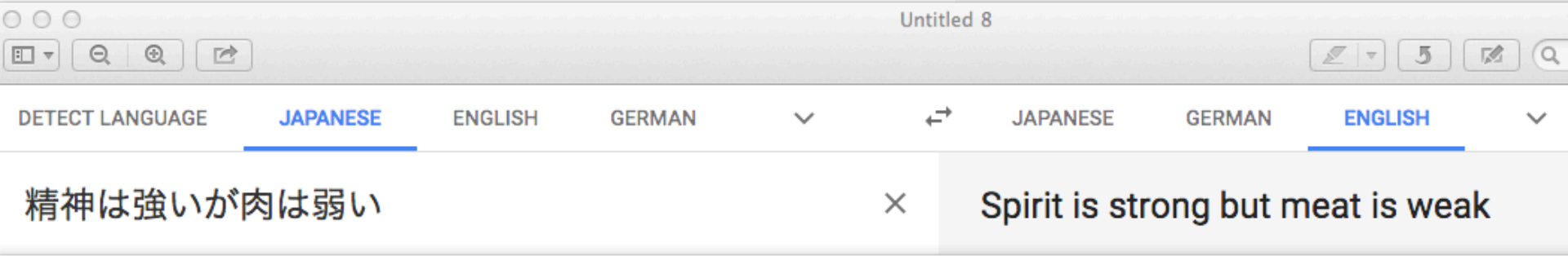
JAPANESE GERMAN ENGLISH

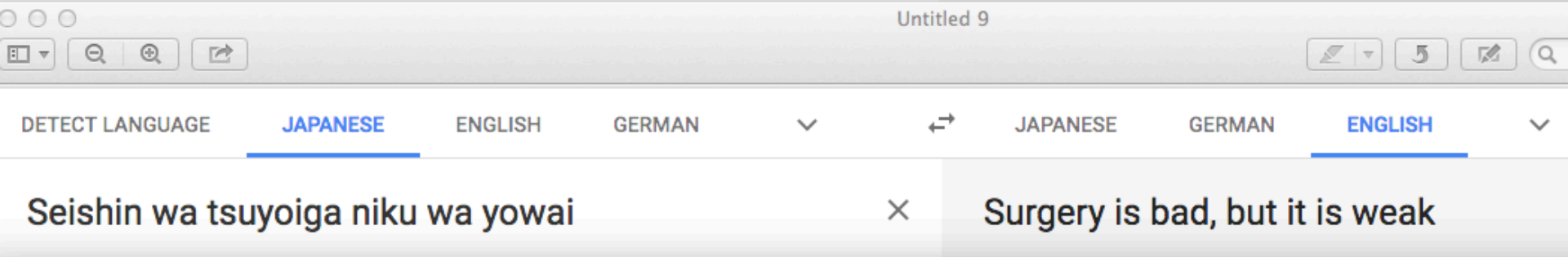
Her team was on the field. She threw a fastball and the batter hit a line drive right towards the mound. I saw her duck.

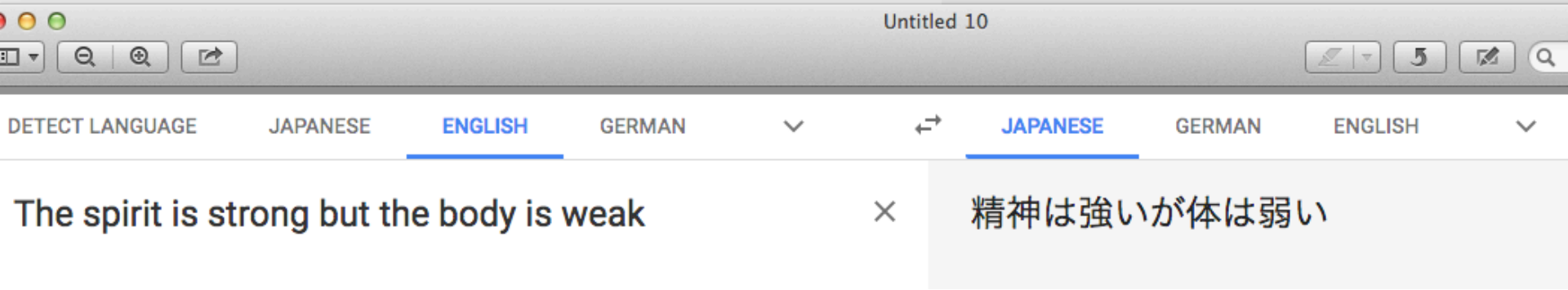
120/5000

Ihr Team war auf dem Feld. Sie warf einen Fastball und der Teig traf eine Linie rechts in Richtung des Hügels. Ich habe ihre Ente gesehen.


DETECT LANGUAGE
GERMAN
ENGLISH
RUSSIAN
JAPANESE
GERMAN
ENGLISH
The spirit is strong but the flesh is weak
精神は強いが肉は弱い


Untitled 8
DETECT LANGUAGE
JAPANESE
ENGLISH
GERMAN
JAPANESE
GERMAN
ENGLISH
精神は強いが肉は弱い
Spirit is strong but meat is weak


Untitled 9
DETECT LANGUAGE
JAPANESE
ENGLISH
GERMAN
JAPANESE
GERMAN
ENGLISH
Seishin wa tsuyoiga niku wa yowai
Surgery is bad, but it is weak


Untitled 10
DETECT LANGUAGE
JAPANESE
ENGLISH
GERMAN
JAPANESE
GERMAN
ENGLISH
The spirit is strong but the body is weak
精神は強いが体は弱い

Exploitation Exploration Tradeoff

This came up in discussion on story telling: small variations on the same successful ‘formula’ over and over, or out of the box with the possibility of ‘failure’

Interactive Narrative

- Façade: http://www.interactivestory.net/ (play trailer)
- Vonnegut's graphing of stories: https://www.youtube.com/watch?v=oP3c1h8v2ZQ
- [RB13] "Interactive Narrative: An Intelligent Systems Approach" by Mark Owen Riedl, Vadim Bulitko in *AI Magazine*, Vol. 34, No. 1, 2013 https://www.aaai.org/ojs/index.php/aimagazine/article/view/2449

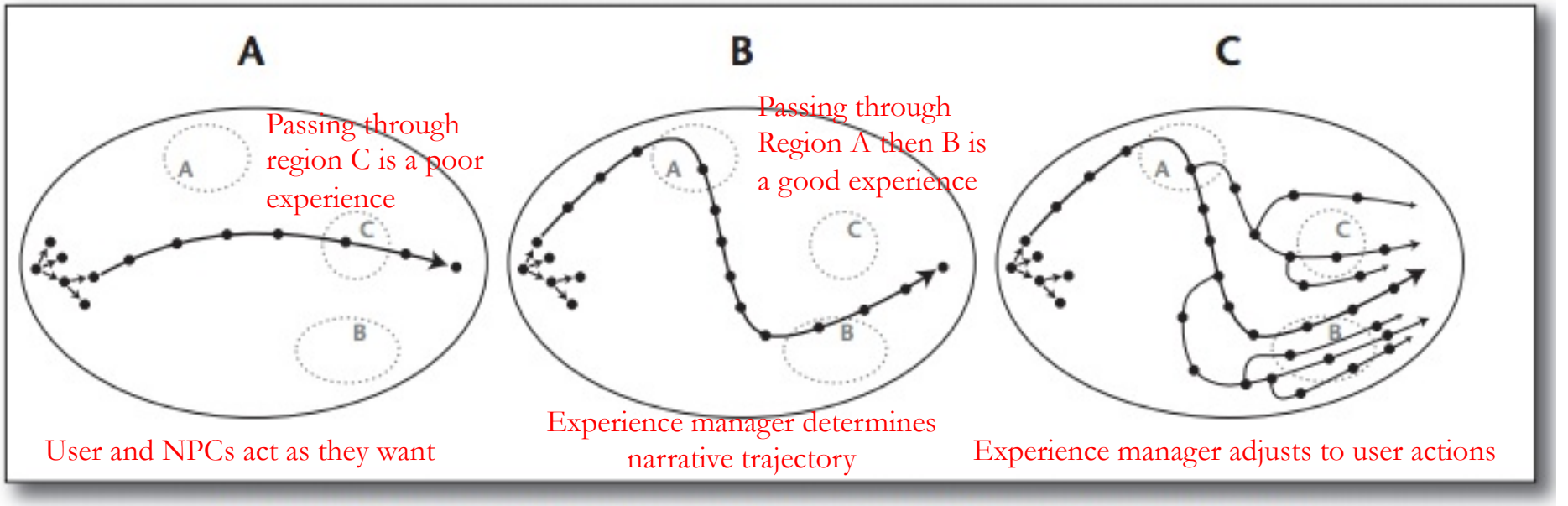


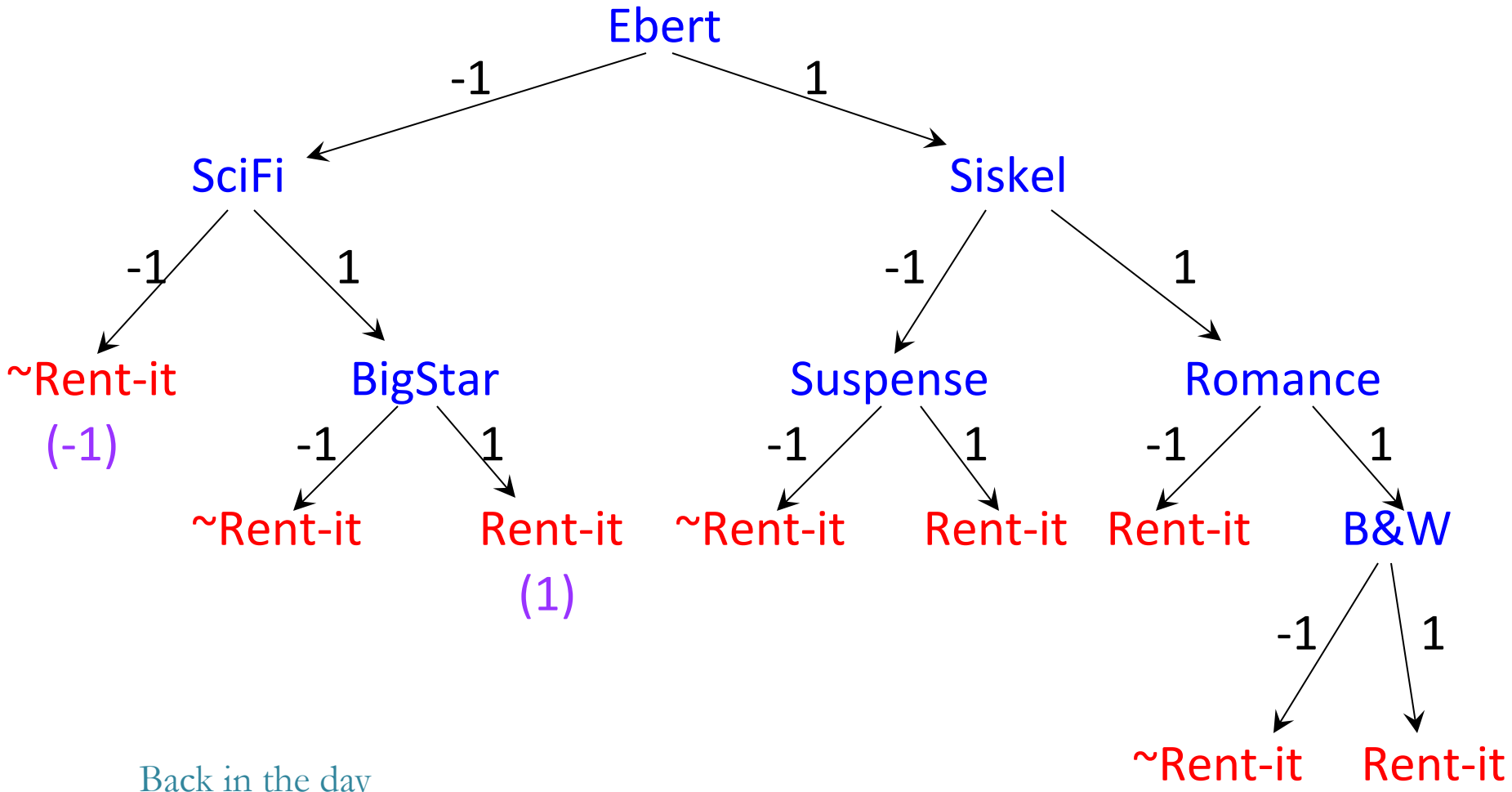
Figure 1. The Experience Management Problem Is to Compute Trajectories through State Space.

a. A possible narrative trajectory through state space. b. A possible narrative trajectory that visits states deemed favorable and avoids states deemed unfavorable. c. Accounting for player interaction.

Strong Autonomy ⟷ Strong Story

Prepping for TA-w4
Recommender Systems
Personalized

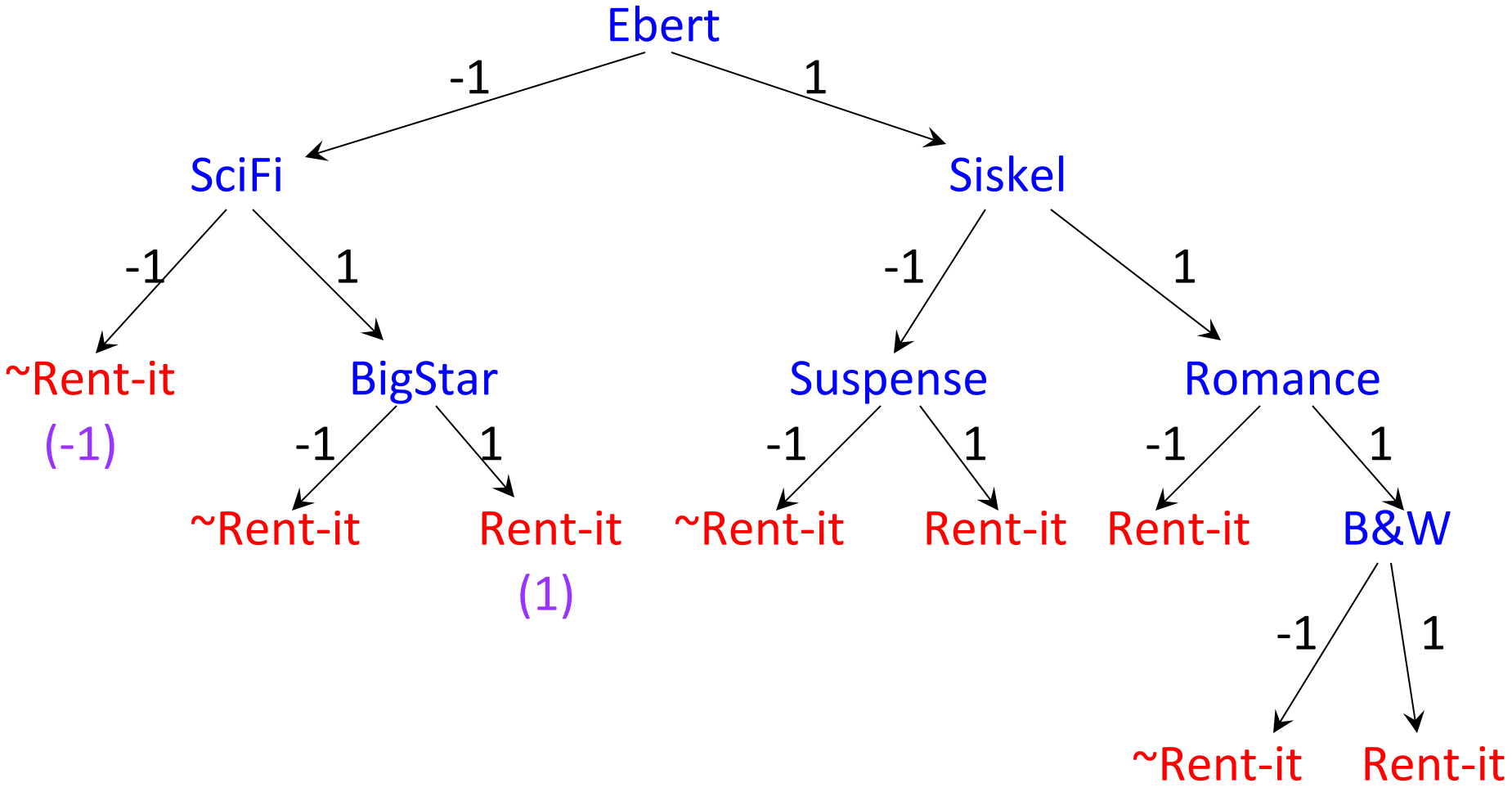
A decision tree that predicts Doug's movie preferences



Back in the day

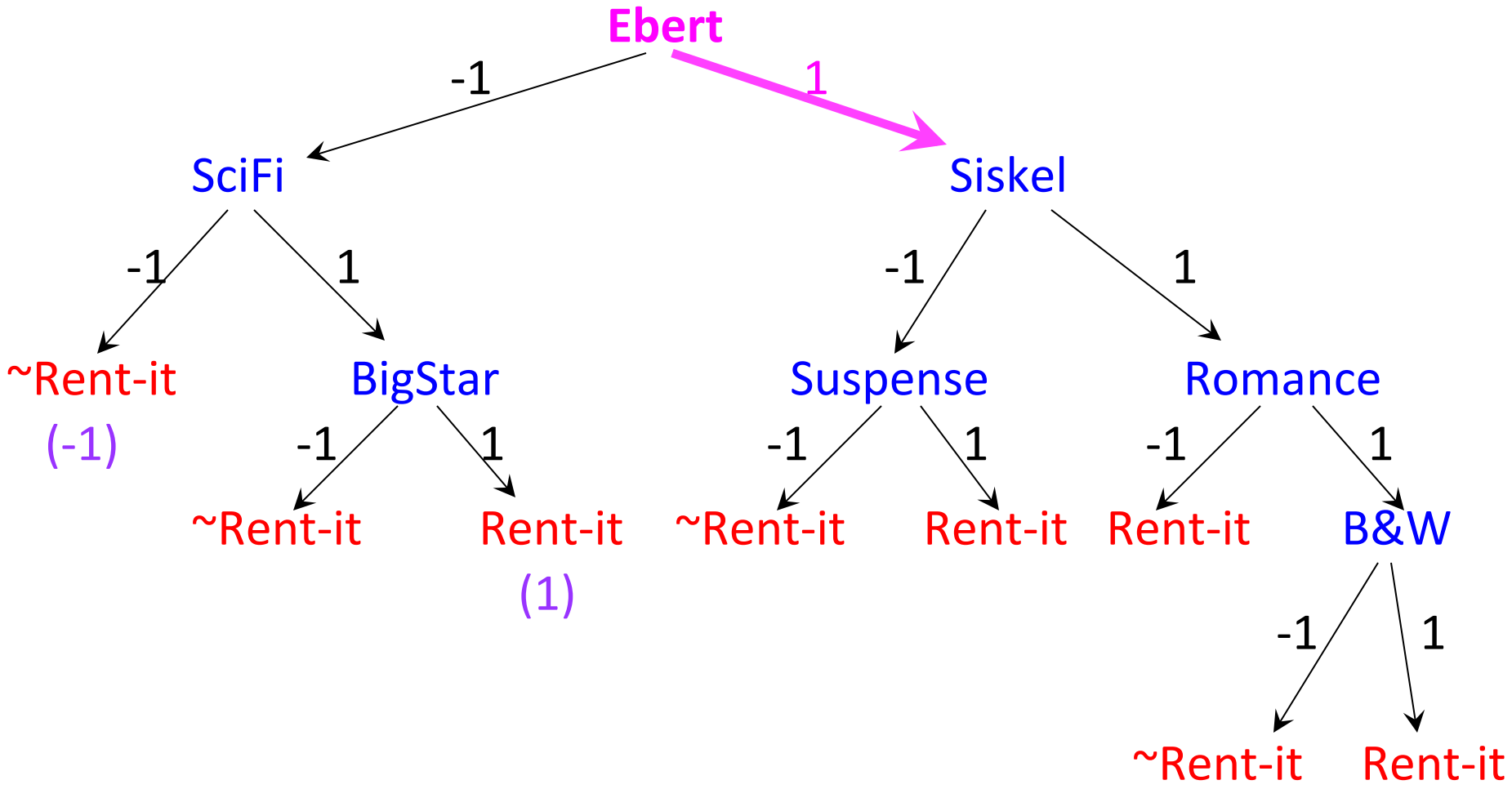
Decision tree classifiers

[SciFi = -1, Suspense = 1, Romance = -1, Ebert = 1, Siskel = 1, …, Rent-it???]



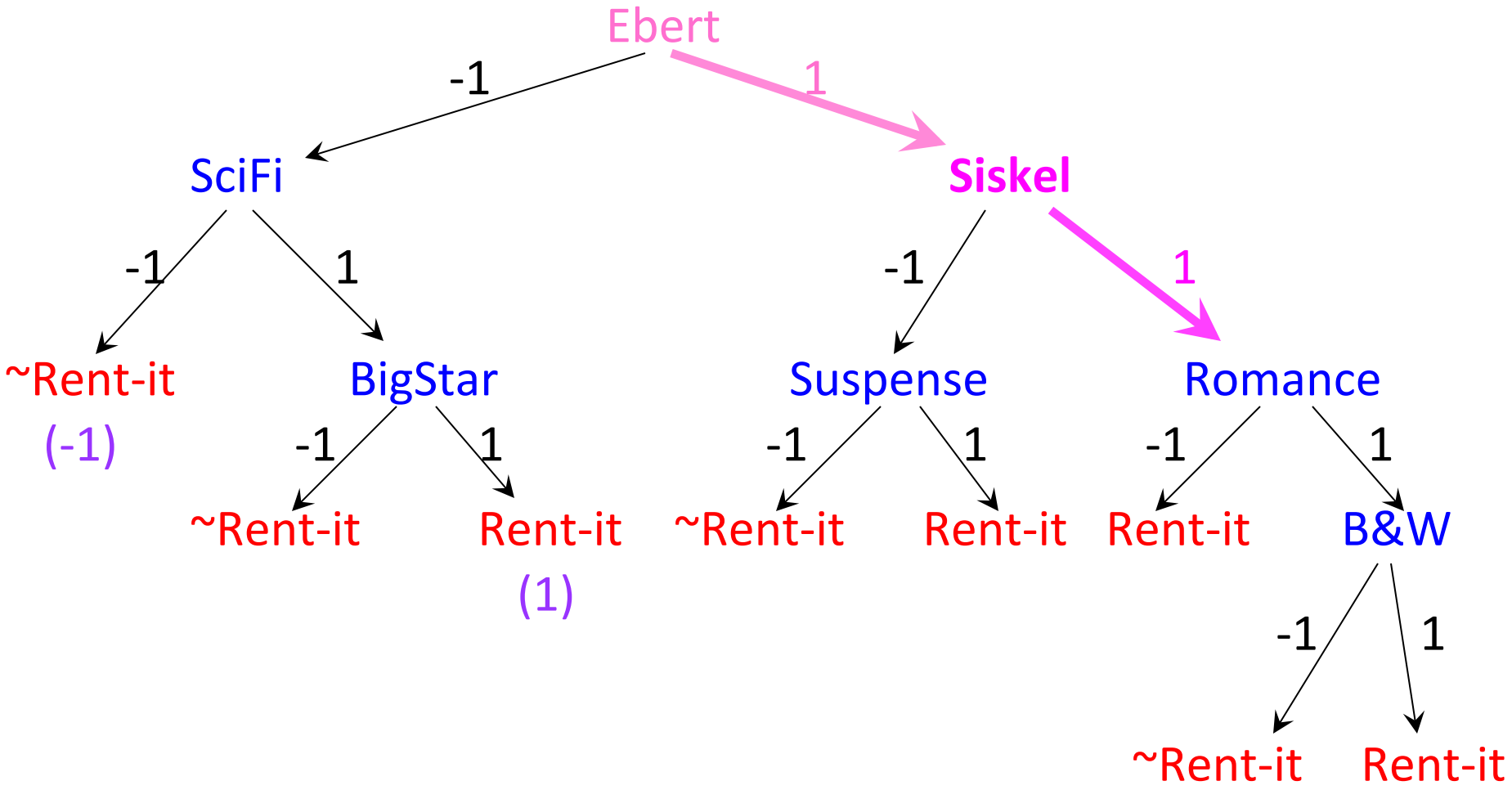
Decision tree classifiers

[SciFi = -1, Suspense = 1, Romance = -1, Ebert = 1, Siskel = 1, …, Rent-it???]



Decision tree classifiers

[SciFi = -1, Suspense = 1, Romance = -1, Ebert = 1, Siskel = 1, …, Rent-it???]



Decision tree classifiers

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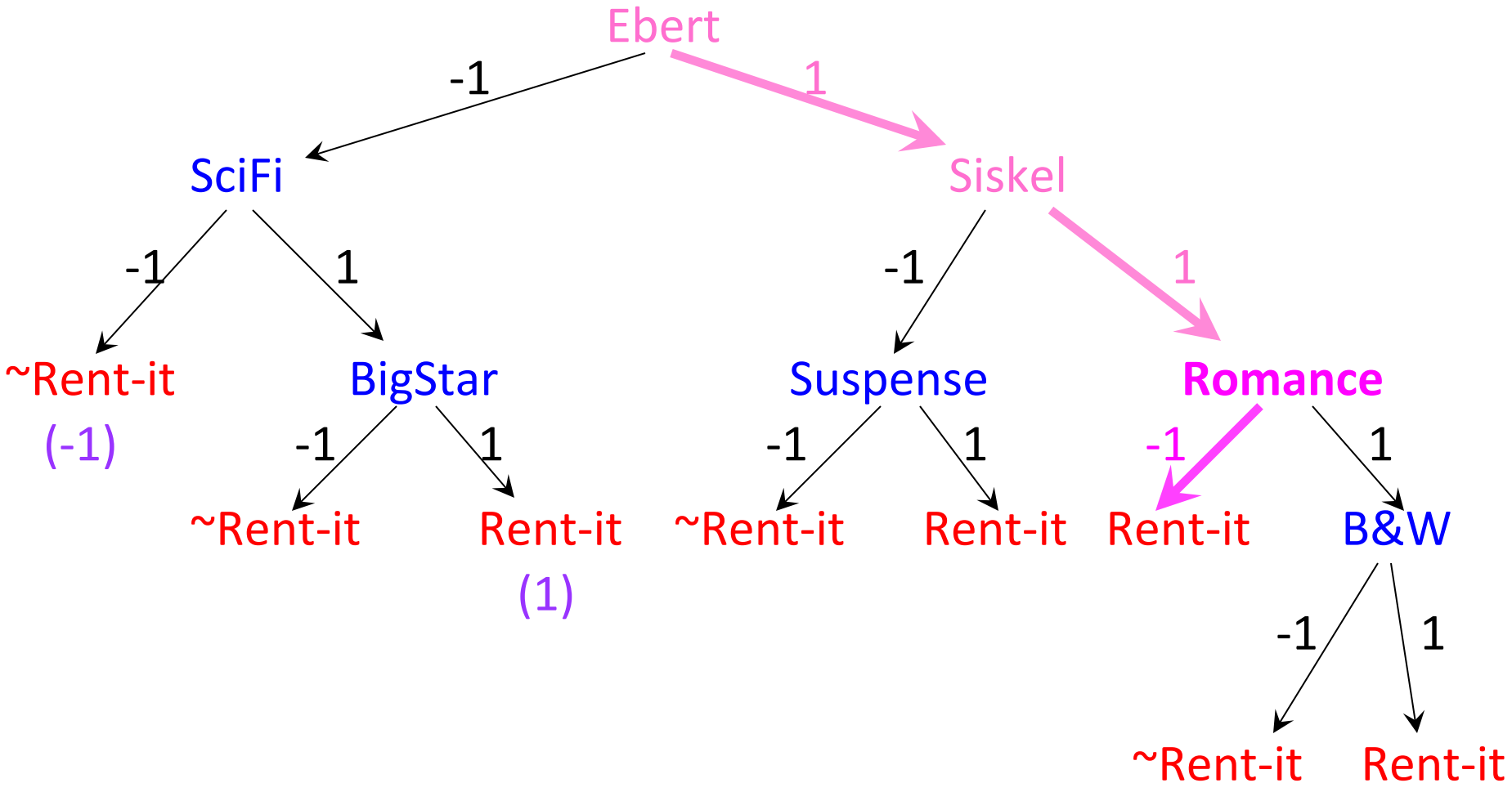
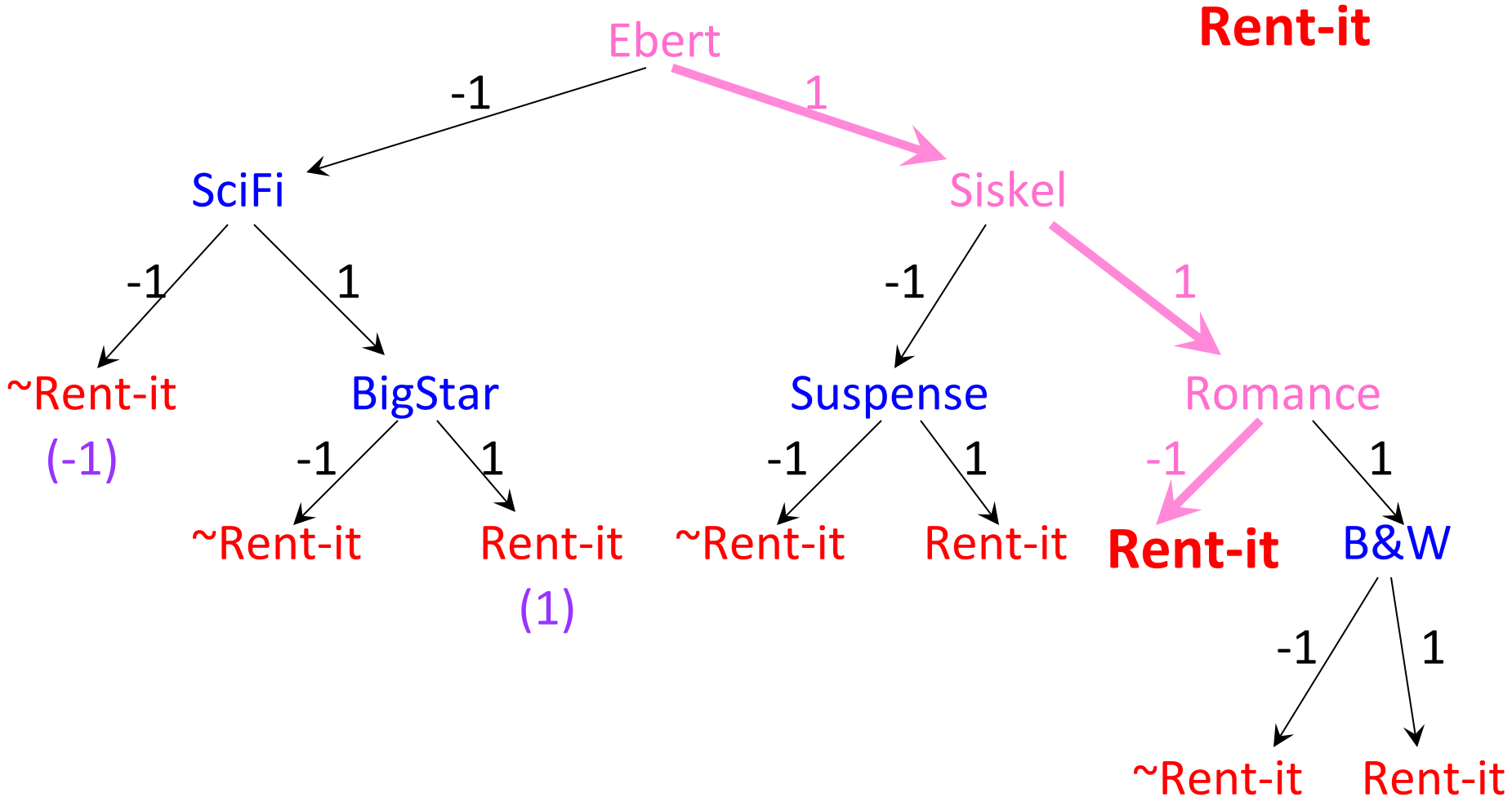


Decision tree classifiers

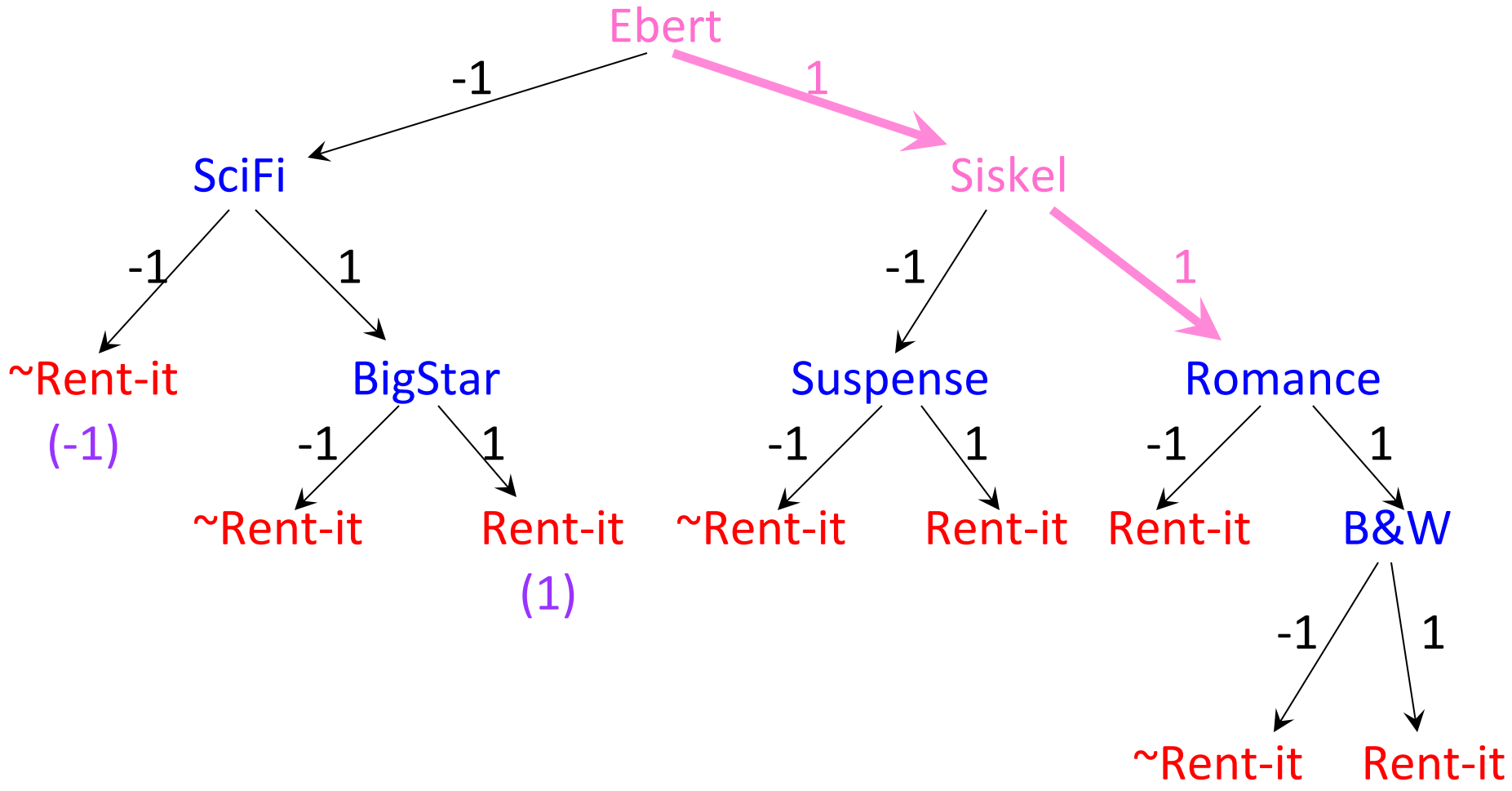
[SciFi = -1, Suspense = 1, Romance = -1, Ebert = 1, Siskel = 1, …, ~~Rent-it???~~]



Consider a completely new movie description, with a different value for Romance (and Suspense); I have also shown the value for B&W

1

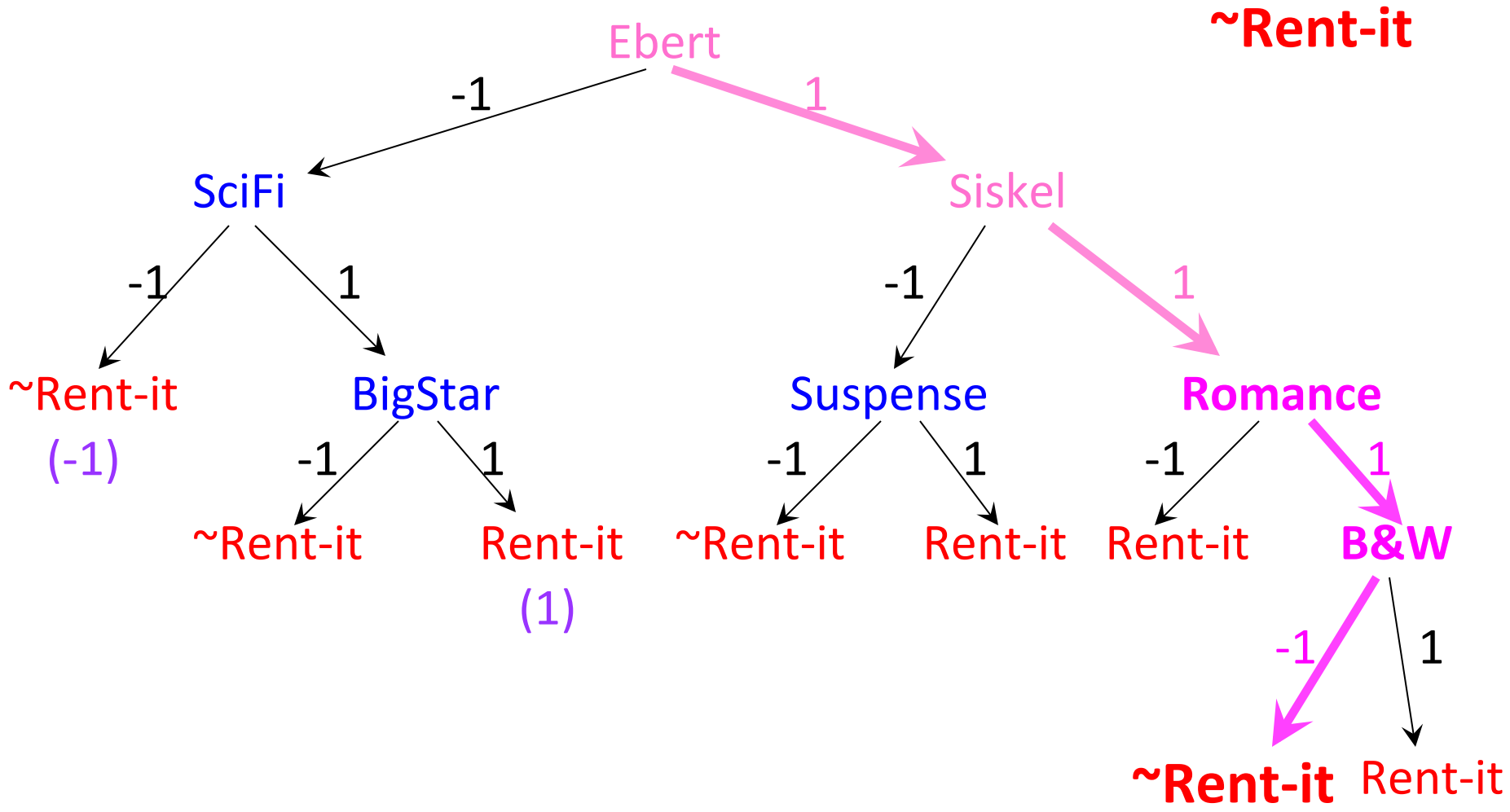
[SciFi = -1, Suspense = -1, Romance = ~~-1~~, Ebert = 1, Siskel = 1, B&W = -1, …, Rent-it???]



The values for Romance and B&W of this new datum would lead to a different classification than the previous datum

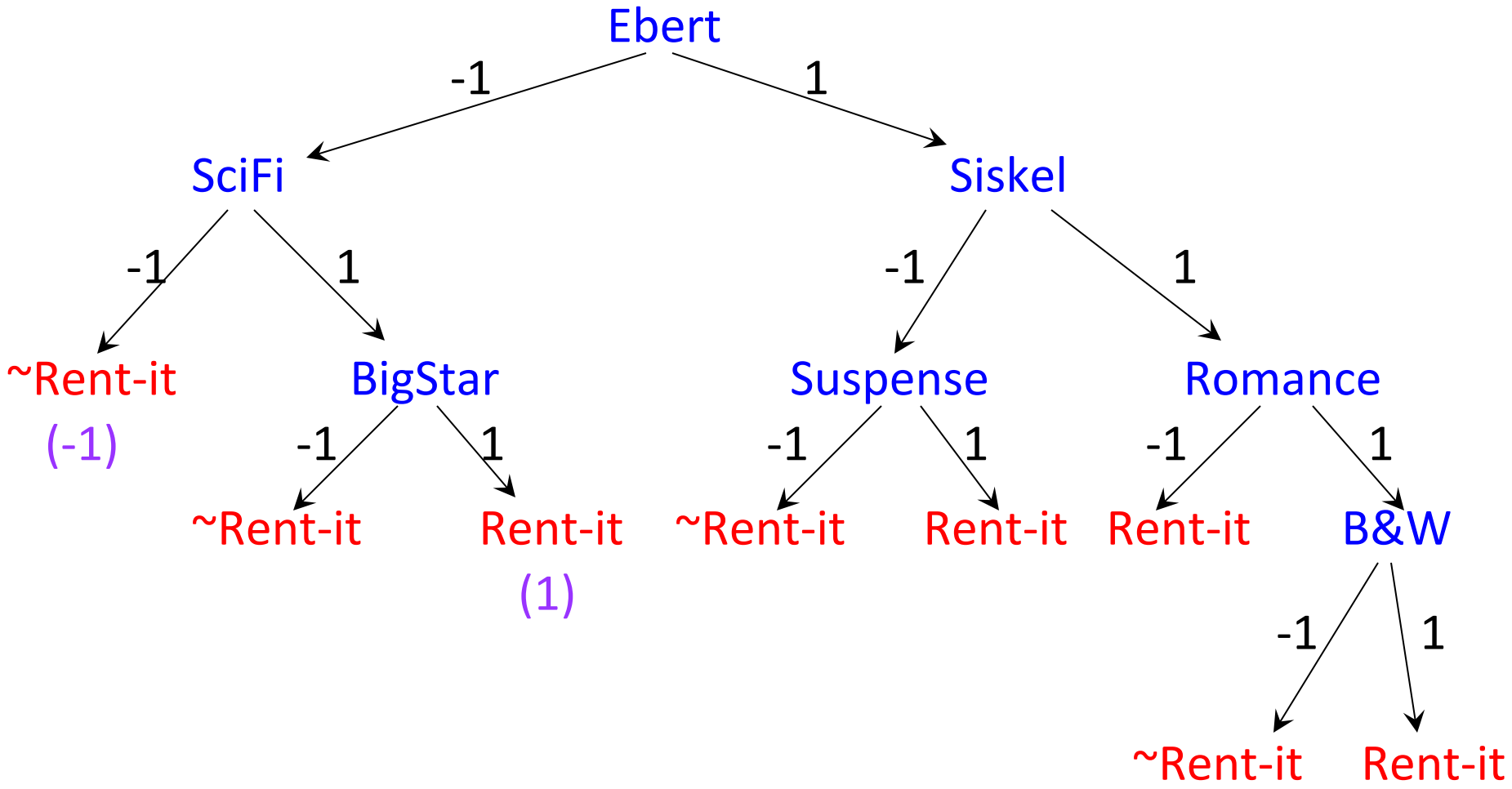
1

[SciFi = -1, Suspense = -1, Romance = ~~-1~~, Ebert = 1, Siskel = 1, B&W = -1, …, ~~Rent-it???~~]



What decision would be made for the following datum, Rent-it or ~Rent-it ?

[SciFi = 1, Suspense = 1, Romance = -1, Ebert = -1, Siskel = 1, BigStar = 1, …, Rent-it???]



[SciFi = 1, Suspense = 1, Romance = -1, Ebert = -1, Siskel = 1, BigStar = 1, …, ~~Rent-it???~~]