CS6750 – Assignment P5

Sergiy Palguyev
spalguyev3@gatech.edu

1 QUESTION 1

OMSCS Benefit

A single most prominent positive effect of OMSCS, is making world-class education available to every, single, person on the planet. More specifically, anyone in the world can create a Udacity account and watch Georgia Tech professors lecture on latest technologies. Anyone in the world can apply to Georgia Tech in an attempt to study and receive a Master degree from one of the top institutions in the world. And finally, almost anyone in the world can afford world-class education when the cost is around $7000.

OMSCS Drawback

A possible negative due to the availability of the program may be the dilution of Georgia Tech's reputation and prestige of the Computer Science program. Certain achievements, prizes or certifications are sought out and revered throughout the world due to their exclusivity and difficult attainability. By making this program available and attainable worldwide, may end up diluting the Georgia Tech brand, over time.

OMSCS Redesign

One possible redesign could be to create a hierarchical tree of class relationships. Certain classes are considered by a majority of the community to be fundamental to a Master's class. Certain courses such as Graduate Algorithms, Machine Learning, or Artificial Intelligence could be marked as courses a student must take first, before continuing with their other classes. Additionally, it is blatantly apparent that the classes, content, and video lectures do not go through redesign very often. Student complain, sometimes for multiple years about class content or video quality with nothing changing. For a fast paced, modern, tech centered program, the class content and structure should be adaptable to new concepts and undergo continuous Agile iterative design cycles. Instead, the majority of classes seem to have had a Waterfall design where the finished product simply

has a time span of 5-10 years at which point the OMSCS administration will decommission the class (i.e. Computability, Complexity, and Algorithms) repackage it, and reintroduce it with some minor tweaks, but following the same Waterfall strategy (i.e. Graduate Algorithms) when designing the course.

By taking an iterative approach, integrating the latest technologies each year into new lecture material, creating a hierarchical structure with mandatory fundamental classes to weed out the strong performers, Georgia Tech can maintain its prestige. Doing so, however, would not take away from the positive effects of the program. OMSCS availability and affordability worldwide would still be heralded as a groundbreaking achievement, but the program itself would maintain the rigor and challenge to remain a sought-after achievement reserved for the highly skilled Computer Scientist.

2 QUESTION 2

Selected Area

One area where the design of technology is dictated heavily by political motivation is that of space exploration. Space exploration is a lucrative market requiring large investments usually reserved only to governments, until recently. Communication satellites, Global Positioning Systems, Spy Satellites, Rocket technologies, all developed using government funding in order to assert dominance and propel ahead of other countries.

Stakeholders

The stakeholders include the astrophysics scientific community, the government bureaucrats and military special interests, as well as the taxpayers that foot the bill for such endeavors. The scientific community is motivated purely by the drive for discovery and experimentation. Having witnessed research projects of doctoral students, it is apparent that scientific exploration often desires incomprehensible budgets and inconceivable expenditure to test minute experiments in the name of pushing the known boundaries of science. Government bureaucrats tend to focus on balancing the need for governmental superiority and financial expenditure in order to consistently fulfill the needs of their constituents. Any military interest is only concerned with strategic advantage and intelligence gathering at all costs. Finally the tax-payers are motivated by

advancements in consumer technology. GPS, the internet, supercomputers and communication advancements were all developed as part of

Motivations

The different motivating factors drive design decisions which have a wide array of consequences and effects on the final project outcomes which result from the efforts. The biggest differentiator between the different stakeholders is which technology to pack into each launch of a government sponsored rocket. The astrophysicists would be motivated to include as much scientific instrumentation and experimentation as needed for scientific experiments. Government and military interests would be motivated to bide for technology included which would provide an advantage to strategic operations such as communications, imaging, or spying. The tax-payers, of course, are motivated in any technology that will improve their life. Communications and global positioning systems would most likely take top priority, whereas extremely expensive scientific experimental machines would not be of highest interest of the tax-payers.

3 QUESTION 3

Piazza Redesign

Piazza is an ideal online forum for academic discussions among peers in various classes. The interface is simple and has many features extremely useful for filtering through the multitude of posts.

The top runner of tags, within Piazza, could use a slight redesign. Currently, the runner homogenously lists all the tags for all the posts equivalently across all posts ever created in a class. However, if the runner would become dynamic and adaptable to the latest topics as the class moves on, then all students could filter through topics easier and focus only on the important topics for the remainder of the term.

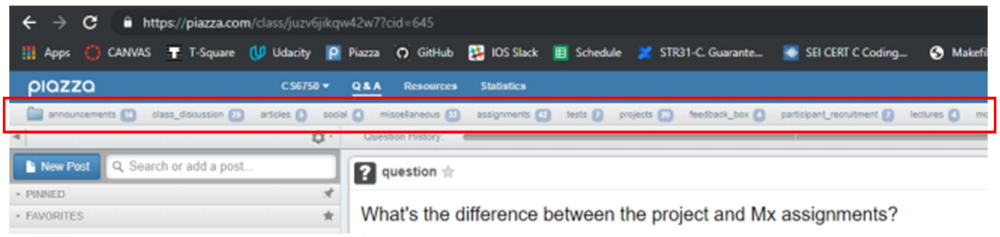

Figure 1: Piazza tag runner

The redesign of the runner would include software logic and require for Piazza to have advanced knowledge of the syllabus. With the syllabus as a reference tool, Piazza could obsolete the tags which have passed their expiration dates on the syllabus. For example, in CS6750, when the first Exam finishes, the threads for M1-M3 and P1-P3 can be removed from the runner to leave room for the rest of the assignments through Exam 2.

Furthermore, the list of threads which is currently filtered by the selected tag, should instead be allowed to be combed through by AITA, which is undergoing trials. With AITA's help, the important topics of a thread could categorize common threads into groups, then the search could list threads, instead of in date ranges, by different sorted groups such as within "test 1" tag one could foresee a "test taking logistics" group, a "materials and content" group, and a group for each topic being discussed (i.e. journal papers and lecture material). Similarly, a tag for Px Assignments could include grouped chat threads for each question Q1-Q4.

Redesign Justification

Firstly, the redesign improved discoverability. Since relevant topics become more visible to the user by having past tags disappear, it is easier for the user to navigate an already busy Forum. Additionally, AITA integration into grouping would allow the user to locate threads relevant to major topics of interest with barely a few button clicks, rather than spend time on proper search keywords and functions. Secondly, although complexity of the website is increased, the simplicity of the user interface is also increased. A user interface which hides irrelevant headers and allows for advanced grouping methods greatly improved the simplicity of having to navigate and locate appropriate discussion threads. Thirdly, flexibility allows users of novice and expert rank to use the system efficiently. By intelligently arranging the tags and groups of topics, even first time users can easily navigate to the topics desired without having to learn the system, search mechanism, tagging, or sorting features. Fourthly, structure is greatly increased since clutter is vastly minimized. On the tag runner, the irrelevant tags are removed while in the thread list, multitudes of threads are grouped together in more meaningful ways than simply posting date. Finally, constraints are improved for easier searching since the user is provided with limited parameters within which to operate. Tags and groups provide the user a more

meaningful path to finding the relavant information rather than cluttering the entire screen with all tags and threads from the beginning of the class.

4 QUESTION 4

The selected paper is titled "UX Design Innovation: Challenges for Working with Machine Learning as a Design Material" (Halskov, Zimmerman 1). This paper focuses mainly on the integration, useability, and challenges present I modern day UX design with Machine Learning features.

Summary

Machine Learning is very different from human intelligence. It applies statistical methods to produce output that can be difficult to explain, and that make seemingly bizarre errors due to a lack of common sense. As the technology becomes more and more commonplace, UX designers must face a new era of design with Machine Learning models in mind. Considering that this technology is well known but poorly understood, current UX design is ill equipped for creating interfaces with this technology as the centerpiece.

The authors of the paper created a survey, covering 51 UX designers. This survey covered nine questions which would narrow down the problem areas and causes of designers' abilities to integrate ML into their designs. The authors, in their survey, asked if participants worked in research or practice, if they had formal design training, if they had been exposed to machine learning as part of their design education, if they had worked on UX projects involving machine learning based services, and if yes, then to provide a short description of the project. In analyzing the survey results, the authors found that users in general had a difficult time envisioning how ML can be used as part of their design, challenges with working with ML technology as a design material, and expressed concern in using ML technology without fully understanding its capabilities or intentions.

Additionally, UX designers expressed a general lack of tools needed to design with ML and a comprehensive lack of commonality between machine thinking and human thinking. Where when ML algorithms make decisions, they can be at odds with what humans would expect or want to do, proving a poor user experience for the client.

The ways in which designers and data analysts see data is at odds with each other. Designers visualize data and look for patterns which fit with the human understanding. Machine Learning , however, does not care much about human thought processes, and instead finds any matching patterns in data which the algorithm dictates, without much thought for causality or human comprehension.

In conclusion, the authors narrowed down their findings to a list of challenges for each UX designer working with ML to consider. Firstly, the designer must consider the interplay between human and machine intelligence. Secondly, the designed must consider the opportunity to aply Machine Learning in less obvious ways. Thirdly, The designer should represent Machine Leaning dependency on data in early prototypes instead of integrating it as an afterthought at the end of the design life cycle. Finally, the designer must foreground ethical considerations of ML. If the technology being used by the designer is poorly understood, the ethical question of whether to use the technology as a black box or not should be considered early on in the design life cycle.

Description of Interest

The topic of Machine Learning use in UX design is fascinating and increasingly relevant, especially to OMSCS students. As a majority of the student population will be taking at least some class in either ML, ML for Trading, or Artificial Intelligence, the question of integrating such technology beyond academic code should be of high concern. As an example, the ML for Trading class of OMSCS introduces the students to a multitude of methods and machine learning algorithms to help in offloading trading decisions on to a Machine Learning algorithm. However, users tend to want some control over their decision, if not which stock to pick then at least which algorithm to use or which stocks to balance in the ML portfolio. As such, blending the use of machine learning with the user's desire for control can present previously unimaginable complexity into designing the UX to facilitate such an interaction.

5 APPENDIX

1. **Dove, G., Halskov, K., Forlkizzi, J., & Zimmerman, J. (2017, May 6). UX Design Innovation: Challenges for Working with Machine Learning as a Design Material. Retrieved July 15, 2019, from http://delivery.acm.org/10.1145/3030000/3025739/p278-dove.pdf?ip=73.71.153.97&id=3025739&acc=OPENTOC&key=4D4702B0C3E38B35.4D4702B0C3E38B35.4D4702B0C3E38B35.9F04A3A78F7D3B8D&__acm__=1563099724_2a58ea5191488155e240c78213ac614f**