

Developing Artificial Intelligence in Education

(Technical Paper)

A Review to Artificial Intelligence in Education

(STS Paper)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Prospectus

INTRODUCTION

Have you ever thought about why you see an advertisement on the internet that shows exactly what you like? How do advertisements collect data from us? Why can't we use this technology in education instead of using it only in marketing? In my prospectus paper, I will suggest a way for students to find the right career path by discussing how targeted advertisements work and how we potentially can mix neuroscience with artificial intelligence used in targeted advertisement to better guide students in choosing their majors of study.

Online advertisements use Artificial Intelligence to learn and predict users' behaviors and actions which automatically optimizes advertisement by processing user's actions on the internet. The advertising algorithm makes an automated decision based on collected data and observations. Then it chooses the advertisements that have the highest statistical chance for user engagement. This makes artificial intelligence the right tool in marketing where speed is essential since it uses users' data to learn how to best communicate with them.

User behavior prediction and algorithms could potentially help us create cognition models for more accurate simulations of how we think. The current existing algorithms all have different methods of nudging to make the users to act in certain ways. For example, Facebook and Instagram try to keep users on the platform by suggesting contents according to user's interest and engagement. LinkedIn on the other hand, is business-oriented compared to Facebook and Instagram, and it's dedicated to help students and professionals build their networks by making connections. It also suggests jobs to users according to their connections and interests. These algorithms are still unknown to the public, but I believe they have significant knowledge of our mindset that they can effectively show us contents that we are interested in. If we want to use Artificial Intelligence in education, it's important for us to firstly focus on the neurological science to understand the mindset of students. This will help us create an algorithm for students to find the best career path.

When students start higher education, they find it difficult to choose their major. Picking the wrong major which comes from different information biases, can be an expensive mistake. College students whose majors don't reflect their interests are less likely to graduate on time and more likely to drop out. So, it is important to create a technology that can find the interest and the strength of students to guide them to the right career path.

ARTIFICIAL INTELLIGENCE IN EDUCATION

Since I want to use Artificial Intelligence behind advertisement for education, I need to understand why we let certain advertisement change our way of thinking. For this purpose, I'm studying *Richard Thaler's NUDGE: Improving Decisions about Health, Wealth and Happiness*. According to Thaler, "A nudge, is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not." (2008, p 6). Thaler argues that to innovate in today's consumer-empowered world, we need to carve the idea and innovation at the psychological part of human decision making. In other words, we need to become a "Choice Architect". Nudges prompt people to think in a new and different way. This means that the success of innovation comes from influencing what people think not from changing their perception either by coercion or persuasion. What advertisement does is not a nudge. It focusses on human emotions to change the way of thinking. This leads to bias and thus wrong decisions. Choice architecture says that people are naturally lazy in both thought and deed. If faced with two options, they will choose the path of least resistance. For advertisers, this insight is the key. They must innovate something that makes people's lives easier. Unfortunately, the path of least resistance for the lazy consumer is for them to continue doing what they've always been doing, and not try something new. This approach allows people to avoid confronting their biases, and in so doing, it can reinforce them. On the other hand, this reveals the fact that people have two distinctive thinking styles that they flip between. The Automatic and the Reflective system.

The Automatic System is rapid, instinctive, and it does not involve what we usually associate with the word thinking. The Reflective System is more deliberate and self-conscious. One way to think about all this is that the Automatic System is the gut reaction, and the Reflective System is the conscious thought. Gut feelings can be quite accurate, but we often make mistakes which can lead to biases. More recently, psychologists have come to understand that these biases emerge from the interplay between the Automatic System and the Reflective System. Innovation can either play on the biases that pattern our automatic (lazy) thinking or can push us into reflective thinking by providing with a new way of thinking. My idea is that maybe if we detect how each student corresponds to biases, the manipulation can be reduced. The reduction of manipulation can make us pay more attention to the details by turning on our reflective thinking. Since we want students to use their reflective thinking and not to take the least resistance path, an artificial intelligence can study from their behavior to see what starts their reflecting thinking which can potentially find their strength.

STS METHODOLOGY

One way to approach my implementation planning, is to conduct case studies. As a student at University of Virginia I can work with the Psychology department by reaching out to the laboratory directors who conduct several studies with children, students, and adults. One of the laboratories that I find most helpful is The Foundations of Cognition and Learning (FOCAL) lab based at the University of Virginia's Center for Advanced Study of Teaching and Learning. It includes more than 30 scholars from several universities. They use multiple methods such as

secondary analysis of large-scale databases, intervention and measurement development, and randomized control trials (RCTs). The lab examines cognition that determines how people of varying ages learn throughout their education years. The cognitive foundations that are central to their studies include motivation, executive function and self-regulation, sensorimotor and visuospatial processing, phonological skills, and general knowledge of the world.

I believe psychology department will help me connect my ideas together better since they know more about vulnerabilities of our minds. I will briefly introduce my AI idea to each lab director or researcher. Prior to this, I will look more into each researcher's published works and identify relevant articles they contributed to. I will give the researcher the space to make comments or ask questions to clarify their understanding or express any concerns. The FOCAL lab has previously published works on motivation and learning, which I think will be relevant to my project which wants to find a way in detecting student strength.

KEY TEXTS

Currently for my paper I used *Nudge: Improving Decisions About Health, Wealth, and Happiness* by Richard Thaler as the main key text since it discusses how our way of thinking changes by different biases. But another key text that I will use for my prospectus is *Stand Out of Our Light* by James Williams. James Williams is a former Google strategist who gave great insights of how technology tries to advance goals of itself and the company instead of advancing user goals. In his Ted Talk at TedxAthens about Stand Out of Our Light, he mentions "Psychology and behavioral economics has cataloged an enormous number of vulnerabilities in our brains, little buttons that can be pushed to get us think or do certain things." Advertisements in parallel to this insight, effectively use these vulnerabilities to make us pay attention to things that are not our life goals but are the advertisement's goals. This insight can be important when we are trying to help students in education because our goal is the student's goal not the other way around. Each student has different vulnerabilities which can help us understand why certain biases affect student's decision-making process. These resources might change by Spring 2022 to support claims efficiently.

REFERENCES

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