

CS6750 HCI Summer 2021:

Assignment P5

Nan Xiao
nanx@gatech.edu

1 QUESTION 1 - COMPUTER SCIENCE PROMPT

1.1 Positive effect of OMSCS

The main reason for me and many others to choose OMSCS is because of the value. The program has a great reputation with an affordable cost. There are many low-cost online programs, but the quality is also an important factor. From my point of view, the main positive effect of OMSCS is to make high quality post-graduate education more accessible like never before.

This positive effect comes in 2 ways. First, the low cost structure enables those people who cannot afford normal university tuition access the post-graduate level education. Second, the flexible structure of the program enables full-time working adults to consider do a post-graduate degree in their free time.

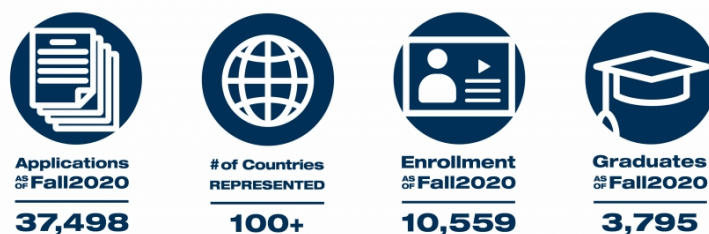


Figure 1—Gatech OMSCS - Enable more people to access high quality postgraduate education

1.2 Potential Negative effect of OMSCS

Every coin has 2 sides. The low-cost structure makes the OMSCS program more accessible, but people tend to have lower commitment as well. The drop-out rate of the OMSCS program is higher than the on-campus program, one of the reason is that the sunk cost is much lower. People can afford to drop out with minimum financial cost. But there can be selection bias here as well. The low-cost structure enables much more people from lower-income families to be participated into the program, but those people are much more likely to drop-out because of the

family issue. Also, another important factor for the high drop-out rate is that, the OMSCS students are generally working adults with full-time jobs. There are much more life commitments comparing to the normal colleague students.

"The demographics of OMSCS differ from MSCS: the average age of a starting OMSCS student is 32 as compared with 22 in MSCS, the majority of OMSCS students are domestic (67.1% in Spring semester 2019), while MSCS' is international (55.4%), most work a full-time job"

There are many people dropped-out from the OMSCS program because of the change of work and family commitment (e.g. Having a new-born to take care).

1.3 Design to preserve the positive effect and limit the negative effect

To keep the program accessible with low-cost and encourage the commitment and engagement, we can increase the cost of the program and give as much scholarship as possible for those who are in needs. There can be performance based awards as well. To encourage people with major life changes able to continue the education, we can allow people to pause the program for 6-12 months with valid reason.

2 QUESTION 2 - COMPUTER SCIENCE PROMPT

2.1 Area that political motivations are determining the design of technology

Social media keeps people connected nowadays. There are many active designs and studies in this domain. The way people sharing and interacting with each other are heavily affected by the political motivations. In China, the biggest social media is not Facebook or Instagram, it is the Moments within the super app WeChat. In this section, we will discuss the value sensitive design of WeChat Moments and stakeholders with their motivations. The way WeChat Moments allows user to share their life and how they are interacting is very different from what you can do with Facebook or Instagram.

2.2 Stakeholders and their motivations

We can refer to the below Table 1 for the stakeholders and their motivations. There are clear conflicts between the users and the advertisers, the users want less annoying ads and the advertisers want the opposite. Tencent (WeChat company) would love to maximize the profitability but if user experience damages

too much, they could lose users to competitors. And the company can be in trouble with regulators if they misuse the user data. So they have to carefully design the product that according to the Chinese culture's value and minimize the negative impact by monetization.

Table 1—WeChat Moments - Stakeholders and their motivations

Stakeholders	Motivations
WeChat Company	High user engagement, high user activities to make ads slots more valuable, profitability
WeChat Users	User privacy is concerned, free to post without judgement, interaction with friends, less ads
Advertisers	High user activities, more people to see their ads
Regulators	User data is protected, users are free from social media scams
Competitors	Focus on the bad experience part of WeChat Moments and offer a better product

2.3 Motivations affecting the design of the technology

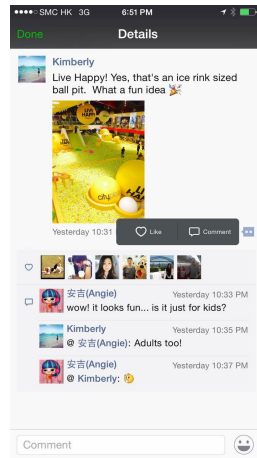


Figure 2—WeChat Moments - Value sensitive design

From the Figure 1 we can see a particular post of WeChat Moments. The core value of the WeChat design it to take care of the user privacy. It is very different from another social media platform called Weibo, which is like Twitter. Everyone can see others' posts. The post can only be seen by the friends added. Also, you can set up group view access to allow only a small portion of people see your posts. Through this design, WeChat emphasize the privacy of the users and let them to choose who can see their posts. This is tailored to the WeChat's

motivation, because they want to have more user engagements, and encourage users to do more posting. The ultimate goal is to boost the engagement that they can sell other services like WeChat pay, and more advertising on the platform. The design concerns about the privacy also lowers the barriers for users to do posting, they can share some sensitive posts with close friends only.

3 QUESTION 3 - ACM CHI

3.1 Paper 1

(Drosos et al., 2020)

3.1.1 *Title and Author*

Paper Title:

"Wrex: A Unified Programming-by-Example Interaction for Synthesizing Readable Code for Data Scientists"

Authors:

"Ian Drosos, Titus Barik, Philip J. Guo¹, Robert DeLine, Sumit Gulwani"

3.1.2 *Summary*

This paper proposes a new programming-by-example way for data scientist to do data wrangling. Traditionally, data scientist has a variety of data wrangling tools to use, but they are reluctant to do so. Because to use those tools requires data scientist to leave their programming environment - Jupyter notebook, and often in another programming language than Python. The authors present a new tool embedded in the Jupyter notebook using the same python language, which will make it easier for data scientist to adopt the new tool to the workflows.

3.1.3 *Interesting point*

First, as a 6 years data scientist, I agree with the author that the data wrangling tools are generally ignored by the professional data scientists. We normally have to write code with libraries like Numpy, Pandas and Matplotlib to understand how to do the proper data wrangling. But if there is a widget in the jupyter notebook to speed up this process, it is definitely going to be helpful. The authors

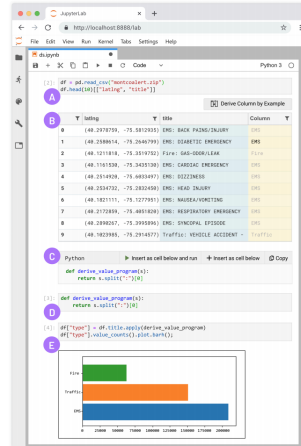


Figure 3—WREX - Jupyter notebook extension to do data wrangling

used the familiar interface to bridge the gulf of execution for the end users.

Second, authors have done enough research on the needfindings. There are many tasks for a data scientist to deliver a data product. Data wrangling is the most time consuming one but less interesting. This is a great area to design a product for improving the workflow efficiency. The authors also did both qualitative research and quantitative research to make sure the tool is indeed improving the data scientist's efficiency.

3.2 Paper 2

(Xiao et al., 2020)

3.2.1 Title and Author

Paper Title:

"If I Hear You Correctly: Building and Evaluating Interview Chatbots with Active Listening Skills"

Authors:

"Ziang Xiao, Michelle X. Zhou, Wenxi Chen, Huahai Yang, Changyan Chi"

3.2.2 Summary

This paper is written by joint effort of UIUC and Juji.¹ It proposed an active-listening chatbot for interview process. Current chatbot is usually not good at handling free context out of its training domain. Especially for interview chatbot, it is more functioning as a better way to do form filling. But by leveraging the latest progress in natural language processing and chatbot technology, Juji is able to build a chatbot to handle users' free-text response and open-ended questions. This is a great progress to enhance the user experience when they are interacting with chatbot.

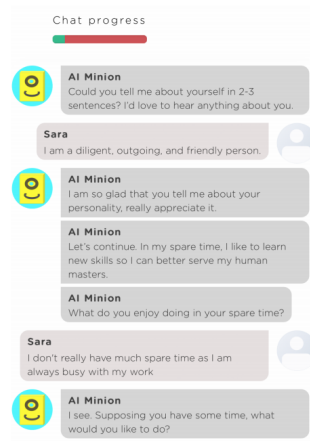


Figure 4—A screenshot of an example interview conducted by a chatbot (AI Minion) and a user (Sara).

3.2.3 Interesting point

The current chatbot technology is usually context based, for example identify if you are interested in booking a flight or hotel, or request for particular service, then redirect you to the preset workflows. The chatbot will fill the slot by asking standard questions like, what is your check-in date, your destination, your account number and etc. They cannot handle out-of-context questions or responses. Some chatbot and do casual chatting if you first question is labelled as small-chat for example. But once you are in the flow, the chatbot is poor at handling free-text response. The new chatbot Juji proposed is able to handle that during the user conversation and that makes the users feel more like talking to a real agent than a robot. The new design fits more to the predictor model of the

¹ Here is the websites of [UIUC DAIS](#), and [Juji, Inc](#), ACM SIGCHI paper [link](#).

user. The user would expect natural response when giving free-text response or asking open-ended questions.

4 QUESTION 4 - OTHER CONFERENCES

4.1 Conference 1 - International Conference on Human-Robot Interaction

This is one of the best full paper awards of International Conference on Human-Robot Interaction 2021 on Technical Advances Track. ² And it is from Georgia Tech RAIL Lab. (Das, Banerjee, and Chernova, 2021)

4.1.1 Title and Author

Paper Title:

"Explainable AI for Robot Failures: Generating Explanations that Improve User Assistance in Fault Recovery"

Authors:

"Devleena Das, Siddhartha Banerjee, Sonia Chernova"

4.1.2 Summary

In this paper, the author proposed a new way of interpreting error message using explainable for the novice users. The author proposed a new type of explanation, Eerr, to help the non-expert users understand robot failure and identify solutions. By using the explainable AI approach, they are able to generate meaningful explanations for unseen scenarios as well. This is very helpful for the non-expert users to understand the problems of the robot and act accordingly to fix the issue.

4.1.3 Interesting point

The authors have creatively to adopt the explainable AI methods to robot failures. It is one of the hottest areas in machine learning field and it make sense to adopt some best practices to the robotic field. Especially, the failures of robot is almost inevitable during the development phase and moving from testing environment to the real world.

² Awards HRI 2021 [link](#)

4.2 Conference 2 - International Conference on Tangible, Embedded, and Embodied Interaction

This is the best paper award of International Conference on Tangible, Embedded, and Embodied Interaction 2020. ³ (Han, Matsui, and Naemura, 2020)

4.2.1 Title and Author

Paper Title:

"ForceStamps: Fiducial Markers for Pressure-sensitive Touch Surfaces to Support Rapid Prototyping of Physical Control Interfaces"

Authors:

"Changyo Han, Katsufumi Matsui, Takeshi Naemura"

4.2.2 Summary

The authors proposed ForceStamps, fiducial markers for supporting rapid prototyping of physical control interfaces on pressure-sensitive touch surfaces. The authors also showcased a wide range of physical controls could be prototyped by utilizing the characteristics of the buffer materials and the spatial constraints.

4.2.3 Interesting point

We rarely understand how to design and rapid prototyping for the haptic sense. It is an interesting and useful design that enable designers without knowledge of electronics to be able to design for touch interface. ForceStamps bridges the gulfs of execution and gulfs of evaluation between the user and the design task. Also, from the example we can see that, it allows the designer to directly manipulate through the interface. This interface further shorten the path between the user and the task.

5 REFERENCES

- [1] Das, Devleena, Banerjee, Siddhartha, and Chernova, Sonia (2021). "Explainable AI for Robot Failures: Generating Explanations That Improve User Assistance in Fault Recovery". In: *Proceedings of the 2021 ACM/IEEE Inter-*

³ Awards TEI 2020 [link](#)

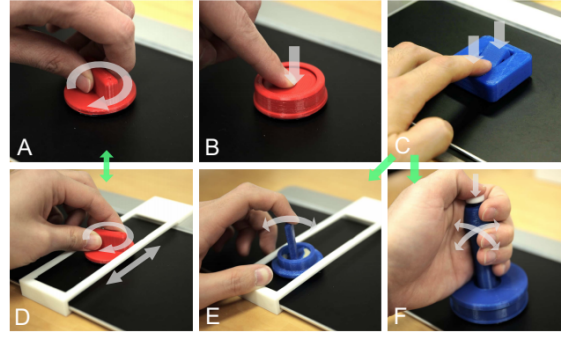


Figure 13: Example of physical interfaces designed with ForceStamp: A) Control knob, B) Push button, C) Rocker switch, D) Vertical slider with a control knob, E) Lever, and F) Joystick with a fire button.

Figure 5—ForceStamps - Direct Manipulation

- national Conference on Human-Robot Interaction*. HRI '21. Boulder, CO, USA: Association for Computing Machinery, pp. 351–360. ISBN: 9781450382892. DOI: [10.1145/3434073.3444657](https://doi.org/10.1145/3434073.3444657). URL: <https://doi.org/10.1145/3434073.3444657>.
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 - [3] Han, Changyo, Matsui, Katsufumi, and Naemura, Takeshi (2020). “ForceStamps: Fiducial Markers for Pressure-Sensitive Touch Surfaces to Support Rapid Prototyping of Physical Control Interfaces”. In: *Proceedings of the Fourteenth International Conference on Tangible, Embedded, and Embodied Interaction*. TEI '20. Sydney NSW, Australia: Association for Computing Machinery, pp. 273–285. ISBN: 9781450361071. DOI: [10.1145/3374920.3374924](https://doi.org/10.1145/3374920.3374924). URL: <https://doi.org/10.1145/3374920.3374924>.
 - [4] Xiao, Ziang, Zhou, Michelle X., Chen, Wenxi, Yang, Huahai, and Chi, Changyan (2020). “If I Hear You Correctly: Building and Evaluating Interview Chatbots with Active Listening Skills”. In: *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. New York, NY, USA: Association for Computing Machinery, pp. 1–14. ISBN: 9781450367080. URL: <https://doi.org/10.1145/3313831.3376131>.