

## **Dark Patterns in UX. Is it Ethical?**

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### **Abstract**

Dark Patterns are tricks used in websites and apps that make you do things that you didn't mean to, like buying or signing up for something. If a company wants to trick you, they can take advantage of users skimming through information by making a page look like it is saying one thing when it is in fact saying another. This is tougher to beat in mobile applications, due to screen size constraints and the goal of fast browsing. This project aims to document this issue and present findings about its effect on users, along with a need for change in the software industry with respect to laws against dark patterns.

### **Problem statement and our goal**

Dark patterns are crafted to manipulate users into doing things they would not under normal circumstances. These tactics benefit the website's business. The goal of this project is to analyze the types, frequency of usage and user behavior towards a set of dark patterns found on mobile applications.

### **Relevance to this course**

A study based on dark patterns and their effects on users highlights the ethical violations present in pre-existing systems. It brings to light the need for laws to prevent any individual or corporate from releasing misleading UI/UX designs in their software.

### **Proposed approach and its significance**

We analyzed scenarios of dark patterns in mobile applications that a user comes across and studied the effects and the correlation between the patterns and user behavior. There is no large-scale evidence documenting the prevalence or a systematic and descriptive investigation of how the different types of dark patterns affect users.

### **Methodology**

Prior work has provided classification of different types of dark patterns, so our work surveys how often users come across these types of patterns, how they feel about them and is it considered ethical by them. Along with this, we use an AI tool to predict user attention against dark patterns in popular mobile applications.

#### **1. Survey**

For this survey, we picked 8 of the most frequently occurring dark patterns in mobile applications [1] and asked three questions.

Dark Patterns surveyed were:

1. Nagging- Nagging is a redirection from the current task that can happen one or more times.
2. Hidden Information- Options to accept conditions are small/grayed-out
3. Hidden Cost- You get to the last step of the checkout process, only to discover some unexpected charges have appeared, e.g. delivery charges, tax, etc.
4. Roach Motel- The design makes it very easy for you to get into a particular situation but makes it hard to get out of it (e.g., a subscription).
5. Disguised Advertising- Adverts that are disguised as other kinds of content or navigation, in order to get you to click on them.
6. Bait and Switch- You set out to do one thing, but a different, undesirable thing happens instead.
7. Forced Continuity- When your free trial with a service comes to an end and your credit card silently starts getting charged without any warning.
8. Toying with emotion- Attempts to make users feel bad about their decision. Instead of having options which say No, it will give you options like, 'I want to pay full price'.

Questions asked in the survey for each dark pattern:

- a. Have you encountered any form of nagging in any mobile application?
- b. If yes, what was your initial reaction to encountering a nagging dark pattern?
- c. Is it ethical to use nagging in a mobile application?

## 2. AI testing on Mobile Application UI

We collected screenshots of the UI of very popular mobile applications and fed them to an AI testing tool used for UI/UX testing. The AI tool we used for this is [Attention Insight](#). We utilized the Attention Heatmaps feature and the Percentage of Attention feature.

## Findings and Implications

### 1. Survey (N=22)

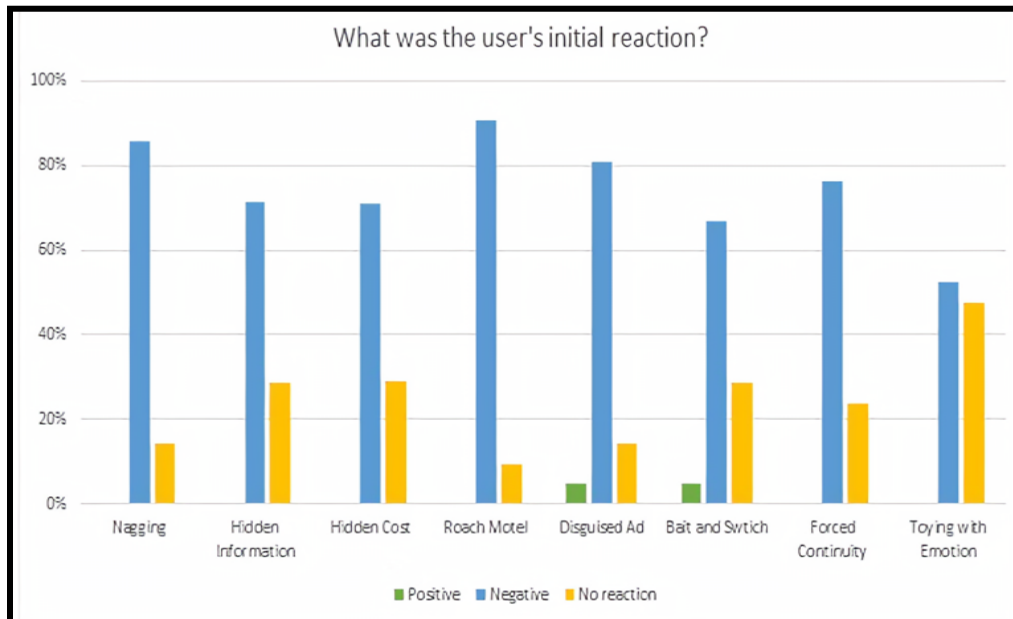
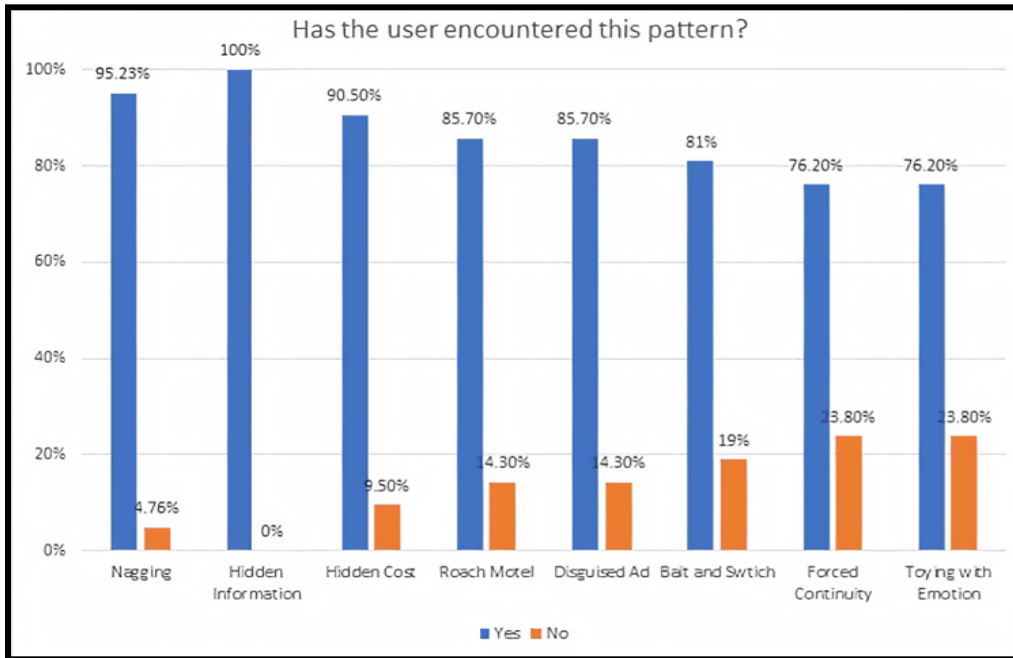
Figure 1 represents the survey results and the survey brought out some key insights. Significant number of users have encountered all these dark patterns. 100% of users have encountered Hidden information in Mobile applications. Almost no user had a positive reaction to these dark patterns. Disguised Ad, Bait and switch, Hidden Information and Roach motel are the most unethical according to users. A small number of people consider toying with emotion, nagging and hidden cost ethical. For toying with emotion, even though 52.4% people had a negative reaction, the same percentage of people considered it ethical.

### 2. AI testing

With the help of the AI heatmap tool we were able to understand the behavior of the user. It helped us understand how a user navigates through apps and when a dark pattern is encountered, what is the percentage of attention it gets, thereby impacting the overall experience. It also showed us what makes the interface a dark pattern. In Figure 2a, we see an example of nagging and in Figure 2b, we see an example

of hidden information. In 2a, the YouTube premium ad appears multiple times, thereby interrupting an experience. When we look at the overall heat map we can clearly see that the main advertisement's white region gets maximum attention, thus redirecting the user away from the video to a secondary task of buying a premium subscription. It also shows Aesthetic manipulation, by placing the '1 Month Free' button on the right side, where a user is more likely to click. Meanwhile, 2b shows an example of Hidden Information where the terms and condition (which is an important area of a login page) is given no attention due to the way it has been represented and that makes it difficult to see the terms and conditions.

Figure 1: Bar Graphs of Survey Responses



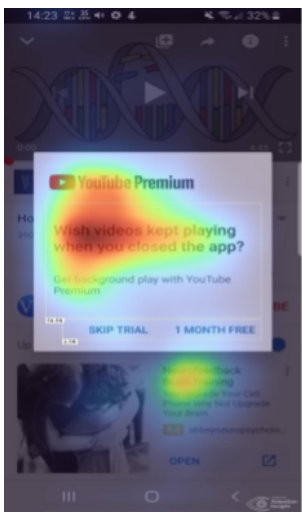
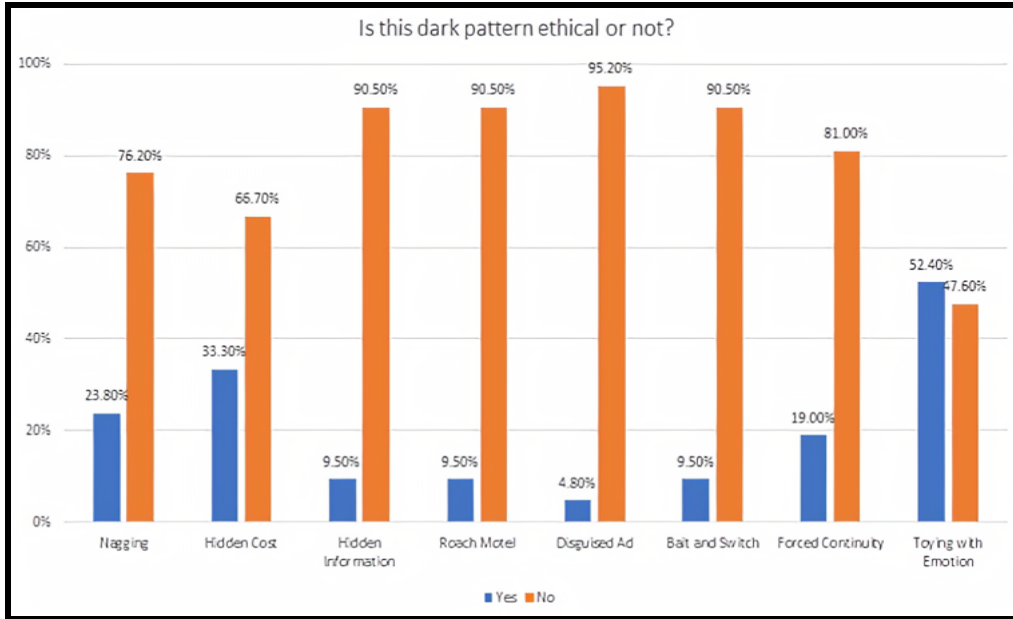


Figure 2a: Nagging in Youtube Premium

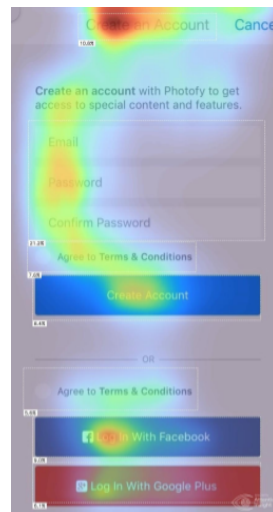
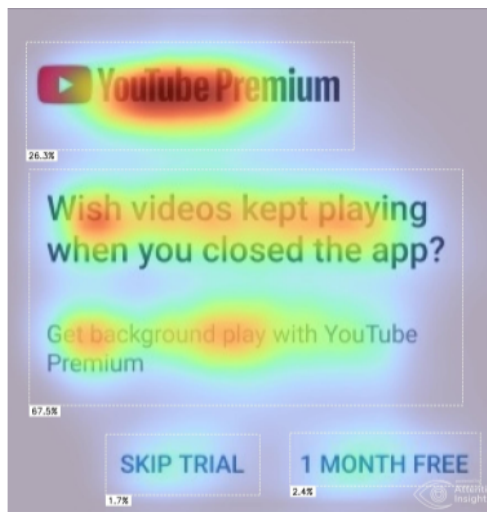
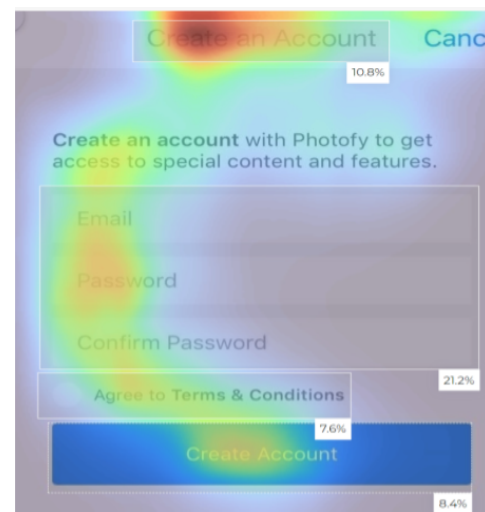


Figure 2b: Hidden Information in a login screen



## Conclusion

Insiders in the industry have urged that designers have an ethical code of behavior that prioritizes privacy, honesty, and respect. Dark patterns are an example of bad design patterns that have been crafted with great attention to detail, and a solid understanding of human psychology, to trick users into doing things they wouldn't have done. Since most of the users are unhappy with these dark patterns, there should be clear laws for regulating companies against using them. Companies could use the laws of UI/UX design effectively for highlighting important information instead of hiding it.

## Future scope

A more detailed survey can be conducted, which would reveal more interesting details of users' interaction with these patterns. Questions such as (1) Does the involvement of pricing make the factor feel

more deceptive, (2) If the dark patterns were considered unethical, would they feel the same if a salesman tried the same deception.

## Appendix

[1] Hooked: How to Build Habit-Forming Products Hardcover. The book Hooked proposed a more rational method. In his book, he discusses the power of persuasive design and how a solid grasp of cognitive science can improve the user experience. He discussed the 'Hook Model,' which gives designers the ability to create habit-forming goods. He recognizes that his paradigm may be abused and speaks on its morality. He feels that manipulation is an experience designed to alter behavior; thus, he created the 'Manipulation Matrix' for designers. This matrix, however, does not attempt to address the question of whether enterprises are moral or which will flourish.

[2] Laws of UX: Using Psychology to Design Better Products & Services An understanding of psychology—specifically the psychology behind how users behave and interact with digital interfaces—is perhaps the single most valuable non-design skill a designer can have. The most elegant design can fail if it forces users to conform to the design rather than working within the "blueprint" of how humans perceive and process the world around them.

[3] What Are Dark Patterns and How They Trick You - this is an article on Digital Wellness. The section that talks about “[How to avoid becoming a victim of dark patterns](#)” is especially useful in our project and in creating awareness among users.

[4] [Ethical dark patterns and privacy](#) - Dark patterns, when used ethically, can be an effective tool to increase privacy. Dark patterns can be designed and implemented like discrimination or hacking. As such they are immoral and harmful, but discrimination can be positive to make sure that marginalized groups are granted access to higher education and jobs, and hacking can be ethical to test the security of networks and infrastructures or to penetrate into criminal webs.

## References

[1] Di Geronimo, L., Braz, L., Fregnan, E., Palomba, F. and Bacchelli, A., 2020, April. UI dark patterns and where to find them: a study on mobile applications and user perception. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1-14).