

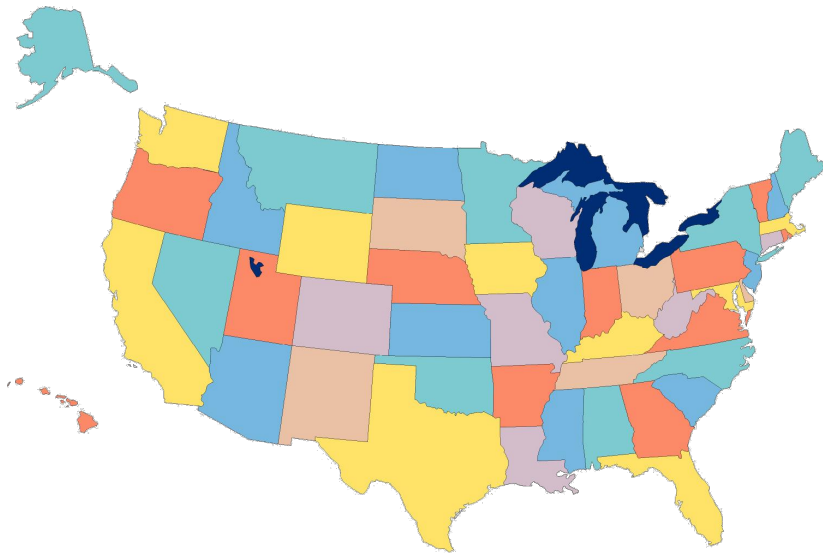
Adaptive Practice of Facts in Domains with Varied Prior Knowledge

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Motivation



Presentation overview

- Context of facts learning
- Case study - Geography facts system
- Evaluation of the system

... Practice of Facts ...

Adaptive **Practice of Facts** in Domains with Varied Prior Knowledge

- How to learn a lot of facts?
- e.g. vocabulary, countries, human bones
- AKA retrieval practice
- flashcard method (and software)

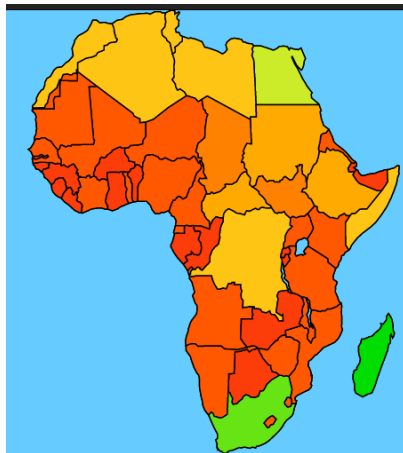
Adaptive Practice of Facts in Domains with Varied Prior Knowledge

- Users' knowledge is highly varied
- How to ask the right questions?
- Which are the right questions?

... Domains with Varied Prior Knowledge

Adaptive Practice of Facts in **Domains with Varied Prior Knowledge**

- Where is **Egypt**?
- Where is **Burkina Faso**?
- Do you know what means in English:
 - cat, pavement, bristle, sapor, sarment



Case Study - Geography facts system

Outline maps World Continents States Maps overview Sign in

World

Feedback

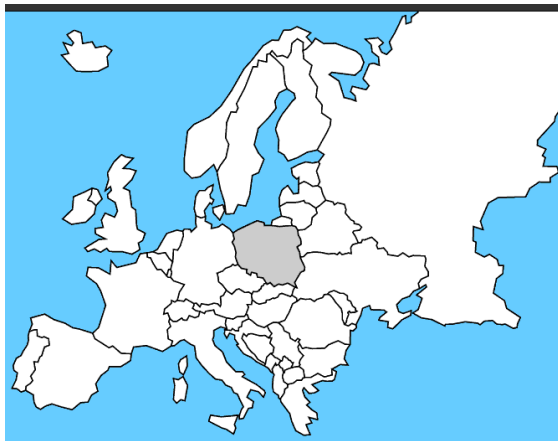
Political map Water Surface

States Practice Cities Practice

Rome	Lisbon	Kiev	Madrid	Berlin	Athens	Vienna
London	Moscow	Paris	San Francisco	Denver	Houston	
Miami	Atlanta	Chicago	Los Angeles	Washington, D.C.		
New York	Vancouver	Toronto	Melbourne	Sydney	Monterrey	

adaptive learning

Practice



What is the name of state highlighted on the map?

 Belarus

 Lithuania

 Poland

 Don't know

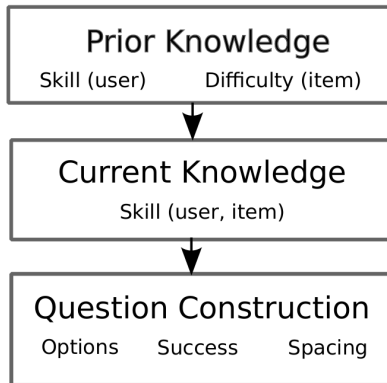
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 Highlight again

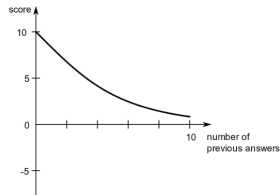
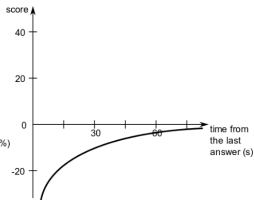
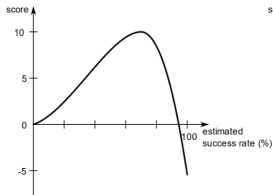
Elo rating system in chess

- Each player has a number (how good they are)
- Result of a match can be predicted
- Changing after each match

Question Construction Steps



Item Selection – Scoring Functions



Are adaptive questions better than random?

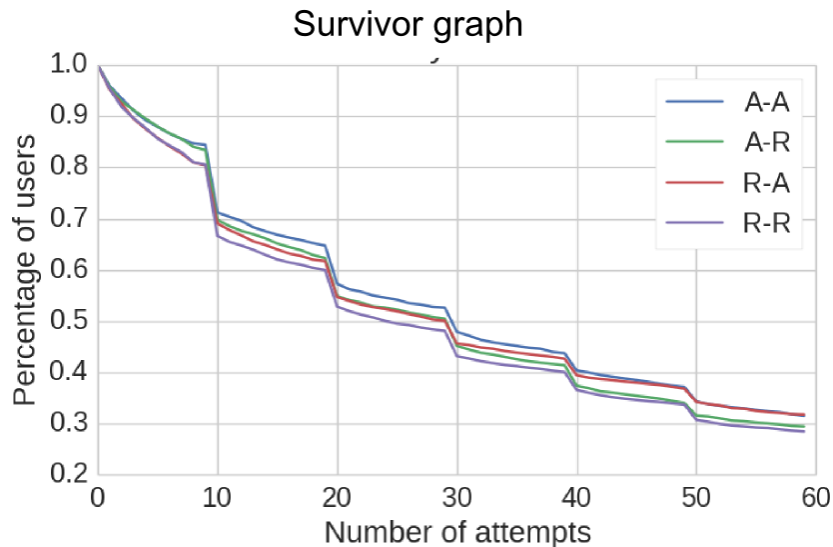
Are adaptive questions better than random?

Condition	Item selection	Options selection
A-A	Adaptive	Adaptive
A-R	Adaptive	Random
R-A	Random	Adaptive
R-R	Random	Random

What should we measure?

- Time in the system?
- User impression?
- Success rate increase?

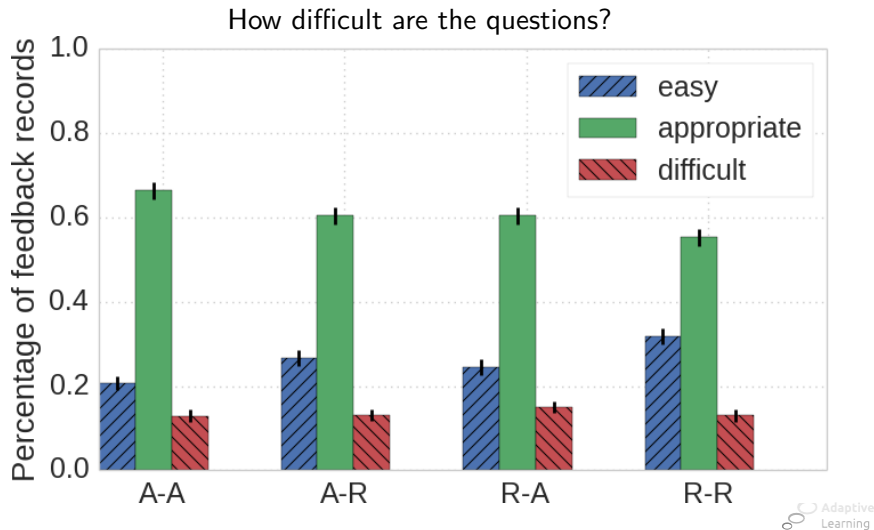
Results - survivor graph



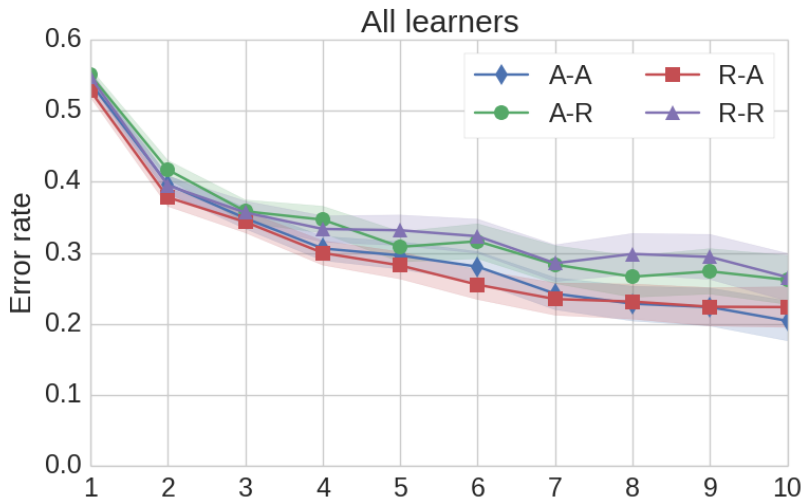
Results - return rate

Condition	Return rate
A-A	15.1%
A-R	13.9%
R-A	14.3%
R-R	13.1%

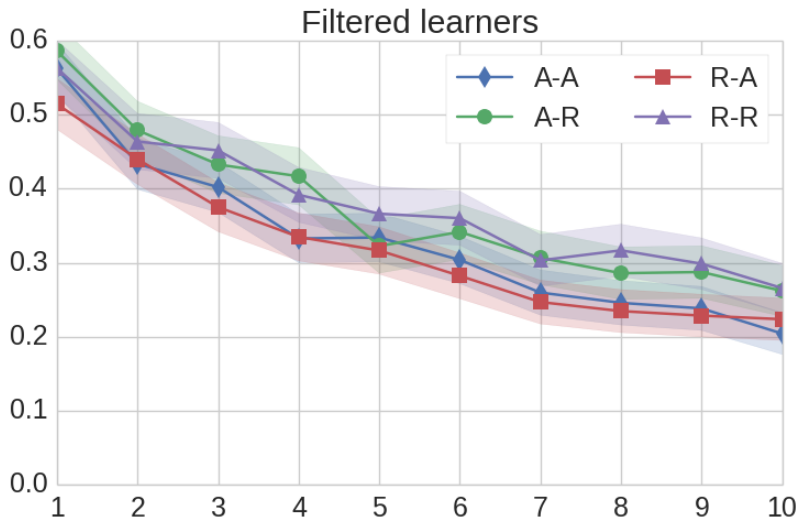
Results - explicit feedback



Results - learning curve



Results - filtered learning curve



Conclusion

- Adaptive system for practicing facts
- Prior and current knowledge estimation
- Adaptivity has positive effects on user motivation to stay
- Effects on learning are difficult to measure