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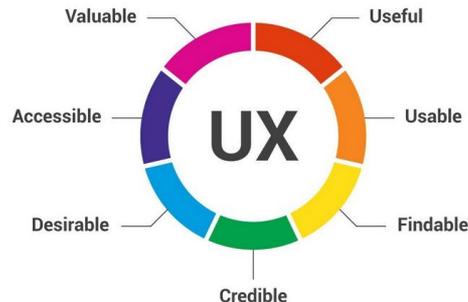
**Usability Approaches Considering Artificial
Intelligence & Machine Learning Techniques and
Technologies**

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Price**

What is User Experience (UX) design?

UX is user-focused design meant to make interaction between the user and the application intuitive and seamless.

Good characteristics of UX



What is Machine Learning?

Machine learning is the process of training a computer to display human like decision making characteristics.

The computer is typically trained using datasets containing thousands of entries of beneficial data.

Larger datasets lead to increased accuracy of classification. The Quality of the data plays an important role as well.



Abstract

Objective

- Discuss machine learning techniques used in UI development
- Understand the positive relationship between machine learning and UX
- Discuss companies that have implemented the techniques to improve UX

Introduction

The technology we interact with on a daily basis is becoming more complex i.e. Machine Learning

As the tech around us advances it is important that interface remains straightforward and easy to use.

This is essential for providing the best experience for anyone who comes in contact with it.

Prime examples of of a heightened UX design despite the complexities of modern applications are Tesla, Netflix, and YouTube.



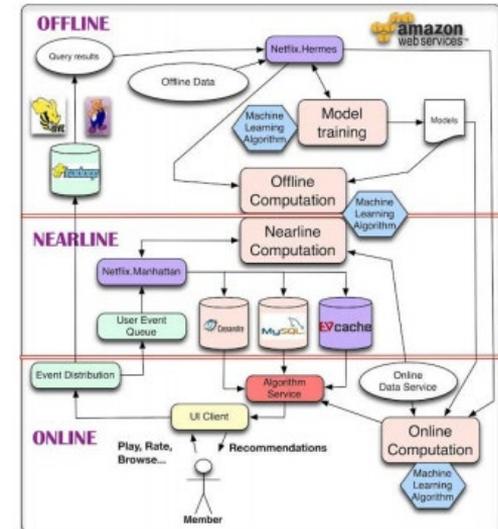
Applications



Netflix's Recommendation Algorithm

Uses machine learning to improve UX by providing a recommendation system that has been gradually improved over the last two decades.

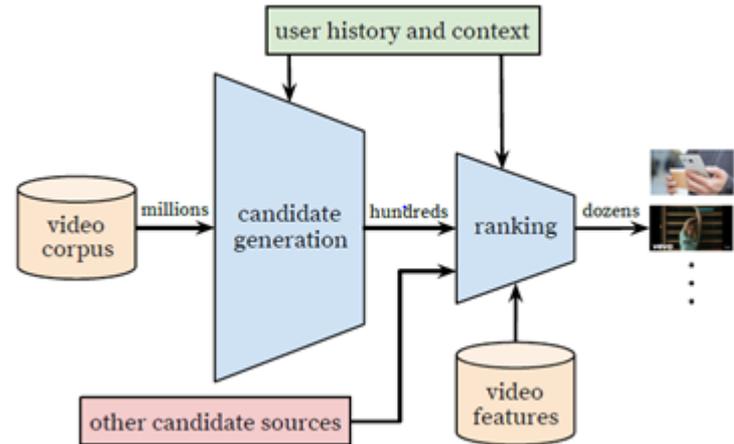
- Establishes a baseline using the most popular titles
- Refines by using a linear combination of the popularity and predicted rating using various “features” and “weights”
- Optimizes for accuracy, diversity, and awareness
- Classifier is adapted for each member of the household
- Millions of user ratings, terms searched, and items added to lists each day providing massive datasets to refine for optimal accuracy
- Metadata also adds key refinements to suggested user datasets



YouTube Algorithm

Had gone through 3 iterations before using machine learning technique:

1. (2005-2012): views = good video = recommend video to user
2. (2012-2016): watch time (retention time) = good video = recommend video to user
3. (2016+): Machine learning technique (Deep Learning) introduced. Based on both rankings and user's watch history to recommend video to user



Literature Reviews

Machine Learning Techniques To Make Computers Easier To Use

- Study on how using machine learning can increase UX by making it easier to use
- 3 learning tasks
 - Command prediction
 - Script generation
 - File prefetching
- Graph-based Induction
- UI used: Clipboard and Prefetch Daemon

The Relationship Between User Experience and Machine Learning

- User Experience
 - UX isn't just a visually appealing user interface
 - Good UX satisfies both a functional need and an emotional one
- Machine Learning
 - ML involves training systems to recognize patterns in training data to draw conclusions when given new data
 - Supervised ML provides the system with input and output, while unsupervised only provides input

The Relationship Between User Experience and Machine Learning

- UX and ML
 - ML can provide a unique UX to individual users
 - UX designers overlook obvious use cases due to lack of technical understanding
 - ML requires large amounts of data gathering, raising possible ethical concerns among users

Machine Learning as a UX Design Material: How Can We Imagine Beyond Automation, Recommenders, and Reminders?

Yang discusses different dynamic challenges that are pertinent when developing a proper UX for new technology

- Discusses the canning of a project for end-stage heart failure detection due to practicality
- Discusses the disconnect between designers and machine learning applications
- Discusses the lack of data and data scientists provided to teams when designing new machine learning apps

Investigating How Experienced UX Designers Effectively Work with Machine Learning

- Interview and Subjects
 - 13 UX designers
 - All with at least four years of experience
 - Were alumni of the study's authors or colleagues of them
 - Interview focused on knowledge of ML and timing of when UX designers were added to a project

Investigating How Experienced UX Designers Effectively Work with Machine Learning

- Findings
 - UX designers acknowledged they didn't have a great understanding of ML
 - They spoke about ML through exemplars and abstractions (Ex. Clippy, auto-correct, spam filters)
 - None of those interviewed had been with the team for the projects entire duration
 - All agreed ML would lengthen the time span of a project
 - Designers searched available data for expected patterns rather than use ML to identify novel ones

Investigating How Experienced UX Designers Effectively Work with Machine Learning

2. Findings

- a. Interpreting and manipulating quantitative data were valuable additions to skillset
- b. Cooperating with data scientists was most effective practice observed
- c. Cataloging examplars and abstractions for communicating ML to UX designers and tools to simulate the role of data scientists are possible areas for future research

Conclusion

- Touched on Good UX through integration of machine learning/AI
 - Tesla
 - Netflix
 - Youtube
- Briefly discussed bad UX examples to reiterate the importance of usability and other good UX characteristics
 - Yang's end-stage heart failure venture
- Society benefits when the core characteristics of good UX are followed

References

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- Carmona, Kim and Finley, Erin and Li, Meng, The Relationship Between User Experience and Machine Learning (May 4, 2018). Available at SSRN: <https://ssrn.com/abstract=3173932> or <http://dx.doi.org/10.2139/ssrn.3173932>
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Extended Resources

1. A Blog post that talks about the history of the YouTube Algorithm and how to work with it.
<https://blog.hootsuite.com/how-the-youtube-algorithm-works/>
2. A Creator's Blog from YouTube in 2012 discussing why they changed their requirement for the recommendation algorithm and how it works.
<https://youtube-creators.googleblog.com/2012/08/youtube-now-why-we-focus-on-watch-time.html>
3. A video on other added attributes to the YouTube Algorithm.
<https://www.youtube.com/watch?v=AI7asbV5A-s>
4. A video on Netflix's use of Matrix Factorization.
<https://www.youtube.com/watch?v=ZspR5PZemcs>
5. An article about the machine learning technique called graph-based induction.
http://www.ar.sanken.osaka-u.ac.jp/~motoda/papers/adv_eng_inf02.pdf
6. A 6 minute video explaining "deep learning".
<https://www.youtube.com/watch?v=6M5VXKLf4D4>

Extended Resources (cont.)

7. An article explaining how to apply machine learning basics.
<https://uxdesign.cc/an-intro-to-machine-learning-for-designers-5c74ba100257>
8. A video explaining “how machines learn”.
<https://www.youtube.com/watch?v=R9OHn5ZF4Uo>
9. A video explaining the difference between UI and UX design.
<https://www.youtube.com/watch?v=TgqeRTwZvIo>
10. A video explaining the difference between UI and UX design.
https://www.youtube.com/watch?v=f_uwKZIAeM0
11. A video explaining UX design.
https://www.youtube.com/watch?v=OR0r_L2ztDI
12. Article on UX design characteristics. <https://www.interaction-design.org/literature/article/the-7-factors-that-influence-user-experience>

Extended Resources (cont.)

13. Tesla Autopilot AI backend information
<https://www.tesla.com/autopilotAI>
14. Tesla Autopilot AI operating instructions
<https://www.youtube.com/watch?v=Q4MngNzG0K0>