

Usability Study on User Interface and User Experience Design Patterns

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Abstract— As the IOT (Internet of things), mobile phones, and cloud computing technologies have evolved, interface technologies have evolved more into GUI, CUI and NUI, and another sort of UI/UX is predicted to be developed within the future. Advancement in personal computing and information technologies have fundamentally transformed how maps are produced and is consumed, as numerous maps today are profoundly interactive and conveyed online or through mobile devices. Accordingly, we need to think about interaction as a fundamental complement to representation in cartography and visualization. UI (user interface) / UX (user experience) describes a group of concepts, guidelines, and workflows for critically brooding about the design and the use of a much interactive product, map-based or other else. This entry introduces core the concepts from UI/UX design important to cartography and visualization, that specialize in issues associated with visual design.

Index Terms— Design Understanding, User Experience Understanding, User Interface Understanding, UI/UX Trend.

I. INTRODUCTION

The ubiquitous concept was introduced within the 2000s and recently it has been highly developed and is been developing into the age of Internet of everything. Within the era of the Web 1.0, the WWW (World Wild Web) was a typical example of providing unilateral information. Within the era of Web 2.0, information may be shared on a platform basis like participation, sharing, and opening, and contents may be created by individuals. The Web 3.0 era could be a personalized, intelligent web that deduces web pages from the individual's center to Web intelligence. The web consists of varied contents on an internet page and interacts with various devices to process and utilize information. At now, the role of interacting interfaces is extremely important. However, it tends to be overlooked easily. Therefore, this study attempts to explore UI/UX related technologies like contents, devices, programs, HCI (Human Computer Interface), and content designing (Design) in terms of design and usefulness. UI and UX aren't an equivalent, separated in their concentrate on interfaces versus interactions. An interface is a tool, and for digital mapping this tool enables the user to control maps and their underlying geographic

information.

An interaction is always broader than the interface, describing the two-way question answer or control maps and their underlying geographic information. An interaction is broader than the interface, describing the two-way question answer or request-result dialogue between an individual's user and a digital object mediated through a computing device (Roth, 2012). Therefore, an interaction is both contingents—as the response relies on the request, creating loops of interactivity—and empowering—giving the user agency within the mapping process with changes contingent his or her interests and desires (Sundar et al. 2014). In 2007, numerous organizations, like LG, Apple, and HTC, delivered new models of mobile phones. The new models were now not equipped with keypads; instead, they were replaced by touchscreens. This caused a significant shift on research attention ever since. There are more than billion mobile phone clients overall which incorporate a huge extent of non-exclusive clients—youngsters, the older, and clients with problems or inabilities. Although mobile platforms are becoming an important part of dailylives, true standards for mobile UI design patterns don't exist. Seemingly, most of the designs are supported the desktop paradigm. The desktop paradigm could also be applicable, but there are notable differences between mobile devices and desktops, including the shortage of tactile feedback, limited screen sizes, and high demands of visual attraction. aside from differences in physical qualities, contexts of use between desktop computers and mobile devices are different. Desktop computers are stationary, whereas mobile devices are often used anywhere or maybe while users are walking, carrying objects, or driving. Thus, desktop designs don't fully fit mobile context. there's a requirement to ascertain a summary of usability studies on mobile UI design, to determine the present state of knowledge and research and to grasp research gaps. This text provides systematic review of the prevailing studies on mobile UI design patterns. The primary objective is to offer an overview of recent studies on mobile designs.

II. USER INTERFACE (UI) AND USER EXPERIENCE

(UX)

If using out the built-in digital interface is confusing and it fails to clarify what the program does and what users can do, then users will probably just leave. Consumers

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shouldn't spend plenty of time trying to figure out an Interface, after all. The simplest and most successful way to improve usability is to hold out interface assessments that involve three key components: representative users, representative tasks and user assessment.

There are five recommended design features that should be considered to develop any apps: persuasive instruction, clear textual interface, predictive icons, sleek interaction, and direct navigation. Users also set out higher specifications for the mobile interface design process and material. In other terms, users can achieve an honest quality of service throughout the customer interface dimension, and reliable info-transformation among suppliers and target customers, therefore implementing the application efficiently and decisively. UX is a common term throughout the sphere of human-computer interaction and designing interaction. User interface also applies to a subjective psychological sensation that users generate during the time of using products or services, which incorporates the beliefs, feelings, desires, attitudes, physiology and psychology, behavior, etc. of the users, and passes across the front, middle, and late stage of service or product usage. To develop a product that satisfies consumer needs, the actual and future requirements of the customer must be identified beforehand. User interface (UI) is a way to communicate, interaction, and knowledge exchange between the user and therefore the device. To finish the work and increase performance, the end user will interact with the device through the UI (User Interface). An improper interface design not also creates user discomfort, but also impacts user awareness and reduces the need to use it [1, 2].

III. CHANGES IN UI/UX TREND

A user interface (UI) is referred to a system and an end user interacting with one another through commands or different techniques to operate the system, input data, and use all the contents. User interfaces range from systems like computers, mobile devices, games, etc. to application programs and content usage. The UX interface is additionally littered with the usability of the system, contents, and services, the user's affinity, and therefore the user's value. This examination depicts the latest UI/UX. Client Experience (UX) alludes to the general experience related with the insight (feeling and thought), response, and conduct that a client feels and thoroughly considers their immediate or circuitous utilization of a system, substance, administration or product. UX is an HCI- related concept that's widely applied not only in software and hardware development, but also in services, products, processes, society and culture. UI/UX is an interface through which an individual can interact with a system or application during a computer and communication environment, which is assessed into a software interface and a hardware interface. The hardware interface is basically classified into a plug or an interface card which connects the pc and the peripheral devices, and also the software interface is represented by the interface. The early interface was a Character UI (CUI) utilizing characters. Subsequent

interfaces were graphical UI (GUI), like symbols and menus. With the quick improvement of IT innovation, interface was created to be NUI (Natural User Interface) like voice, movement, motion, and organic sign acknowledgment to comprehend human goal all the more brilliantly and humanly. UIs suitable for the case are continuously being studied in various fields like mobile, hologram, location based service, argument reality, game machine, and automobile, etc. [3, 4].

IV. UNDERSTANDING USABILITY

Usability is a core terminology in HCI. The term usability was coined within the early 1980s to replace "user- friendly," which was vague and contained subjective connotation. Usability is crucial to any products because if in case the users cannot achieve their goals effectively, and in satisfactory manner, they will hunt for alternative solutions to achieve their goals. Usability criteria make sure that the products meet the three outcomes. There are several usability criteria mentioned in literature, as an example, effectiveness, efficiency, satisfaction, safety (error tolerance), utility, learnability (easy to learn), memorability, and engaging. One of the major targets of usability criteria is to enable the assessment of products' usability in terms of how that product can improve user's performance more [5]. A number of the usability criteria are pretty much task centered, where specific tasks are separated out, quantified, and measured in usability testing. As an example, efficiency which refers to how briskly the user can get their job done can be measured by time to finish a task or the learnability can be measured by time taken to learn a task. A number of the usability criteria can hardly be measured by using quantitative measurement, such as satisfaction and engagement, as they're subjective and basically involve human emotion. There are several factors which contribute to overall satisfaction, and therefore the factors may include entertaining, helpfulness, aesthetically pleasing, and rewarding, or if there are some negative qualities such as frustrating, boring and annoying [6].

V. MOBILE UX DESIGN

On Google market there are almost thousands of apps similar available for a similar process. All the apps available provided the same work but their representation and development trends and their User experience (UX) trends change their ratings. Different companies use different variety of designing tools for development but the top rated and mostly used are "Skeuomorphism" and flat design. Skeuomorphism developed in early year of Development which importance on the designer to develop the app near to real world entities to provide best user experience and that they can easily understand the way to operate the application. Designer that develops the design keep very close eyes to make sure their product is close to real world. But this process as-well make the product less attractive and sometime complex application look horrible for digital world [6, 7, 8]. By undergoing this process in 2015 with the launch of windows 8 Microsoft Company launched new sort of design

with class flat design. It had been a revolutionary sort of advancement and most rated companies shift their product to flat design because it became the popular trend and other people love to see this type of apps because it enhances the usability and user experience.

Advancement in development in Apple and OS mobile application it draws much of attention of users to use it and additional dependence of designer on Skeuomorphism design. as the launch of windows 8 and some new design popped which is also called Flat design which makes great spark in application development make many designers to debate over which is best way to design different apps. Mobile phones also give great advantage beforehand when the mobile user can lookout their health with mobile phones. New technologies are being developed to detect heart-beats and steps taken to keep track people health and their daily need of water. In addition to that specialize in computer science and information technology publishers we intent to hide other research areas associated with Mobile UX like art, gaming, education, culture, industrialization, advertisement commercialism or medicine within the review. There's a requirement to design a proper single framework which incorporate all the important elements associated with User Experience [9, 10, 11].

VI. MODERN MOBILE UI/UX USABILITY AND DESIGN TREND

- a) **Evolution of Minimal Design** - In 2017 as well, designs that continue to use minimalist layouts while minimizing complexity appear. Minimalist design centers consideration on clients' contents first as opposed to UI, and gives an interface through clear visual correspondence [12].
- b) **Long scrolling and parallax technique websites** - long scrolling or infinite scrolling is also expected as a standard for websites. Also, additionally, mobile phones utilize the more scrolling on small screens connected with contact control types.
- c) **Moving Pictures Become Popular** - Vision is known as the most powerful sensation of all human senses. The picture was a main consideration in the long UI design, and the accomplishment with the picture was a characteristic springboard to bit-by-bit form into moving pictures. The picture addresses 1,000 words and the moving picture addresses multiple times more words. There's a valid justification for this, and the picture is static while the moving picture is dynamic [13].
- d) **Increase in Micro Interaction** - Micro interaction was discussed on the Internet in 2016, and the that trend is expected to continue still in 2017. Micro interaction carried out as a for the most part fragile liveliness assumes a vital part in

UX plan, and particularly each time an application is utilized by a customer, a large number of micro interactions will expand the job of mobile phones [14].

- e) **Rich color and sensuous typography** - Rich color tone and shading are utilized as UIs. It is likewise expected to be more splendid by utilizing brilliant tones as an interface. Hence, the UI is typographically addressed utilizing more honed color palettes, duotones, and intense gradient tones [15].

VII. CONCLUSION

During this paper, we looked into the prevailing work relating to the integration of UX design work. Since 2010, the main focus has gradually shifted to usability evaluation of design patterns and studying major user factors (e.g., age, culture, and disabilities). To recapitulate, the review clearly shows that touch screen is that the major factor that forms research directions of mobile user interface. Significant touch screen characteristics that shape research bearings are restricted screen size, absence of actual reaction and material input, undetectable motion, portable ubiquity, and major appeal for visual consideration. The review also showed that there's a massive knowledge gap for mobile interface design. There are a few classifications where no exploration can be found, despite their significance to mobile interface and user interaction design. Several categories have insufficient empirical-based data to establish a solid design guideline, and there's still a requirement to assess more factors that influence its usability.

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