SAN FRANCISCO STATE UNIVERSITY

The Learning Curve

Models & Derivations

Gregory Kielian
November 7, 2013

Over 100 years of learning and forgetting research have resulted in tested models which optimize and model the learning curve. In this article I aim to summarize and show implementations of each model, as well as derivations demonstrating the path from premises to prediction.

1 MAJOR TOPICS

Listing the strategies in alphabetical order:

- Spaced Repetition
- Active Recall
- The Zeigarnik Effects

1.1 SPACED REPETITION

These algorithms optimize association building, giving the user the choice of building up: a) short-term memory or b) long-term memory.

1.1.1 CRAMMING HAS BEEN SHOWN TO RESULT IN POOR LONG TERM RETENTION OF INFORMATION

Sometimes referred to as the "cramming effect", repeating the stimuli to build associations ad nausium builds short-term memory quickly, but research shows this memory to be shortlived (INSERT THAT REFERENCE HERE). From analysis done on learning curves of students in

controlled studies(TWO REFERENCES HERE), it was declared by (INSERT RESEARCHER HERE) that this method of studying is actually much less efficient than a more gradual studying schedule.

In summary, while one appears to be accelerating one's learning by cramming, the type of memory built is primarily short-term, and recall ability will be decimated soon after the short-term memory window closes.

However, one can build persistent, long-term memory more quickly and with less cumulative hours spent studying if one aptly spaces the stimuli.

1.1.2 Spacing Considerations

- Anki
- Mneo
- Others

1.2 Active Recall

hello there

1.3 The Zeigarnik Effect

Being first observed by

$$\begin{aligned}(x+y)^3 &= (x+y)^2(x+y)\\ &= (x^2+2xy+y^2)(x+y)\\ &= (x^3+2x^2y+xy^2)+(x^2y+2xy^2+y^3)\\ &= x^3+3x^2y+3xy^2+y^3\end{aligned} \tag{1.1}$$

Phasellus viverra nulla ut metus varius laoreet. Quisque rutrum. Aenean imperdiet. Etiam ultricies nisi vel augue. Curabitur ullamcorper ultricies

1.4 Heading on level 2 (subsection)

Lorem ipsum dolor sit amet, consectetuer adipiscing elit.

$$A = \begin{bmatrix} A_{11} & A_{21} \\ A_{21} & A_{22} \end{bmatrix} \tag{1.2}$$

Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem.

1.4.1 Heading on level 3 (subsubsection)

Nulla consequat massa quis enim. Donec pede justo, fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo. Nullam dictum felis eu pede mollis pretium. Integer tincidunt. Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim.

Heading on level 4 (paragraph) Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim.

2 Lists

2.1 Example for list (3*itemize)

- First item in a list
  - First item in a list
    - First item in a list
    - Second item in a list
  - Second item in a list
- Second item in a list

2.2 Example for list (enumerate)

1. First item in a list
2. Second item in a list
3. Third item in a list