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HCI with User Interface Design

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Abstract: ***There's no doubt that the way we interact with computers has changed drastically over the last decade. The computers are omnipresent today. You can't escape or avoid them. To develop the understanding of human computer interaction that in how it influence our daily life. The development in the computing era from 1970 to 2020s helps in adding great ability to society by using computer technology. This study was conducted as a systematic literature study, with the aim to identify and discuss the growth and interdependency between Human computer interaction and user interface design.. We are living in an exciting age of design and evolving user interfaces; a new technological era where our clothes, accessories, homes, cars, and streets have become one massive user interface...—dubbed by some as the "ambient intelligence world.***
Keywords: Computer technology, HCI, Interface, Growth, Design

I. INTRODUCTION

The Human computer interaction (HCI) study the designs and uses of computer related technology, and focused on the interfaces between computer technology and people (users) . It deals with designs, program execution and assessment of computer system and related phenomena that are in use for humans. The major goals of HCI are effectiveness, efficiency, safety, and learnability, utility. The upcoming growth in human–computer interaction field has been in quality of interaction, and in different branching in its history. HCI increased accuracy of data input and data interpretation. Individuals, government, communities, and organizations depends on computer technology to give or innovate the majority of things in their people lives, such as infrastructure, services, entertainment, care, food, communication, education and transportation. User interface designs are the Users-end applications view to which user can interacts in order to use the software or computerised device. HCI is a forerunner of user experience design. UI design refers to graphical user interfaces and other forms-eg. Voice control interface, face recognise design, a good user interface provide a unifying structure for finding, viewing and invoking the different component of a system.

II. HCI MAKE INTERACTIONS MORE HUMAN

The relation of an interaction between human and computer has a direct effect on the efficiency of the interaction between the both sides. Until the late 1970s,the only human who interacted with computer were information technology professionals. In later 1970s, HCI emerges till 1980s with the popularization of personal computing as shown in fig 1 of computing era .Computer were no longer being developed just for experts but actually the goal of HCI was to make all interaction with computer easy and efficient for number of users at different skill levels.

Computing era =>

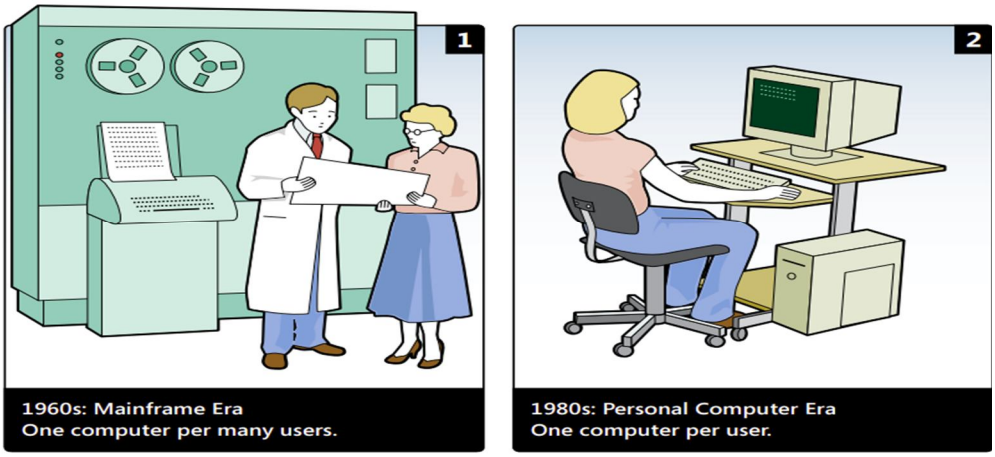

Fig. 1 It shows the computing era at late 1960s and later 1980s.

III.BASIC GOALS OF HCL

A. *Effectiveness*

1) There should be increased accuracy of data input and data interpretation.
2) There should be decrease in user training time & cost and increased in productivity.
3) Increase not to use the term 'user-friendly' which intended to mean a system with high usability but always misinterpreted to mean tidying up the screen displays to make it more pleasing.

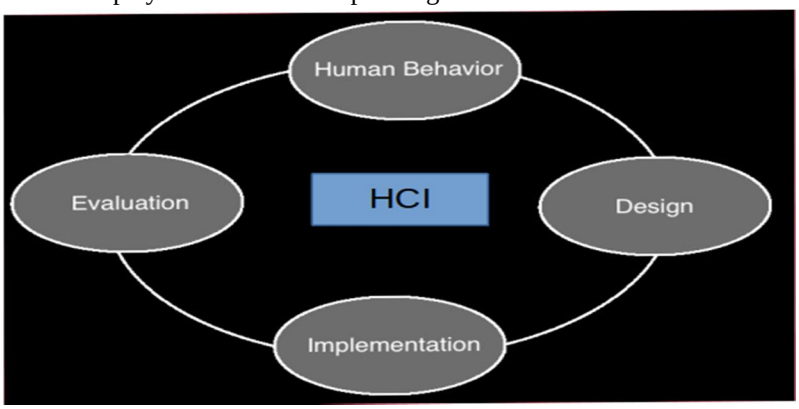

Fig 2. It shows the four phases which may effect the HCI

B. *Efficiency*

It is way where the system supports user in carrying out their tasks.it will enhance are efficiency in performing are regular task. The task which ma be not standard for human can easy done the help of computer. For example e-commerce site in which we don't have need to went out to shop anything we can order anything just using computer in few seconds ; GPS navigation system increase our efficiency to reach are destination ; internet browser increase our efficiency to search anything .there should be increase accuracy of data input and data interpretation.

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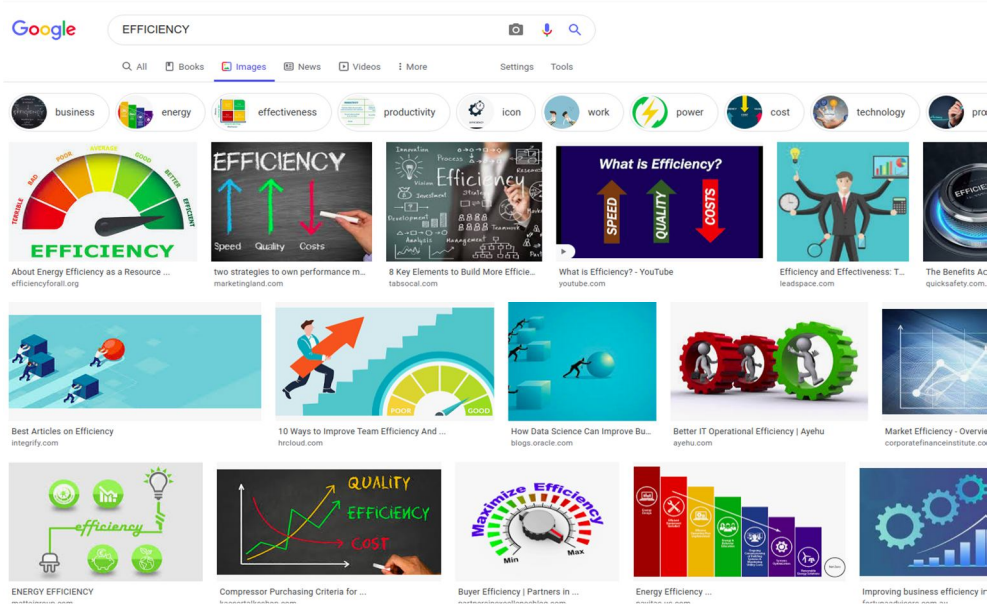

Fig 3. shows the Google browser where we can share or get information from all over the word

C. Safety

It involves protecting the users from dangerous condition and undesirable situations. In relation to the first ergonomics aspect , it refers to the external condition where people works for example x-ray machine and chemical plants where safety is must there they are not able to control by themselves and can be control by computer based system remotely.

Preventing the user from m asking serious error by reducing the risks of wrong key/buttons being mistakenly activated. Proving the user various means of recover y for the mistakes that will make the user fell confidence and allow the user to explore the interface of the system.

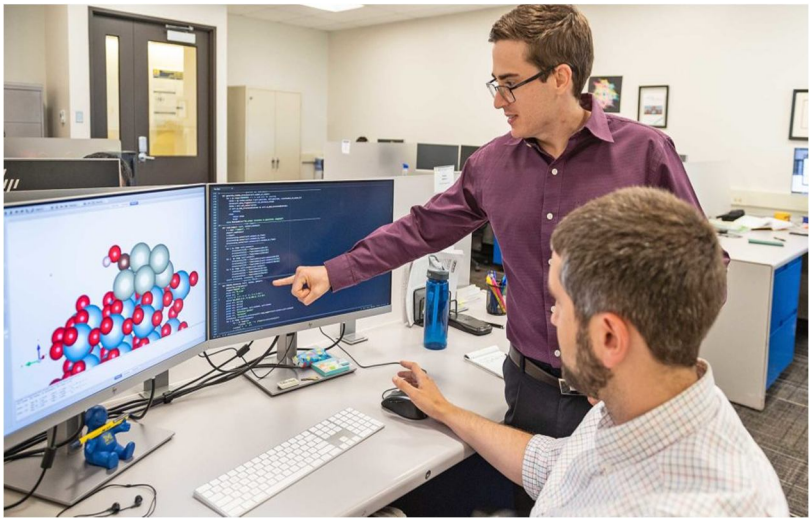

Fig 4. It shows the chemical engineer working on computer system and giving commend to machine without visiting the chemical plant.

D. Utility

It refers to the correct function nalities, that a system providing to the user to complete the scheduled task. With the example of system a with the IDE (Integrated Development Environment)that is high utility which provides various suggestions and tools to a programmer, and a system with the low utility is a simple text editor which forces the user to do most of the works while programing , like an Operating System acts as a communication n bridge (interface) between the user and computer hardware. The purpose of an operating system is to provide a platform on which a user can execute program s in a convenient and efficient manner.

Fig 5. Shows the different operating system

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E. Learnability

It is about how much a system is easy to learn for a new user, people wish to become familiar with the system easily rather than spending more time on learning the system. Learnability is the ease with which a software application or product can be picked up and understood by users. The better the learn ability of an application, the less training and time it will take for a person to use it. For example, modern OS (Operating Systems) with GUI is easy to learn compared to the older DOS operating system with CLI.

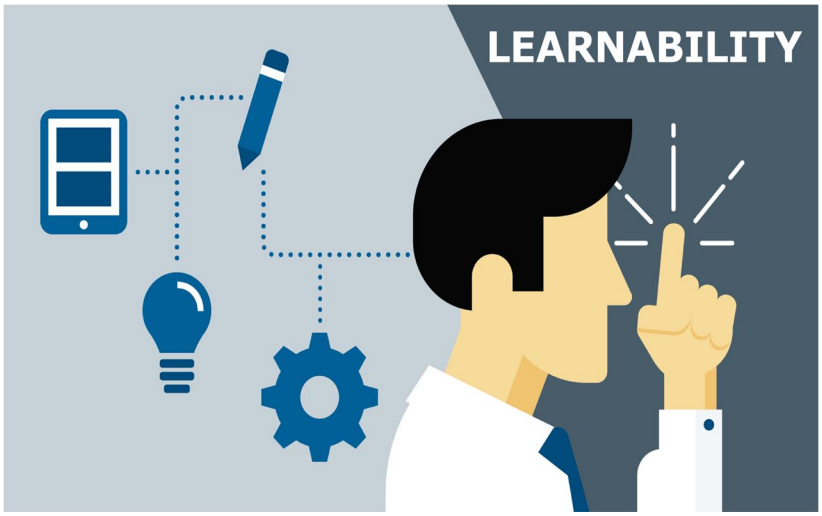

Fig 6. It shows the learnability which drafted on june 28, 2017 by auren blu

IV. APPLICATION OF HCI

The technology which is used to serve and connect people is compute technology in the modern era. Laptops, desktop and mobile phones which connect the world together with each and other and perform multiple tasks at once; however, this industry includes more than these machines. Government ,Individuals, communities, and organizations depends on computer technology to produce or innovate the majority of things in our lives, such as infrastructure, care, communication, education food, services, entertainment and transportation.

A. Computer technologies in food

New innovations in computer technologies are used by Farmers to synchronize the best time to plant, fertilize, harvest and sell crops. The stock market reports in real-time, Internet offers weather report and its global network of potential buyers is more expansive than local merchants help farmer to expand business widely. New machinery, such as cow milking machines, uses basic computer programming's routines to automate the care of crops and animals .when crops are gathered give more information to driver by Harvesting vehicles , and farmers are able to detect if plants are contaminated with fungal toxins or not. As farmers become aware of new farming technology, they can adapt their future farming methods to new heights.

B. Computer Technologies in Services

Computer technologies will plays an important role in services. It easy the work of human and increase the efficiency. Computer technology is a collection of machines that receive commands and perform calculations or services accordingly. Many types of operation s, such as billing, record keeping, transactions and planning, take place through commercially available or customize d machines. Most modern devices use microchips and processing units to perform their basic functions. GPS units ,ATM machines, gas station pumps, and barcode scanners may be common in everyday life. However, each relies on digital data and circu1t boards to meet the needs of consumers.

People gain more access to personalized services through the Internet. You can order a pizza or groceries online, buy cloths online on e-commerce website and email your doctor's office or visit WebMD.com after receiving indigestion from something you eat. Scan a product's barcode into your smartphone, and read reviews or price-match the item before purchasing it. Look for online coupons that print out as discounts or free merchandise coupons for local stores and restaurants.

C. Computer Technologies in Entertainment

Most of motion pictures and TV programs use some form of visual, audio and animation effects in their Shows. Video games employ graphics produced by a computer, and each game plugs into a computer-based home entertainment system. Players can play with others or by themselves over the Internet. Some people can sell downloadable programs and stream movies online yo entertain others.Voice is another type of interaction that is on the rise. Software like Apple's Siri are making it possible to set assistant, search the internet, set timers and other routines tasks using only your voice. The potential of this type of human-computer interaction is absolutely large, but we've still got a long way to go.

D. Computer Technologies in Communication

The importance of computer technologies in communication has greatly increased since the comming start of the 21st century. People correspond with acquaintances , friends, familyand business associates through social media, email, by texting and instant messaging. Use computers to book holidays, and print off labels instead of hand writing each envelope. Stay in touch with everyone from work at home, attend video conferences instead of having to travel and send a mass email . Avoid the expense of a high school reunion by forming connections to old classmates through Facebook, Twitter, LinkedIn and other social networking sites. Stock prices ,access news, weather forecasts, and more through websites and blogs that regularly compile top stories.

E. Computer Technologies in Education

A computer is a useful tool for advancing education in traditional and non-traditional ways. In the time of pandemic education of many student is disturbed, Colleges and universities offer online courses and online class for adults who are looking to obtain a degree without quitting their job. Younger students rely on computers to research and access information, or to submit their project to their teacher over online system on time. Professional or volunteer tutors can be found online to gain help on a variety of topics.[4]

V. BENIFITS OF HCI

Advantages of HCI is that when an error occurs in system ,human can act fast and responsively where as the computer can be go in a infinite loop and end up crashing .Humans interact with computers in many ways; the interface between humans and computers is crucial to facilitate this interaction. Internet browsers, Desktop applications, handheld computers, ERP, and computer kiosks make use of the prevalent graphical user interfaces (GUI) of today. Voice user interfaces (VUI) are used for speech recognition and synthesizing systems, and the emerging multi-modal and Graphical user interfaces (GUI) allow humans to engage with embodied character agents in a way that cannot be achieved with other interface paradigms. The growth in human–computer interaction field has been in quality of interaction, and in different branching in its history. Instead of designing regular interfaces, the different research branches have had a different focus on the concepts of multimodality rather than unimodality, intelligent adaptive interfaces rather than command action-based ones, and finally active rather than passive interfaces[2]

VI. DESIGNING USER INTERFACE

User interface is the Users-end application view to which software or computerised device are been used by user. User can create changes, manipulate and control the software as well as hardware by means of user interface. Today, user interface can be seen at almost every place like smart watches, smart phone or where digital technology exists, right from computers, airplanes, ships ,satellites, mobile phones, cars, music players, etc.

UI provides essential fundamental platform for the human-computer interaction. User interface is part of software and is designed such a way that it is expected to provide the user insight of the software.

User-interface designers are the coming heroes who is responsible for anonymous transformation. Their innovations ,efforts turned personal computers into today's widely successful mobile devices, electrical devices and enabling user to communicate and collaborate in remarkable ways. These invigorated communities conduct business, communicate with family, get medical advice over online system, and create user-generated content like blogs, life experience that can be shared with billions of connected users that makes everything more productive.

Internet visionaries ,like Google's CEO Eric Schmidt who made the revolution change for future generation by promoting a world with free access to data and information. User interfaces are also controversial because of national defence, electronic health records, crime fighting and so on.

Fig 7. The interactive interface between humun and technology shows mobile notification over digital watch

VII. DIFFERENT ASPECT ON DESIGNING USER INTERFACE

1) *Individual Level:* At individual level, the experience of user is been changing more effectively such as pilot can fly airplanes more accurately; diagnoses become more accurate by doctor beneficial for patients; and Graphic artists can explore more creative possibilities, AI reaches to new heights rise day by day which make life easy.
2) *Societal Level:* It help in connecting communities open up new forms of collective action and new policy engagement.it enhances the user friendly interface for social purposes which increase the government transparency, increase in information awareness among everyone leads to better decisions; promotes equality when facing health, legal issue and serious challenges.
3) *At Dangers Level:* If there are pros of something then cons also exist that is it may lead to promote the extreme terrorist activity, online scams, danger from obsessive social policies or racial hatred. The increase in power of technologies collaboration and social platforms means that there must be a balance of legal protections, police power and privacy may be disturbed.
4) *Increase Family Relation:* Internet conferencing and video calling enhances the family and personal relationship at the time of pandemic people are structure at different places far away from their love once, video call and online group meetings interface play the major role in get rid of loneliness at no cost.
5) *Enhance Information:* Due to the help of World Wide Web's (www) million of people and student were able to access to extraordinary knowledge , million of book are available online at free of cost and cultural heritage resources which provide access to everything from outstanding art objects of India to music of Indonesia, sports from brazil and entertainment from Hollywood or Bollywood.

VIII. ADVANTAGES OF USER INTERFACE DESIGN

A. Tools like Google assistance, navigation, Wikipedia, browsers, YouTube, e-commerce shopping site; and social networking site like Facebook, Instagram, Telegram enhance the status and make the life easy.
B. Due to safe interface user can make transactions of money securely from one bank to another which saves your time and enhance security.
C. It increase the connectivity by the use of online video conferencing, an will keep in touch with our love once.
D. Designers help users to create, edit, distribute 3-D printed objects, immersive virtual reality games, interactive animations, and increasingly high-definition music, voice, and videos. The result is ever-richer experiences and a creative outpouring of user-generated content available, even on mobile devices.
E. Many interface like virtual reality in which person can experience real environment at definite place widely use with video game , simulators and training.

IX. DISADVANTAGES OF USER INTERFACE DESIGN

A. Due to the explosive growth of upcoming new social networking site and user generated content ,older media such newspaper ,radio or television lost the audiences.
B. It increase the danger from extreme group who promotes terrorism ,online scam , privacy leak, which confirm it most emergence issue of computing era.
C. It need more processing power and memory to run than other interface types.
D. Due to these excess use of mobile phones ,social sites leads to weaken the relation between our community or family and also create misunderstand among us.

X. GROWTH OF USER INTERFACE

1) User interface were no longer trapped within a small screen and were instead integrated into our everyday life. The data show reasonable growth from only 75 entries (papers in conferences and journals) published in late 1980 to an astounding 11166 entries in 2014. This 151-fold growth . By now there are approximately 26 journal and 100 conference focusing on HCI research and user interface, while many other conferences and journals regularly include special issues, sections, or individual papers on HCI researches.

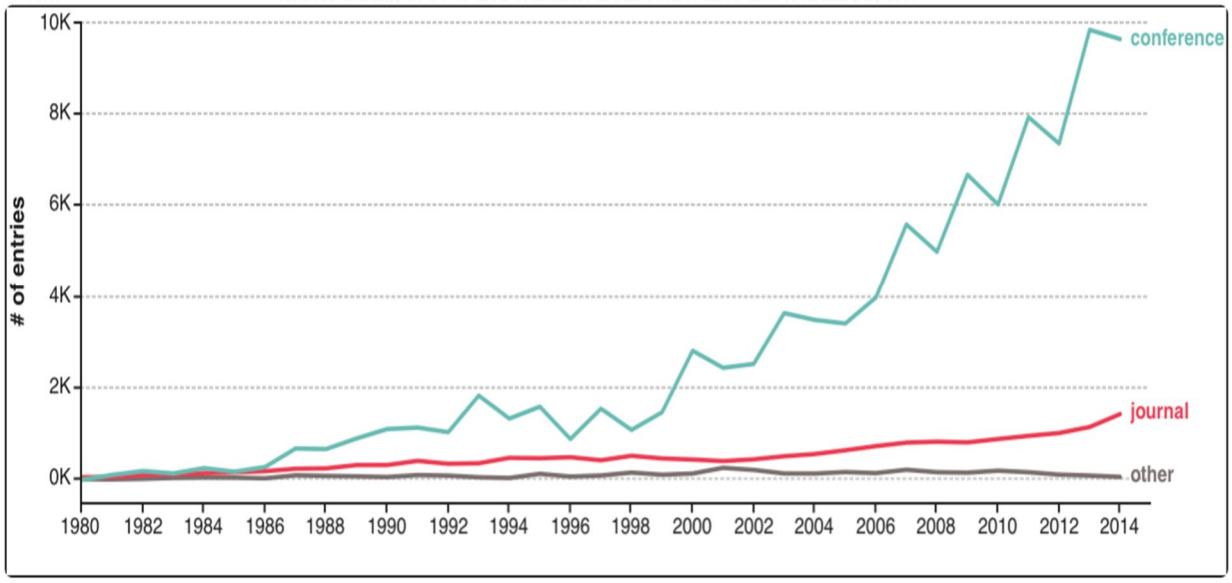

Figure 1: Growth in the HCI from 75 to 11165 entries during late 1980 to 2014, mainly from conference and journal papers.

2) Second Way to track the growth of a discipline is through the use of the free publicly-accessible Google Viewer. This web-based tool allows users to submit word and phrases and get a graph that shows the frequency of those terms in English-language published books. A simple search on “usability, human-computer interaction ,user interface, user experience,”, shows the dramatic growth since 1982 (Fig 2). Since books are written for wider audiences than research articles, it is natural that user interface and usability are much more frequently used than human-computer interaction.

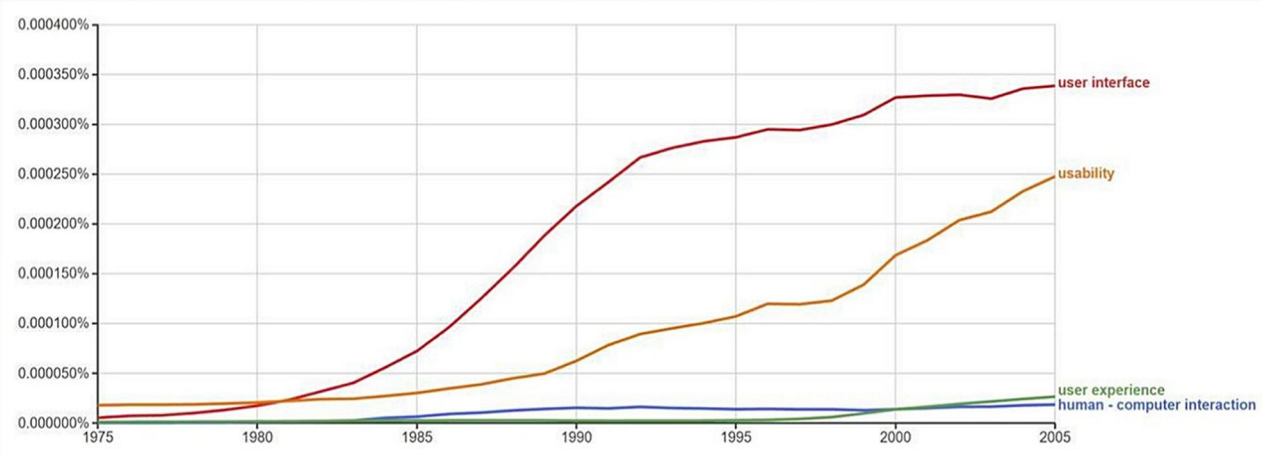

Fig2: Growth in usage of terms (user interface, usability, user experience, and human-computer interaction) in Google’s Ngram Viewer that cover almost 20M English-language books during 1975 to 2005.

3) A third way to assess the growth of HCI is through a broad news source such as the New York Times, BBC news. Their frequency of mentions shows growth in documents that refer to the component terms (Fig. 3). It still shows substantial increase.

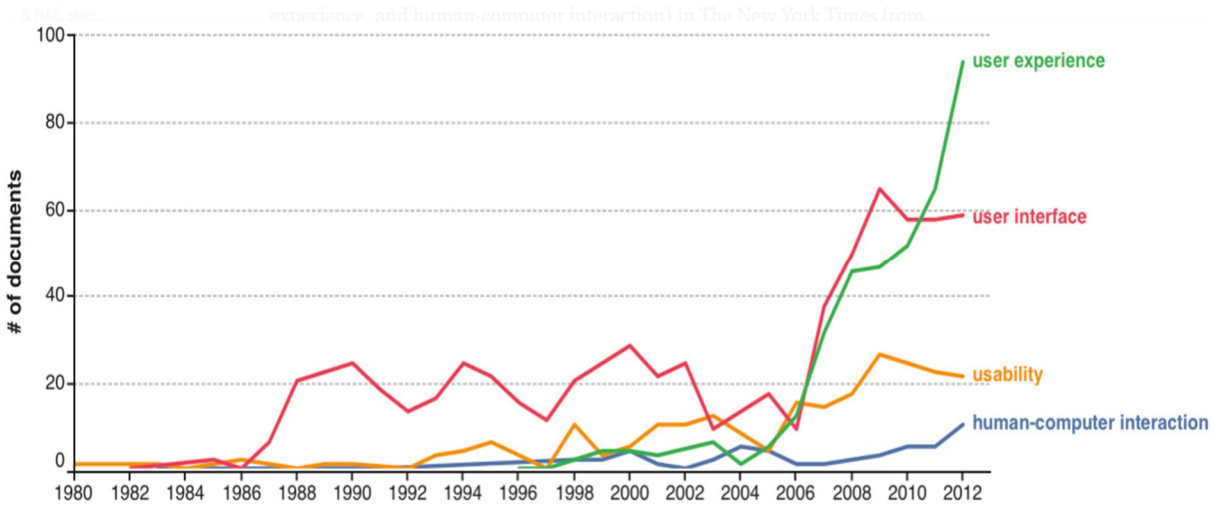

Figure 3: Growth in usage of terms (user interface, usability, user experience, and human-computer interaction) in The New York Times and BBC from 1980 to 2012. Information provided from internal New York Times resources.

XI. CONCLUSION

There is no doubt that the way we works with computer has changed drastically over the last decade. The potable devices today we able to access like mobile phones are enabled all sorts of amazing new human computer interaction , all in the palm of your hand. It all about creating and understanding software and other technology that people will want to use, will be able to use and will find effective ways. There was nice quote that "Changing the world isn't just about the big things that have direct impact on many people's lives. … If we reduce users' stress level or give them a momentary feeling of accomplishment, we're helping to change the world." by Ronnie Battista .The growth of technology which include voice guided user interface, Virtual reality, wearable's are laying the foundation for a future where humans and computer are tied more closely together than ever before. The way people communicate and use technology changes constantly. The implantation of thoughtful UI is a way companies can build strong product that can satisfied customer.

XII. ACKNOWLEDGMENT

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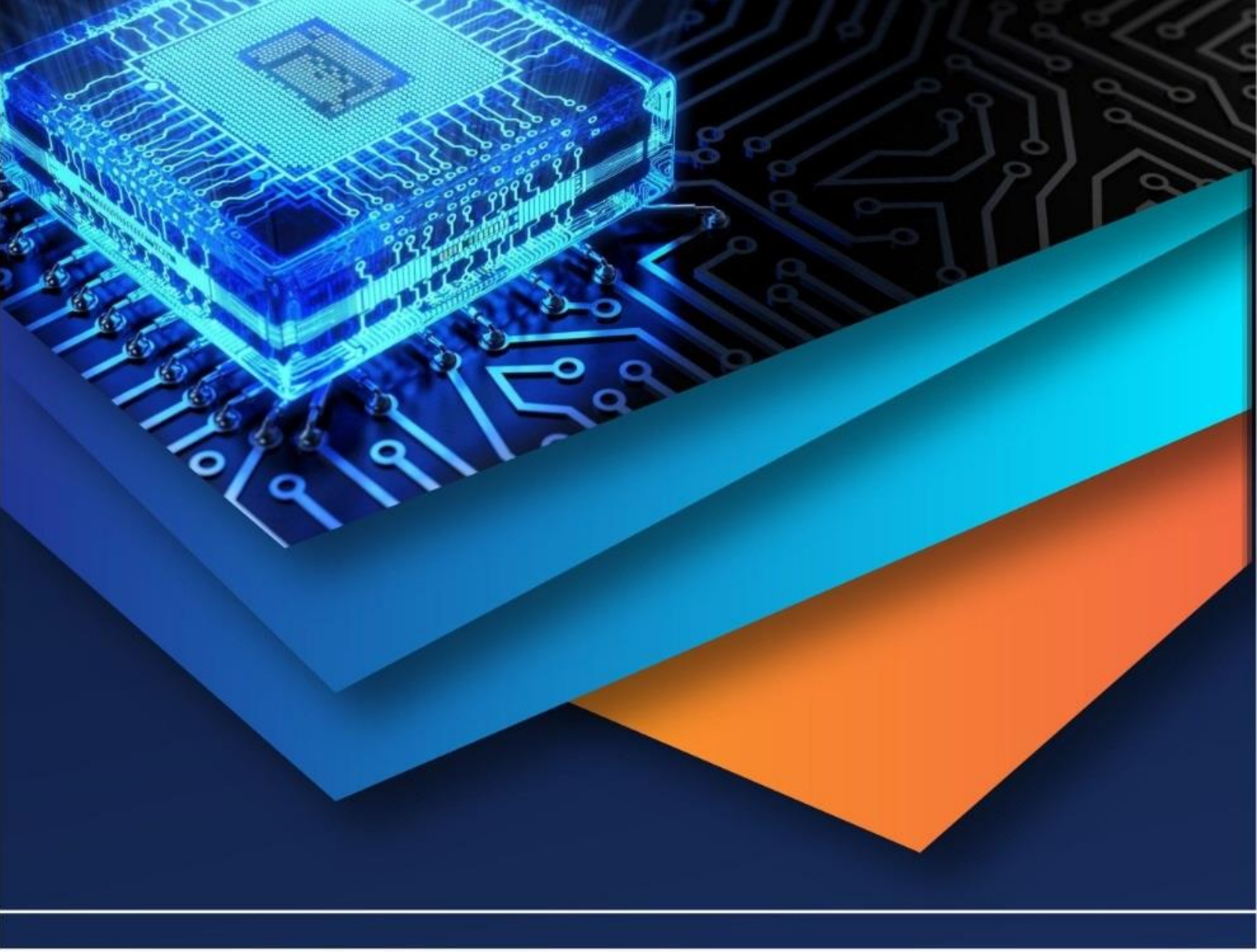

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