Progression towards Persuasive Holistic Human System Interaction: Conceptualization and Modeling framework

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Abstract

In present era of ubiquitous computing environment, as the plethora of modern digital artefacts and services resulting due to emergence and evolution of new-fangled kind of communication and computation formats comes increasingly into play in everyday practice and experience virtually almost for every type of activity, the people's requirement and aspiration to be an active part of this global digital ecosystem flourishes high-and-high. At the same time the periphery between digital and physical spaces diminishes sharply. Offering only superior usability and efficacy through intelligent interface and systems will not indubitably be sufficient in such ubi-com environment considering the nature and diversity of fragmentation present in user's demand and expectations. The need is to look forward, beyond the usability issues, towards offering high-quality enchanting ubiquitous interaction environment enriched not only with the abilities of autonomous personalization and adaptation but importantly ensemble persuasive, engaging abilities in the perspective of social signalling, social context, human values and ethics. This paper firstly conceptualizes such holistic environment. It presents a novel modelling and designing framework for realizing such a holistic interaction environment encompassing particularly the technology mediated human-human concerns..

Keywords: *Holistic interaction, User experience, Interaction analyst, Beyond-usability concerns, Social signaling, Human system interaction (HSI).*

1. Introduction

It is unarguable fact that computing technology at present, more than ever before, performs much more and in a better way than simply compute. The Human Computer Interaction (HCI) was originated as a discipline primarily concerned with relation of computing technology with human, major phenomena surrounding them in the context of designing, evolving, practicing, and implementing the interactive computing applications, services, and systems aiming at greater facilitation of user [1]. HCI spotlights mainly on human use of computers and advanced computing technology in a sense that how to help in offering easier, more needful, more productive, more useful, and more fulfilling user experience and that too in an expected/desirable fashion.

In the past [2] [3] [4] [5], it mostly focused on approaches, techniques, processes, models, and/or technologies which let it realizing the above mentioned amenities through its users and their activity-centered software development and designing approach. Initially during the evolution of HCI, the exordial historic outbreak of GUIs along with interaction metaphors; WIMP interactions, direct manipulation, point and click input devices; plug and play I/Os; resulted intuitive, insightful, comprehensive and visually rich interaction interfaces which were appropriately capable of conveying and carrying the functionality/feeling associated with them [6]. Afterwards, the proliferation of networked and distributed computing devices and environment in around last 12 years with its more recent fine-tuned coupling and convergence with communication technology unveiled the unbounded avenues for HCI to contribute and facilitate the human life [2] [3] [7]. These new-fangled dimensions explore and delineate the causal impact of digital technology at organizational, enterprises, and collaborative echelon and address the concerned issues. The motive was to design the solutions to fulfil the need of group of users in a particular context. During this phase of evolution, the HCI supported the organizations, enterprises and business houses with its enterprise computing systems, decision support system and CSCW (Computer Supported Cooperative Work) [3]. It is

this time when the one-size-fits-all problem [8] was overcome up-to some extent with role-centered design approach. However, mostly its scope was mainly limited to within organization, enterprise or particular context. Even this approach facilitated individually tailored interactions based on the user's role nevertheless role-centered approach was incompetent due to its limitation of offering static-personalization only and that too is not generic one [3]. It was common perception that HCI should go beyond usability concerns and looks forward to ensemble and encompass beyond-usability facets and should also design the interaction environment that is beyond simple human computer interaction [7] [9].

Presently, today's prevailing physical-digital ecosystem touches almost every single feet our life. Today, most of the products and services; commerce-facilities; media; education and entertainment means; health-care systems and applications; financial processes; banking and transactions facilities; surveillance; information as well knowledge support; hobby-making and fulfilling; job-finding and switching; and many more domains in ours everyday know-how and surroundings are successfully being facilitated by latest digital technology [2]. This increasingly galvanizes the people throughout the world to participate, involve and adopt the digital revolution and be an active part of global digital techno-society. At the same time, the ever increasing requirements, demands and desires of people can no longer be offered only through customary activity-centered and role-centered interaction-designing approaches [3] [9]. Therefore, there is obvious need to look forward towards extended kind of interaction environment along with the robust modelling approaches to realize it. Being the prime associated discipline the HCI (Human Computer Interaction) is going to deal all this. The scope of different constituent of HCI i.e. human, computer and interaction is also required to be redefined, revised and extended under the context of advanced multi-useful, multi-faceted, ultra-modern interaction environment [2]. This even significantly aid to the realization of ubiquitous computing environment originally envisioned by Weiser and its various variants into practice including facilities like personalization, context awareness etc. [10] [11] [12] [13].

Even if we foresee the not-too-distant future computing environment then it is going to be ubiquitous, proactive, undetectable, indistinguishable, entrenched, tangible/virtual, finely-incorporated, widely interconnected, well-diversified, interoperable, and movable [2] [3] [7] [9]. It will be a tightly intermingled physical-virtual pervasive space that is always available, always aware, always active, always accessible, always helping, and always ready to be used. There will be highly diversified assortment of

intelligent electronic devices communicating to each-other and to us through range of modalities. In this sensory-networked, hyper-connected, bio-physical, psychosocial, cyber-rich ambience, humans are going to create their virtual identities, project their virtual presence [4]. People are going to use this nearly omnipresent medium to virtually expressing, exchanging and collecting the opinions, views, feelings, emotions, status, thoughts, comments, suggestions etc. from anywhere to anywhere on any type of matter either individually or in a group. In this scenario everything like computation, communication, media, trades, entertainment, information and knowledge resources seem to converge towards above pointed-out trend thus creating almost endless set of open opportunities of highly diversified range for everyone. Nonetheless, this scenario poses many fundamental challenges and questions in the broader perspective of this emerging digital ecosystem, deeply concerned with human-system interrelation and consequential human-human interrelations [2] [3] [4] [9] [12] [14] [15]:-

- How to offer the customizable persuasive service and products in general for people that let them to be aesthetically conversant, comfortable, satisfied and delighted customers, clients, designers, users, professionals, and may be in any other role? Furthermore, how these help to strengthen and widen the relationship of people with digital technology in a broader scope.

- How the interaction and user-experience designs can encompass the wider range of societal, ethical and moral concerns? How to ensure the practice of human values, morals and ethics? How to preserve individual and family relations and rights, psychological and physical well-being, the cultural/societal constitution and composition, commercial rights and interests? These issues are required to address larger societal, moral and ethical concerns of responsibility and accountability of people.

- How to ensure practicing of robust value-system including perpetuation of values like privacy, transparency, fairness, ownership, safety and security in all respects, in and beyond the operating environment, during and after interaction?

- How to ensure a proper technological tracking system in place towards appropriate pursuit of laid-down code of etiquette/conduct?

- Lastly how to have a strong, widely accepted, and fast-track integrated judicature system.

All the above questions are required to be answered because every now and then we come to know about

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90

nagging and nefarious use of digital technology in the form of financial fraud; swindle through spoofing; intentional defamation attempts; attack on privacy and relationships; content-piracy; unauthorized and unwanted spying; reusing without proper referencing; collecting and unauthorized sharing of information and data for using it to promote products; breach of common code of conduct etc.

In the above mentioned context, rather than continuing with traditional HCI practice with primarily targeting at the human-beings and their capabilities to be facilitated with the technological advancements, it is required to broaden and widen the scope of HCI to transform interaction into holistic interaction in the light to better ensemble the social, cultural, motivational, emotional, ethical and moral concerns in order to make-over the world into an ideal global techno-society. In this global techno-society, the members perceive themselves be safe, secure, socially-inclusive, responsible, accountable and most importantly contribute cohesively towards the betterment and advancements of the society, mankind and humanity at large along with a 'self-sense' of satisfaction for fulfilment of personal/individual goals, needs, interests, aspiration, desires, aesthetics, pleasure and growth. The researcher, designers and developer need to understand the entire life-cycle of human response system to the technology from capturing/focusing attention to provoke/stimulate the feeling to finally make a decision including instinctive or emotional perspective also. With all these efforts, enough attention is to be paid towards better understanding of the background theory of frustration, boredom, annoyance and intrusiveness. All these are to be taken into account, not just at the level of the individual, but also at the social, cultural and ethical level. Such developments will ground the HCI to be much more than an engineering process and practice as earlier it was comprehended and establish the HCI as truly interdisciplinary discipline.

The very next section presents the conceptualization of holistic interaction in detail. Section-III figures-out on characteristics of holistic interaction. Then section-IV specifies an architectural framework for holistic user-experience. In the last, section-V discusses the results and finally concludes the work and points out the future direction.

2. Conceptualization of Holistic Interaction

At one side our ambience happens to be increasingly intelligent, autonomous, gentle, automatic, aesthetic and our interaction experience with digital systems on-and-on becoming more humanion, outstandingly useful, more facilitating, more ergonomic; and at the other side due to

digital revolution, there outburst e-media mediated many nascent and their own type of virtual business-houses/communities/societies/groups. They gradually get evolved on the basis of their virtual presence, identities, personalities and projections on electronic media and people knowingly happen to be member of such communities, societies, business processes as per their own self-choice, self-requirements and self-decision.

How the digital technology can help us to better live in this global digital world with the values like safety, security, ownership and many others as discussed in previous section. Are only making the standards/rules, technological provisions and cyber-laws along with strictly ensuring their abidance will be sufficient enough to transform the digital world into a better place to live in? The past experience does not favour this. Therefore a general awareness, catalytic pursuing technological backdrop with a proper conducive environment for positive mind-making and transparent functioning through the technological aids is the potential solutions. Specific care must be taken particularly for the adolescents, neophytes, non-tech savvy, physically challenged persons and old-age people who may be victimized easily being more vulnerable.

For this to realize, the researchers, practitioners, designers and developers in HCI domain has to widen its spectrum of activities particularly to address and encompass human-human concerns resulting from the use of advance computing and communication technology in addition to the human-computer concerns. For this to realize practically, the HCI has to incorporate extra-usability issues and look ahead towards exploring other co-related disciplines and alternative designing methodologies/techniques. The HCI must be able to support enable, and optimize the people in their personal, cognitive and social practices like decision-making, habit-changing, problem-solving, creating, analyzing, learning or performing a skill, generating innovative ideas. At the same time, we must look forward towards a better and superior integration of software engineering practices with interaction and user-experience design. Even more steps can be introduced to extend software development life cycle to move ahead from user-centred approach to human-centered design in order to exclusively address the higher-level concerns (e. g. societal, ethical and moral concerns) discussed earlier to steer the entire process and practice resulting more toward 'human' directions.

This work advocates for three directions to drive and fulfil these demands of HCI;
- Much more focus towards aspects/concerns over and above engineering

- Disjoin the human interface part from rest of the part
- The demand of Interaction-design facilitator/analyst

The major challenge with the increasingly higher focus on human values along with human-human concerns is to still achieve the design objectives of efficiency, usefulness, effectiveness, accuracy, and usability. Other than traditional parameters like time, space and errors, many other parameters e.g. visible and inherent impacts of proposed technology at personal, family organizational and social level along with moral, ethical and cultural concerns needs to be weighed-up and design trade-offs to be settled cautiously. The HCI is required to extend the user-centered design approach in order to transform its interaction-design and user-experience design approach more oriented towards families, communities and social groups along with considering the users as consumers, entertainment-seeker, creators and in many more possible roles. Fig. 1 depicts conceptualization of Holistic Interaction Experience.
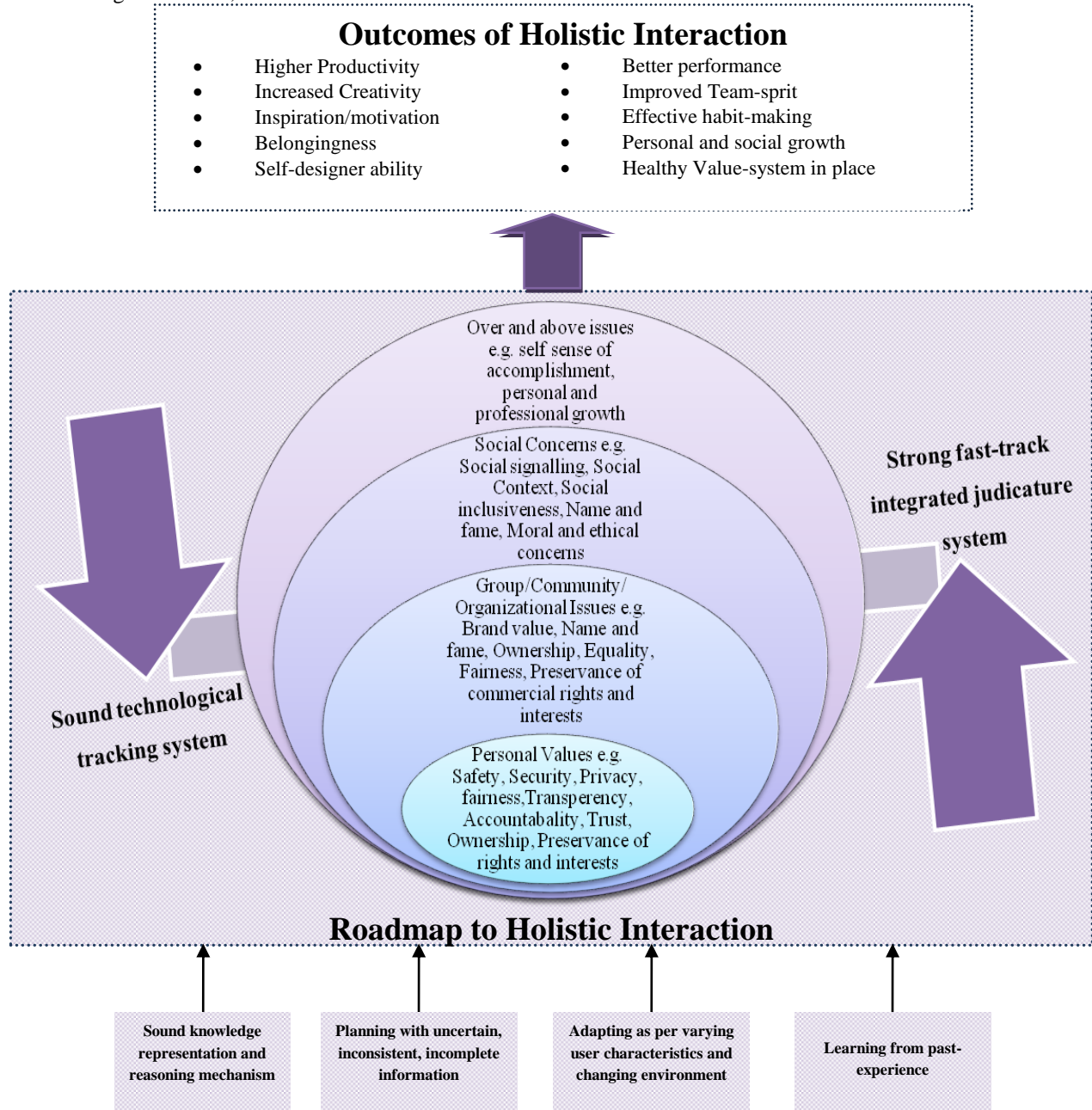

Fig. 1 Conceptualization of Holistic Interaction

3. Characteristics of Holistic Interaction and Its Design Process

For holistic interaction to be realized, the computing and communicating devices should take the initiative to offer aesthetically personalized, constructive, persuasive, creative, delightful, excited, immersive user-experience through innovative, multimodal and wide-ranging ways and at the same time be in control of the interaction and its environment.

Holistic interaction design refers to an approach for interaction design in such an elegant way that promote creativity, productivity, inspiration, belongingness, performance, safety, team-spirit, effective habits, and personal escalation, particularly in relation to individuals' personal requirements, objectives, interests and preferences. It is the speciality of holistic interaction that it contributes towards better social signalling and society building through a robust value system in place. For all this to realize individual's cognitive and perceptual capabilities along with bio-physical capabilities, emotional status, personality characteristics, and situational aspects need to be taken into consideration.

The holistic interaction design must support following properties.

- Sound knowledge representation and reasoning mechanism: Humans have brain to store and process knowledge. In addition to that, we have many verbal and nonverbal communication modalities to transfer and to receive information to and from other human beings. Since digital devices don't have brain therefore they should be made capable enough to store adequate knowledge under a particular context in a predefined structured representational way. At the same time, it is equally important to equip them with efficient inferential capability through processing and analysing the stored knowledge. Inferential adequacy represents the ability to apply existing knowledge efficiently in order to deduce new-one. Since it is the user-interface that basically acts as transceiver therefore in multimodal environment it must be capable of interpreting multi inputs from various modalities and robustly resolve ambiguities and minimize errors. At the same time it must be efficient enough to effectively transfer the responses to users in desired formats through appropriate modus and modalities.

- Planning with uncertain, inconsistent, incomplete information: Effective communication demands the system-processes to continue even with the incomplete, uncertain and inconsistent knowledge/information. The information lose may be due to many reasons like data loss in communication process, noise present in the channel, malfunctioning at the time of data collection or incomplete information provided by the user. Nonetheless, the digital systems must be able to provide such responses to the user which are as optimized as possible.

- Adapting as per varying user characteristics and changing environment: It is obvious that with the time user's requirements, interests, preferences, contexts and environments drift and the system must be able to tune-up its responses and behaviour to tender an acceptable level of performance.

- Learning from past-experience: This is most important characteristic. It is the ability to easily attain, understand and learn new piece of information and appropriately integrate it with existing knowledge structures. Sound user-modelling and activity recognition techniques should be employed. The system should be employed with the ability to continuously learn from past interactions and experience over the time. This learning must be reflected in future interactions. Ultimately, the more it is used, the smarter and compatible it should become.

- Over and above all the issues discussed earlier, considering the present scenario of physical digital ecosystem, most required, notable and essential aspect is how to address concerns related with cultural, social, organizational, ethical, human value. What new codes of etiquette will need to be practiced? How the new technologies, applications and services be designed to take these into consideration?

- Devising and employing the methods, techniques and approaches to shape society's new dynamic relationships with computing and communication technologies? This includes the broader set of concerns related most conspicuously with human values along with the moral and ethical aspects of designing applications, services and technologies.

HCI domain, being the prime concerned discipline, in association with the interdisciplinary communities of researchers, practitioners and designers are likely to play vital role to silhouette ours and society's new relationships with digital technologies?

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93

4. Proposed Approach and Architecture for Holistic Interaction

Presently the families, society, humanity, civilization, prevailing value-system, moral and ethics values, different cultures are going through transformations/transition period due to the outbreak of digital revolution. Consequently an extra-wide, global and virtual digital landscape and ecosystem is flourishing beyond the geographical and political boundaries. In this scenario, new and varied type of e-mediated relationships, family-ties, communities, social groups, cultures, creativeness, opportunities, possibilities; along with virtual zones, clubs, organizations and personal and business associations are upcoming on the floor. Such type of transformations will lay the mainstay for the coming generations and their surrounding ambience.

Now the HCI researchers, designers and practitioners have to ensure that the electronic computing and communication media augment transformations of people into more accountable and responsible inhabitant, not only of the cyber-world but of physical world also. It is but-obvious that if, in future, the HCI discipline is continue to dealt with the lens of engineering exercise with highly user and use-centered approach then the issues discussed above will not appropriately be addressed. It is generally observed that till now the user's (individual or as a group) attributes have been kept at highest priority even at the cost of associated or related moral, ethical and social attributes. Therefore, HCI has to look forward to be more rather than being an engineering process though they have played pivotal role in the design and development of offering useful and usable interaction under wider and broader context.

As the ubiquitous digital environment gets realized with hi-tech devices present/embedded in the ambience and HCI advances and broadens its scope towards the fulfilment of higher level needs, the isolation between the interaction design and engineering continue to be widened. This increasingly broadened scope will attend to extensive array of issues related to interaction design for which the engineering concepts, models and solutions happen to be progressively more distant less important and inappropriate. These aspects will require the additional approaches that are external to engineering in order to offer the holistic interaction experience. Other than the usefulness and usability related engineering issues, the additional extra-engineering concerns related with personalized tailored interactions satisfying personal taste, aesthetics and style of use, emotional drive, cognitive aspects, societal and cultural issues are to be addressed exclusively with help of concepts and theories of allied disciplines like philosophy,

psychology, sociology in order to offer the interaction experience in totality. In this way the modern interaction designing can be brought much closer to habitant and become naturally absorbable in habitat in many respects rather than it is designed closed to mechanical designing process. In short, engineering along with the technology jointly builds and provide the basic infrastructural facilities and services in finely interweaved digital-physical cyber-rich environment and the HCI influences the designing of protocols to connect, compute and communicate these infrastructural components into a full-fledged operational framework of any information system considering the engineering and beyond-engineering aspects. For example the civil engineers are specialist regarding structural strength, security, safety and material-selection. They can't efficiently act as interior designers. Similarly, an automobile engineer can't be efficient body-graphics designers. Similarly a software or computer engineers can't be efficient interaction experience designers. Therefore, the present information systems must be envisioned as consisting of two pieces:

1. Development of the core functional technology from engineering aspects- defines technically what, where, when and how the required and desired services are to be provided. This component fulfils the lower level requirements e.g. usefulness, usability, applicability, timely response and completion of activities, accuracy etc. This part is developed by software engineers.
2. Designing of the interaction environment (including interactive interfaces) from perspective of people as well society, usage environment and usage situation related aspects- As the human experience of digital computing and communicating environment also involves psychological and sociological concerns, the engineering aspects get behind into the background in interaction design process. This includes designing of the ways and modes through which the services will be accessed and used by the people. This module fulfils higher level requirements which are external to engineering domain. This component is designed by interaction designers with the help of experts from other allied discipline.

Uncoupling the conceptualization, designing and creation of interfaces, interaction environment for optimized user experience with that of underlying facilitating functional softwares will open many more new avenues in digital-technological world. It will create the wider space with broader scope for new type of opportunities of their own kind for planners, artificer, architects, artists, experts, designers and developers to come-up with novel, real-time needed, innovative and practical design solutions, services, applications, means of commerce and entertainment,

devices and products for individuals, families, communities, organizations, society, and any other group of people with similar type of requirements e.g. physical-challenged people. The people will then have more choices, more options, more variety and increased level of customization for personalized products and services in everyday experience. This scenario will be able to efficiently and effectively fulfil and address the fragmented demand of users, customers and clients in relation to expected information systems.

The other most obvious benefit of this isolation of information systems into two pieces from the system production and management point of view is that now these two pieces of information system can be discussed, thought-about, modelled, designed, developed and managed independently necessarily not by the same individual or same team of members and may be developed parallel in some manners. Furthermore, with this approach, any service or application software may be rendered through many different customizable instances of interfaces when presented to the people at run time. These instances reflecting the aspirations, needs, characteristics of individual or particular user group with respect to interaction styles, capabilities and limitations of users.

4.1 Proposed Architecture

The ultimate aim is how better, easily and effectively interface presents a mechanism to the user in order to communicate, connect and pursue people regarding the rendered services at one end and at the same time efficiently understand the user's intention to initialize a desired action, at the other end.

For this to achieve effectively object-oriented or component-based architecture, design and development model is suitable. Firstly, standards and protocols for both pieces and to interconnect them with one-another are to be defined even at micro-level. This is same as hardware industry, where the independent manufacturers provide wide range of hardware devices and products which are reusable, interchangeable and most importantly compatible with peer devices and products. The reason being they conform and adhere to the laid standards and norms. Therefore, when a buyer specifies a requirement for a new computer system, the seller chooses a suitable set of different parts, least bothering for interfacing/interconnecting concerns, to best meet-out the mentioned requirement and then assembles them as a system and delivers it to buyer. Since this market is well open for all i.e. manufactures, designers, developers, third party vendors, all are having enough opportunities to offer and come-up with their products. The buyer/supplier gets benefitted with this because they can choose the set of suitable products as per their choice, budget, brand and preferences. Aiming to capture the maximum market-share in the healthy competitive scenario, the companies provides high quality, rationally priced products and services with high class after-sale support, maintenance and training (if required).

Analogously, like digital hardware commodity, software commodity can be realized and practiced. The component-based architecture for modelling, designing and development of today's information system best suit in this regard and even apt for distributed computing environment.
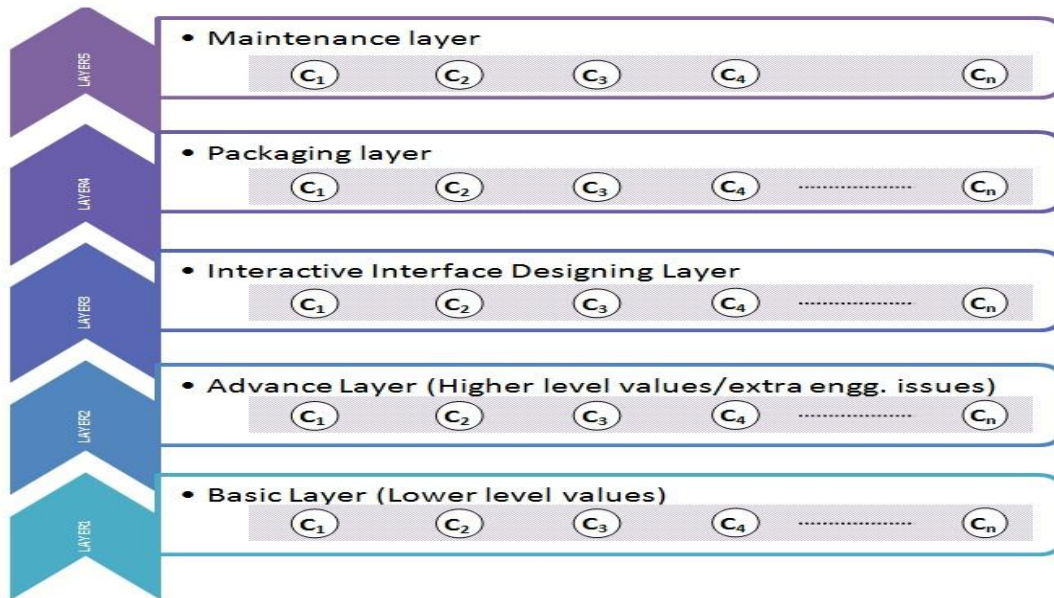

Fig. 2 Proposed Component-based Layered Architecture for Holistic Interaction.

This paper presents open-system component based layered architecture for designing/developing holistic interaction experience, as shown in Fig. 2. For each layer, at the abstract semantic level, an appropriate and balanced partition of the services/functionalities and tasks into independent and manageable components is done in such a way that these components altogether encompass the overall functional module of the concerned layer. The biggest benefit of this approach is its inherent power of component's reusability, interchange-ability and flexibility.

Table 1: Layer-wise Task description for Holistic Interaction

S. No.	Layer	Tasks
1	Basic Layer (Lower level values)	• Responsible for Usefulness, Usability, Feasibility, Efficiency, Privacy, Security, Safety (i.e. engineering aspects)
2	Advance Layer (Higher level values/extra engineering issues)	• Responsible for assessment of reflecting consequences of proposed system on individuals in large particularly in long term context of their mental status; their health; their ability to think, remember and decision making. • Assessment of the effect of proposed system on existing value-system/culture, on existing practices. More over what type of new trends it establishes and their reflecting consequences on society, humanity and mankind. • Assessment of what type of signalling and connectivity messages (may be social, organizational, community) it propagates/spread-outs and how this signalling impacts the society, social-inclusiveness, community, mankind etc. • Assurance of practice of high standards moral, ethical practices and common code of conduct. • How to curb electronic-mediated ill-value system and feeling of loneliness, boredom, frustration, e-addiction.
3	Interactive Interface Designing Layer	• Look and feel, navigational structures, usability issues, modes of interaction, situational aspects, individual's bio-physical activities, cognitive and perceptual capabilities. • Ability to be context-aware, adaptive, persuasive, affective. • Due consideration of geographical and cultural factors.
4	Packaging layer	• Deployment strategy. • Proper testing regarding proper behaving and functioning of different layers and their components. • Session establishment and termination policies. • Tracking and monitoring policies and agencies. • Judicature system and agency.
5	Maintenance layer	• Identifying, locating, fixing and handling post-deployment problems and unexpected outcome. • Releasing better patches and solutions

Table 1 layer-wise enlists the group of tasks to be performed by that particularly layer. For each task or for a group of task a 'component' is defined. These components are referred as Service-components. Respective interfacing mechanism of these components to interact, control, communicate and exchange the data and information are also defined efficiently. These interfacing tasks are also implemented through component designing methodology. These components are referred as Interface-components. Any number of interface components can communicate to specified service component and any number of service components can communicate to any number of interface components. One step ahead, even the designer and developer of one component can recommend, certify or licence the other third party vendors for various complementary and add-on components. The components of one layer can communicate to the components of the other layer also if required but in compliance with the predefined way (set of protocols). In this way, in an open-for-all environment, any new information system is evolved with designing and developing independent components of functional piece's components and underlying interacting interface piece (this may be vice-versa also), both all the time adhering to the laid-down standards and norms. Moreover, this evolution process is always open because at any point of time any new or

existing vendor can float any new component or upgraded version of previous component.

One potential outcome that may occur (even it is present today also, but to the less degree) with this open for all development environment is the availability of plethora of similar type of services and products. Moreover, this trend will even catch continuously increasing momentum in future. This will particularly be more applicable for commonly required services and products. In that scenario, the people who have requirement of such systems for their own reasons may get confused and frustrated in order to choose the set of appropriate products/services/packs and the authentic vendors as well that best suit and fit to their particular requirements. This situation may even lead the people to take uninformed decisions that result in dissatisfaction and make people ignorant towards the digital technology. Therefore, in the scenario when functionality is being and will be offered and packaged in many different modes and flavours to capture the market share of fragmented demands of target customers, there is an authentic and genuine need of expert interaction facilitator/advisers/counsellor/consultant.

The role of these facilitator/counsellors is to first exhaustively understand the needs, limitations, operating situations/situations of proposed information system in consultancy with the client and then to propose, explain and help to finalize rationally an appropriate set of services and products (initially may be including many alternatives and considerable options also) that best meets all the client's criterions. This finalized information system when deployed in production environment satisfies, inspires, pursues, entertains or delight the clients, users and support-team and moreover, in a long run, most importantly generates a highest sense of self-system, self-esteem and self-accomplishment.

5. Results and Conclusions

In today's digital technological landscape, the notion of Human, Computer and Interaction required to be revised and the scope of the HCI discipline is to be broadened. The scope of the interaction of the people, as ever before, now not limited to within the periphery of 'simple users'. The people (or group of people) are now designers, creators, entertainment seekers, educator, trader, service-providers and want to play many more possible roles in and beyond interaction environment. Similarly computer notion has to be transformed to be more generalized and denoting the family of digital technological devices that can efficiently perform both computation and communication. In the above light, this work advocates

that the HCI to be recognized as Human system interaction (HSI) well coupled with advanced computing and communication technology to facilitate and present its offerings under a larger and broader context of interaction environment and everyday experience. On the similar note, in today's circumstances, the interaction is merely not a time-being and time-limited session between user and device but it is a persuasive, enchanting and engaging experience that remains in effect in post-interaction time also. The interaction establishes the healthy interrelation between human and computer, directly or indirectly/ knowingly or unknowingly/ temporarily or permanently.

Under these revised perspective, this paper presents conceptualization of 'holistic interaction' and proposes a novel layered open system component-based modelling architecture for it. This work also figures out about the potential separate market of interaction experience designers and the high demand of interaction experience facilitators in near future. All this aims to transform, through the holistic interaction, this world into the best place to live in and furthermore the digital society into the superior society to get associated with.

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