



Attention Engineering: The Manipulation of Humans through Notifications and Recommendations AI

FIT1055 IT PROFESSIONAL PRACTICE AND ETHICS

ASSESSMENT 1

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Introduction

Do you find yourself spending unhealthy amounts of time on your phone? Are you tired of feeling helpless against social media addiction? It's not your fault. It is all about Attention engineering. During the April 2017 TED conference, Harris claimed attention engineering is used by tech companies(TC) for users to maximize their time on their applications due to the profit. Products are designed to extract human attention and lead to addiction. This makes users return for more, and these ideas are gathered from gamblers in Las Vegas (Busby, 2018). TC often use techniques like notifications and reward schedules to keep users hooked. According to Labrot (2021), TC designs their applications to be as addictive as possible to increase usage and follow by revenue. Revenue can be generated from selling goods or services. The most common service is advertising. Therefore, the more users use their application, the more advertising revenue the company can generate. Hence, TC designs their products to be irresistible without considering the potential consequences.

According to Berthon, Pitt and Campbell (2019), TC often designs their products to attract human attention and psychologically manipulate users. For instance, notifications are designed to grab users' attention by using features like bright colors and vibrating. By doing so, notifications can be used to create a psychological phenomenon called fear of missing out (FOMO), which impacts the users where one will feel anxious or insecure. On the contrary, companies often use recommendation artificial intelligence (AI) to drive users towards certain actions that are profitable for companies (Petropoulos, 2022). For example, companies collect data on user behaviour for targeted advertising. Hence, the techniques used in attention engineering by these companies have raised ethical concerns when companies try to manipulate users.

This essay focuses on the problem of how TC uses attention engineering to manipulate users by exploiting human weaknesses. The structure of the essay will start with an introduction, literature reviews, problem statement and conclusion, followed by a reference list.

Literature review

According to Wikipedia (n.d.), attention engineering is a technique used by TC to retain user attention on their products. They often design their products by using the behavioural psychology and weaknesses of humans to maximise the potential addiction to their products. TechDetox Mom (2022) states TC designs software interfaces by exploiting human weaknesses to keep them engaged. The most commonly used techniques in attention engineering are notifications and recommendation AI.

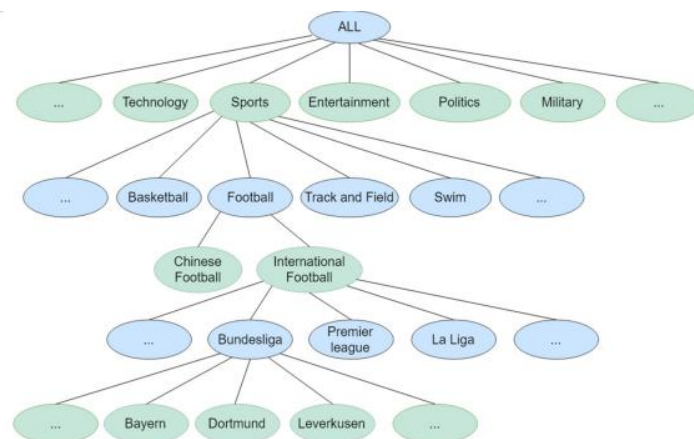
Firstly, attention engineering commonly uses notifications to draw users' attention. Notifications are designed to catch users' attention and prompt an immediate response using built-in features like vibrating and ringtones. According to Cemiloglu, Naiseh, Catania, Kukkonen and Ali (2021), external stimuli can distract one from their primary objectives and make them engage with digital platforms. The distraction of notification can trigger an individual to pick up their device and address it to satisfy one's curiosity. To fulfil their curiosity, individuals will engage with their devices, even though it interrupts their primary objectives.

Moreover, some gambling techniques are similar to notifications, where the reward is unpredictable (Berthonn, Pitt & Campbell, 2019). Notifications are unpredictable, just like the outcomes of each game in gambling. Thus, receiving an unexpected notification like "someone requested to follow you" can be similar to the thrill of gambling. It could create a sense of urgency and curiosity in individuals, making them pick up their device again even if they had previously decided to focus on their primary task. Hence, it is evident that notification is one of the techniques used in attention engineering to let users engage with their platform.

According to the research, whenever a notification is received, the mesolimbic dopamine circuits in our brains are triggered (Kuss & Griffiths, 2012). The release of dopamine creates a euphoric feeling in individuals, making them crave more notifications. Therefore, making one engage in their gadgets and look forward to the next notification. After several times, individual's brain is used to these dopamine hits, making one interact more with their gadgets. Therefore, it forms a loop when the dopamine decrease, individual will engage with their gadget until they are satisfied.

On another note, TC like TikTok often uses recommendation AI to keep users engaged on their platforms. Using algorithms to analyse users' past activities to generate personalised recommendations. Cemiloglu et al. (2021) claim that recommended algorithms(RA) encourage one to scroll through the content continuously without realising the passage of time. The contents are tailored to users' interests, as the algorithms recommend users based on one's viewing habits. Thus, the applications will recommend more content that interests users. This triggers human curiosity and makes one continue scrolling. As a result, users may spend hours watching short videos and eventually become addicted (Zhao, 2021). In other words, a short video may cost 15 seconds, but when one decides to watch short videos. It eventually consumes more than 15 seconds. Because of the recommendation AI and the simplicity of the application, where individuals just need to swipe up for the interesting video. It creates a seamless and addictive experience for users. It triggers the thoughts of continuing to scroll, since it is just a 15-second clip and it is relevant to one's taste. Eventually, it leads to endless scrolling through the application. Therefore, tech companies often use recommendation AI in attention engineering to engage users on their platforms.

According to Zhao (2021), the algorithms recommendation AI is built upon a hierarchical tree diagram. The highest level of this tree diagram is the root of all the content. The first layer under the root is the general categories such as Technology and Sports. Each parent node in a tree has child nodes representing a more detailed version of its parent node. For instance, Sport's child node mainly focuses on the field of sports like badminton and swimming. In this tree diagram, each branch further narrows to more specific domains of their parent nodes. On another note, when users sign up for an account in the application, they are often asked to log in through a third-party social account like Email or Facebook. This enables them to move the whole hierarchy behaviour to their application to analyse users' habits and use RA on users.



(Zhao, 2021)

Figure 2.1: The Hierarchical Interest Label Tree

According to Zhao (2021), RA works by taking a set of inputs X and Y from users' content and the classifiers used to obtain characteristics of content and users. Essentially, the data extracted by the classifiers based on their interactions with platforms like "likes" and "purchase history" and uses are used to predict suitable content for the users. The algorithms can be improved by continuously updated by the platform. The data set can be divided into two sets which are training set and test set, where the training set is to train the model by feeding it a large amount of data and model uses this knowledge to make accurate predictions. Training sets often compare their prediction with the actual outcome obtained from user feedback. Hence, the model can learn from its mistake and make suitable adjustments to predict more accurately.

Moreover, A test set is used to evaluate the model's performance once the model is well-trained and can predict every outcome accurately. Then a test set is used on the model, where it is a set of data that the model has never seen before, this test can ensure that the model is not memorizing the training data and can make accurate recommendations on new data. After that, the model can be put into use for recommending users. Therefore, by training the model in a manner that allows for flexibility, the model can be adapted to meet the changing need of its user.

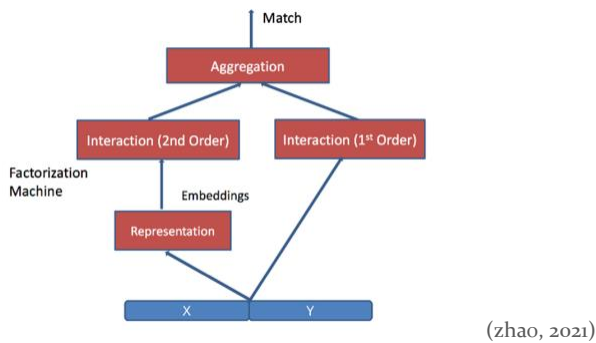


Figure 2.2: Typical Architecture for Recommendation

Problem statement – What, Why, and How

When attention engineering is widely used among industries, it can lead to manipulative tactics by exploiting users' weaknesses. TC can use several techniques to psychologically manipulate users and lead them to engage with their products. Not to mention, TC also try to manipulate individual decision-making by using recommendations AI to maximise their profit.

It is evident that TC designs notifications for manipulating users' behaviour psychologically. Companies often design their notifications to create FOMO in users and keep them hooked. According to the research, the frequency of notifications can increase one's FOMO (Rozgonjuk, Elhai, Ryan & Scott, 2019). With that being said, users often feel a sense of urgency to respond immediately when a notification pops up. They feel compelled to check their notification frequently even though it stops a task at hand due to FOMO on the information. This makes users couldn't focus on their primary task as FOMO effect could distract one from focusing . Hence, notifications are designed manipulate users to increase their FOMO.

Taking a real-life example, tech companies often combine notifications and rewards to psychologically manipulate users and increase engagement with one's applications. For instance, Snapchat uses "Streaks" and notifications to manipulate users and keep users hooked (Berthon, Pitt & Campbell, 2019). Where the applications encourage users to maintain a consecutive snap exchange with their friends in order to keep the streak going. In other words, Snapchat will send notifications when the snap streak is about to disappear due to users failing to maintain a snap exchange in one day. This creates FOMO on streaks in the users and makes one engage with their platform at least once a day as no one wants to break streaks after many days of contribution to snap exchange. This makes Snapchat daily active users increase steadily from 2014 to 2022 as shown in diagram 3.1. Hence, it can be concluded that TC combines notifications with rewards to psychologically manipulate users to create FOMO effects in users and make them engage with their platform at least once a day.

Snapchat quarterly daily active users 2014 to 2022 (mm)

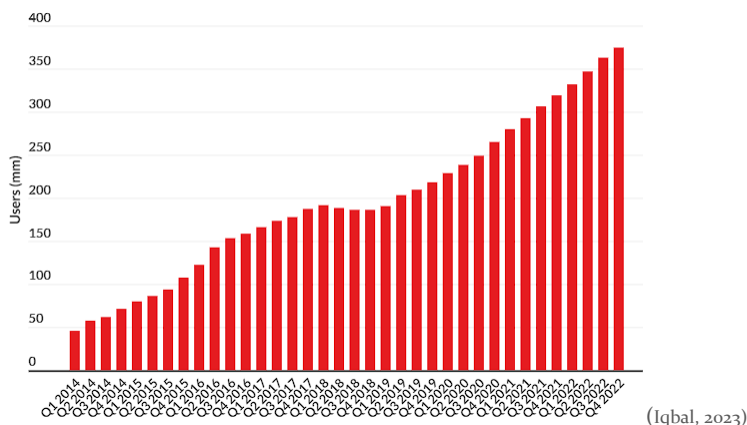


Diagram 3.1: Snapchat daily active users 2014 to 2022

On the contrary, recommendation AI can manipulate users by using personalised content to influence user's decision-making. For instance, when recommendation algorithms are biased towards a particular agenda, they can manipulate users' decision-making without letting the user realise. Due to the primary goals of TC are to maximise their profit, they can utilize the data gained through RA to manipulate users towards certain actions that can gain profit for their companies (Petropoulos, 2022). For instance, an individual is looking for a new phone online, and an e-commerce platform could use recommendation AI to display phones advertisement based on user's search history. Eventually, the algorithms will suggest a slightly expensive phone compared to user's initial choice as the platform has a higher commission on this phone. Hence, when recommendation AI is biased towards a particular agenda, it could try to influence users' decision-making and maximise TC profit.

Taking a real-life experiment done by Dezfouli, Nock and Dayan (2020), the experiment is designed to test will Artificial intelligent (AI) influence human decision-making. By using an AI called adversary, where its target is to make one choose a particular action, named "target action", by making them believe that it has a greater reward. To lead one in choosing a target action, the adversary used a tactic called "learner rewards", which gives rewards for choosing an action. The adversary assigns learner rewards for the target action in the next trial if the target action is chosen previous round. At the same time, the adversary put learner rewards to non-target action when it was unlikely to be chosen in the next round.

For instance, action A is target-action and B is non-target. If the user chooses A, learner reward will assign to A, and in the next trial, adversary will assign learner reward to A again to reinforce the user's preference. On the other hand, if B was chosen, learner reward will assign to B, and since B is non-target action, adversary would assign learner reward to B in the next trial as it is unlikely to be chosen in the next round to make the manipulation not obvious and make A appear more attractive at the same time. At the end of the experiment, they found out that the AI had 70% success rate in leading one to the target action. Thus, it is evident that AI can manipulate users' decision-making when biased towards a particular agenda.

With that being said, it is possible for a TC to manipulate users by using the method above to promote more expensive items for the sake of their profit. This would be unfair to the users and may lead to legal repercussions.

However, there are solutions to prevent manipulation, one of the solutions is to increase the transparency of recommendation and notification algorithms. As users should understand how the algorithms produce recommendations and notifications, it lets users be more mindful of manipulative tactics. According to Nuenen, Ferrer, Such and Cote (2020), tech companies should be more transparent about the inner working of a system or algorithm, especially regarding RA. Increasing transparency can lead to fair outcomes as users understand how recommendations are generated. Hence, increasing transparency of the inner system and algorithm can help reduce the potential manipulation of tech companies and ensure the fairness of decision-making.

Conclusion and Discussion

In conclusion, attention engineering is a technique used by tech companies to attract human attention. Techniques like notifications and recommendation AI are to keep users hooked to generate profit through advertisements and services. However, this has led to ethical issues like psychological manipulation and influenced decision-making. However, the ethical issues could be improved by transparency in the algorithms of their products. As customers, it is essential that the algorithms is known and understandable by the customer to avoid falling victim to manipulation.

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