

Human Computer Interaction (Hindi mein)

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Interface: Lecture 5, part 2

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[Sangeet] Namaskar. Saptah paanch mein aapka punah swagat hai. Jaisa ki is saptah mein hum interface ke baare mein baat kar rahe the jo ki sampark bindu hota hai. Aapke computer aur maanav jo bhi usko use kar rahe hain. Woh alag-alag jo pratikriyaayein hain, pratikriyaayein hain, usko poorn karne mein aapki madad karta hai. Toh chaliye ek bahut tezi se punravritti kar lete hain. Abhi tak humne kya seekha hai? Toh humne seekha hai ki kaise alag-alag tarike ke interface hote hain. Alag-alag tarike ke jo interaction hote hain unke prakaar kya hai aur kaise alag-alag interface jo sampark bindu hai woh usko poorn karne mein alag-alag interaction ko poorn karne mein madad karte hain. Uske baad hum conceptual modeling aspect ke baare mein janenge interfaces ke. Kaise vaicharik jo models hain, woh humein ek achha interface banane mein madad karte hain. Cognitive aspect jo ki ek tarah se baudhik aspect hota hai interface ka woh humein achha interface banane mein madad karta hai. Aur iske alawa alag-alag tutorial jo ki hum is saptah mein cover karenge uske baare mein baat karenge. Toh chaliye interface ke baare mein jaise humne bataya tha ki interface ek tarah se medium hota hai jo ki aapka upyogkarta aur system ke beech mein samvaad sthapit karne mein madad karta hai. Toh, ek tarah se yeh jo interface hota hai, toh jo alag-alag tarah ki kriyaayein hoti hain, interaction hote hain, samvaad hote hain, usko kushal aur prabhavkari banane mein aur khaastaur pe upyogkarta ke anubhav ko achha banane mein kaafi achhe se madad karte hain. Aur jaise ki hum dekh sakte hain ki kisi bhi interface ke liye teen key elements hote hain. Kya usko input milega, kya output woh dikhayega? Aur kis tarah ka feedback us interface, woh interface dega jab aap koi kriya karte hain ya pratikriya aapko milti hai. Toh jaisa ki humne bola tha ki best interface wahi hota hai jisko jo upyogkarta hai usko pata hi nahi chale ki usne koi interface use kiya. Isiliye bola gaya hai the best interface is no interface. Aur ek achha interface ek tarah se iski mahatta aap is tarah se dekh sakte hain ki kaise ek achha interface jo upyogkarta, upyogita hoti hai usko badhata hai, sugamta ko badhata hai aur uske baare mein humne alag-alag example ke madhyam se charcha ki thi kaise yeh ek tarah se navachar ko aage badhata hai aur uske baad humne baat ki thi jab bhi koi hum human machine interaction ki baat karte hain, human interaction ki baat karte hain toh usmein ek tarah se mukhyatah teen elements hote hain. Manushya jo ki us upkaran ko use kar raha hai, seva ko use kar raha hai. Uske ab ek tarah se uske alag-alag senses honge, alag-alag activities hogi. Machine hoga ya computer hoga jo alag-alag karya karega. Aapke upyogkarta ke aavashyaktaon ke anuroop. Uske baad ek tarah se uske beech mein ek sampark bindu hoga,

interface hoga jahan aur jiske madhyam se woh apne-apne alag-alag karyon ko karna chahta hai, dekhega, kya ho raha hai, kaise ho raha hai. Toh, is tarah se agar hum dekhein toh is tarah se mainly teen interface hain. Human, teen elements hain. Human, machine aur interface. Aur yeh jo interface ek tarah se medium hai jo ki alag-alag tarike ke interaction ko poorn karne mein madad karta hai. Toh ab hum jaise ki baat karein ki interaction in HCI toh key elements humne dekha tha user, system, context aur goals kaise woh apne alag-alag jo lakshya hain uski poorti ke liye kaise woh samvaad karta hai, kaise interact karta hai. Kaise interface usko poora karne mein madad karta hai. Yeh saari baaton ko hum dekhenge. Toh, uske baad hum alag-alag example uske dekhe the. Kaise aap airline ya railway station pe alag-alag kiosks hote hain. Jahan pe apne tickets dekh sakte hain, ticket nikaal sakte hain, ticket book kar sakte hain, check in kar sakte hain. Waghera-waghera humne kaafi dekha tha. Toh uske baad humne baat ki thi kaise alag-alag tarike ke interaction type hote hain. Human computer interaction mein. Aap disha nirdesh de sakte hain. Instruction ke madhyam se aap samvaad kar sakte hain. Conversation ek tarah se aap karte hain. Usse apne karya ko poorn karne ke liye. Humne yeh baat ki thi kaise jo nirdesh, instruction based system hota hai woh repetitive task jahan pe karna hota hai wahan pe kaafi upyogi hota hai. Conversation jahan pe aapko apni baat rakhne mein aasani hoti hai. Natural tarike se rakhne mein aasani hoti hai. Manipulation humne baat ki thi kaise aap hastakshep ke madhyam se aap apne karya ko bade aasani se sugamta se kar sakte hain. Jaise ki humne baat ki thi kaise aap kisi file ko drag and drop karke apna karya karte hain, delete karte hain, copy karte hain, move karte hain. Kaise aap jo map hota hai usko zoom in zoom out karte hain. Kisi particular detail ko dekhne ke liye ya ek bada sa overview dekhne ke anveshan ke madhyam se aap kisi bhi vastu ko, kisi bhi item ko ek tarah se uske baare mein detail mein charcha karte hain. Jaise aap space ko dekhte hain. Aap alag-alag elements ko dekhte hain. Khaastaur pe virtual environment mein responding jaise aap pratikriya dete hain. Kis tarah ki pratikriya dete hain kisi bhi karya ke liye? Jaise system initiated interaction system aapko batata hai ki kya ho raha hai. User ne kya choose kiya hai waghera-waghera. Toh is tarah se hum dekhein toh instruction alag-alag tarike se humne inke sabke fayde nuksaan ke baare mein charcha ki thi. Uske baad jaisa ki humne baat kiya ki alag-alag interaction hai. Alag-alag kriya ho rahi hai. Toh usko support karne ke liye alag-alag interaction, alag-alag interface hone chahiye. Antar falak hone chahiye, sampark bindu hone chahiye. Toh, humne alag-alag interfaces ke baare mein baat ki thi. Humne graphical user interface ke baare mein baat ki thi. Kaise ek tarah se yeh visual tarike se aapko ek tarika deta hai ki aap usse is sampark bindu ke madhyam se chahe woh icon ho, chahe woh menu ho, chahe Windows ho, buttons ho, uske madhyam se aap kisi jatil karya ko bhi ek simple ek button ke madhyam se bade aasani se kar sakte hain. Aur ismein galti hone ki chances bhi ek tarah se aap dekh rahe hain kam hoti hai kyunki aapne simple tarike se jo button dabaya woh apne peeche dher saare jo jatil karya hain woh saare karya ko karke woh karya kar dega. Uske baad humne command line interface ke baare mein baat ki thi jo ki ek tarah se jaisa ki aap Linux aur Python interpreter mein dekhte hain ki aap alag-alag command ko type karte hain. Jaise agar aapko us particular folder ke andar saare file ko dekhna hai toh aap 'ls' likhte hain aur 'ls' ke madhyam se us folder mein jitne bhi files hoti hain uski details aapko de deta hai. Toh ek

tarah se yeh light weight aur operate quickly hota hai. Ismein GUI ek tarah se achha dikhne wala interface nahi hota hai. But ismein khaastaur pe yeh jo expert users hote hain jinko yeh saari cheezein badi tezi se aur bade achhe se karni hoti hai unke liye kaafi kaam aata hai. Aur yeh un logon ke liye faydemand nahi hai jo ki beginner hain jo ki abhi-abhi seekh rahe hain unko unke liye ek tarah se isko seekhna bhi utna aasan nahi hota hai aur visually bhi utna appealing nahi hota hai. Humne baat ki thi natural user interface ke baare mein jaise ki khaastaur pe jo manushya hai woh apne natural tarike se saahaj tarike se jaise bhi samvaad karke koi karya karta hai chahe woh gesture ke madhyam se ho, voice ke madhyam se ho, touch ke madhyam se ho un saahaj kriyaon ko support karne ke liye jo interface hota hai woh natural user interface hota hai. Uske baad humne tangible user interface ki baat ki thi. Kaise ek tarah se ek tangible jisko aap chhu sakte hain, touch kar sakte hain, uske saath khel sakte hain aur apne alag-alag karya ko kar sakte hain. Chahe woh education ke liye ho, chahe woh kisi aur sports ke liye ya kisi aur karya ke liye ho. Toh jaise yahan pe humne baat ki thi kaise Sphero Spark with STEM education robot, educational robot hai jo ki ek tarah se aapko dikhata hai kaise alag-alag karya kar rahe hain. Uske baad khaastaur pe jab hum kritrim duniya ki baat karte hain, virtual reality ki baat karte hain toh kaise aap jo immersive 3D environment hai usmein aap interact kar sakte hain. Us interaction ke liye jo interface banaya jaata hai woh ek tarah se virtual reality interface hota hai. Jaise example ke taur pe Oculus Rift mein hum gaming aur training ke liye simulation karte hain. Toh jo interface wahan pe hota hai woh virtual reality interface hota hai. Aur usi ki tarike se aap augmented reality ki baat karte hain. Jahan pe aap jo alag-alag virtual element hote hain real world mein uske upar overlay karte hain. Jaise Go ki baat ki thi. Humne IKEA place app ki baat ki thi. Humne alag-alag jo filter Snapchat aur Instagram waghera pe hote hain uski bhi baat ki thi. Toh iske bhi alag-alag fayde nuksaan hai jo humne baat ki thi. Toh is tarike se aap dekh rahe hain ki alag-alag interaction ko support karne ke liye alag-alag tarike ke interface hain. Alag-alag sampark bindu hain alag-alag kriyaon ko support karne ke liye. Toh is tarike se hum yeh saari cheezein kar sakte hain. Aur alag-alag styles hain jaise interaction types hain. Uske corresponding interface styles hain jo ki ek tarah se humein ismein madadgaar hoti hai. Jaise a description of what user is doing when interacting with the system. For example jab aap unse instruction, nirdesh de rahe hain, baat kar rahe hain, browse kar rahe hain, respond kar rahe hain. Interface style ek tarah se interface hota hai jo ki support karta hai un sabhi interaction ko. Jaise ki command hua, menu based hua, gesture hua, query hua, pen driven, kisi form ko fill karna aur video, voice, graphic is tarah ki cheezon ko support karne ke liye. Toh chaliye hum agle part mein aate hain is adhyay ke. Toh humne baat ki thi kaise jab bhi aapko interface banate hain toh humein jo vaicharik models hote hain unko dhyan mein rakh ke banane hote hain. Humein jo cognitive aspect hote hain unko bhi dhyan mein rakh ke interfaces ka nirman karna hota hai. Toh chaliye is baare mein aur detail mein jaante hain. Toh sabse pehle hum conceptual design ke baare mein baat karte hain. Kaise vaicharik design ek tarah se aapko madadgaar saabit hota hai ek achha maanav kendrit system banane ke liye. Toh ek tarah se yeh proof of concept ho jaise ki jo bhi vichaar aapke mann mein hai usko check karna ki yeh karya karega bhi ki nahi karega kis had tak karya karega toh ek tarah se aapko iske baare mein conceptualize karne ki koshish karta

hai jo bhi aap product banana chahte hain woh kya karya karega kis tarah ki kis tarah se upyogi hoga kis tarah ke jo uske upyogkarta honge unki zarooraton ko kaise solve karega toh humein conceptual design ko samajhne ki zaroorat kyun hai? Kyunki ek tarah se yeh humein madadgaar saabit hota hai. Scrutinize karne ke liye jo hamare ek tarah se aspasht vichaar hote hain ya assumption hote hain, dhaaranayein hoti hain ki yeh aise kaam karega, woh aise kaam karega. Toh, proof of concept ke madhyam se hum usko aur thoda sa achhe tarike se samajhte hain ki yeh jo product hoga, woh kaise log use karenge. Kis tarah se uska fayda lenge. Apne karya ko karenge. Toh us tarah se uski feasibility ko bhi check karna. Ab bolne ke liye vichaar ke taur pe toh aap bol sakte hain ki apni car mein baith ke aap moon pe chale jayenge. But aisa sambhav hai kya? Toh ek tarah se proof of concept ke madhyam se hum thoda sa feasibility ke baare mein baat karte hain. Kaise hamara jo upyogkarta hai usko use karega uske baare mein jaante hain. So how realistic is to develop? Jaise ki hum baat kar rahe the ki uske liye aapko Tesla se baat karni padegi. Shayad aapko Elon Musk ki madad leni padegi. Usi tarike se how desirable and useful is. Toh sochne ke liye banane ke liye aapke vichaar mein aap dheron aisi functionality bana sakte hain. But kya uski sach mein zaroorat hai? Kya woh bahut upyogi hai? Kitna upyogi hai? Kis toh yeh saari jo dhaaranayein hain humein conceptual modeling ke madhyam se vaicharik designing ke madhyam se hum us baare mein aur ghan charcha karte hain aur design karte hain. Ek conceptual design ke madhyam mein ek bahut achha sa example jo hamare dimaag mein aa raha hai. Aap sabhi log Steve Jobs ko jaante honge aur aap yeh jaante honge ki kaise woh itne bade vichaar dhaarak bane navachar ke madhyam se aaj ke time pe jo Apple company hai usko is level tak laane ke liye unhone kitni mehnat ki aur kitne bade level pe le gaye. But kya sach mein woh ek unhi ka poori tarike se idea tha. Aisa hota nahi hai. Jab bhi aap navachar laate hain toh zyada tar cases mein aap jo chhote-chhote alag vichaar alag-alag jagahon se aap lete hain, seekhte hain usko aap use karke ya usko aap samajh ke ya usko dekh ke apne naye vichaar ko janm lete hain. Jaise ki hum aisa toh hai nahi ki abhi hum jo bhi padhai kar rahe hain. Achanak se saari cheezein seekh gaye. Iska ek foundation banta hai. Alag-alag cheezein seekhte hain. Toh us tarike se agar aap example ke taur par yahan dekhe toh Steve Jobs ne basically ek tarah se Xerox jo bahut badi company thi us samay uske office gaye aur wahan pe usne unka STAR UI system dekha aur STAR UI system dekh ke woh asambhit ho gaye. Unhone mainly wahan pe teen badi cheezein dikhi. GUI graphical user interface, interface pe dhyan dijiyega. OOPs object oriented programming aur jo networking jo ek tarah se alag-alag system aapas mein networking ke madhyam se jude the waghera-waghera toh after jo Xerox Palo Alto ka visit karne ke baad toh unko yeh kaafi revolutionary laga. Unko bahut hi krantikari vichaar laga ki agar hum yeh jo saari cheezein dekh rahe hain khaastaur pe jo graphical user interface kyunki agar aap upar network ke liye dekhenge toh yeh zyada tar ek tarah se aap keh sakte hain jo developer hai programmer hai unke aspect se hai. But GUI jo directly aapke upyogkarta se connect karta hai. Kaise hum kisi karya ko karne ke liye usko bade aasani se simple ek button ke madhyam se ya interface jo aap jiski baat kar rahe hain simple ek simple sampark bindu ke madhyam se apne jatil se jatil karya ko bade aasani se kar lein. Toh ek tarah se graphical user interface graphical matlab user interface ek tarah se aap usko dekh sakte hain ki aur jo bhi karya kar rahe hain woh aapko ek

tarah se darshayega ki aap kya kar rahe hain kitna ho gaya kya ho raha hai toh ek tarah se Xerox STAR UI se inspiration leke unhone apne Mac OS ka nirman kiya, Mac computer ka nirman kiya aur uske baad aap dekh sakte hain uske baad kabhi woh peeche mud ke nahi dekhe aur ek tarah se dekh lein Fortune jo ki ek bahut hi popular magazine hai. Uske cover page pe bhi hai. Toh us tarike se aap dekh sakte hain ki kaise unhone graphical user interface ko conceptualize karke ki kaise usko commercial jo computers hote hain usmein hum zyada se zyada tar logon tak pahunch sakte hain. Jatil se jatil karya hum bahut hi aasani se kar sakte hain. Chahe woh print karna ho. Ho ek simple ek button daba ke hum kisi file ko print kar sakte hain, save kar sakte hain. Aur bhi alag-alag tarike se simple yahan pe aap dekh sakte hain ki alag-alag jo interface hai, elements hain interface pe uske madhyam se woh apna karya kar sakte hain. Toh ek tarah se hum agar jo vaicharik hamari modeling hai, design hai, uske liye humein alag-alag dhaaranayein banani padti hain. Ya alag-alag jo daawa hota hai, woh dekhna padta hai. Aur uske apne dhaaranayon aur apne daawon ke madhyam se aap apne system ka nirman karte hain. Toh best toh yahi hoga ki jo bhi aap dhaarna bana rahe hain. Agar jab agar woh sach mein sahi hai tab toh aap ek achhe pranali ka ya system ka ya keh sakte hain ki ek achhe seva ka utpaad ka nirman kar sakte hain. Otherwise woh poori tarike se fail ho jayega agar woh sahi nahi hoga. Toh humein apne jo bhi dhaaranayein hain ya hamara jo bhi daawa hai usko humein likhna chahiye aur usko validate karna chahiye kisi bhi tarike se. So we try to define and support them. Aur aisa toh nahi ki aap usko andhbhakti ki tarah bas haan yeh mere dimaag mein aaya toh sahi hoga. Aapko ek sahi tarike se dhyanpurvak us pe karya karna padega aur jo sahi hai usko aage le jaana hai aur jahan galat aapko lag raha hai us pe vartalap ke madhyam se alag-alag madhyamon se expert se discussion ke madhyam se apne user usko kaise use kare uske madhyam se usko sahi karne ki zaroorat hai. So these are difficult to articulate. Toh ek tarah se humein ek tarah se isko likhna hai jo spasht hai aur unrealistic hai usko sahi karna hai aur iteratively aisa toh hota nahi hai ki aap ek hi baar mein isko kar lein jaise ki maine kayi baar bola hai khaastaur pe hum jab bhi maanav kendrit system banate hain toh usmein punravritti ki zaroorat baar-baar hai. Toh ek tarah se iterative tarike se aap apne jo final design hai wahan tak aap pahunch sakte hain aur woh ek achha conceptual modeling bana sakte hain. Jo bhi aap seva ya ek tarah se utpaad ya service banana chahte hain toh alag-alag assumption kya ho sakte hain? Toh assumption jaise yeh ho sakta hai ki agar aap car pe bana sakte hain ki people will want to watch TV while driving. Jab bhi aap driving karte hain toh aap usmein TV dekhna chahte hain. Aapki assumption hai. But kis had tak yeh sahi hai aur aapne dekha bhi hoga ki kaafi had tak beech mein kuch samay tak log apne television ya chhote television ko tablet ko apne saamne aise car pe driving karte samay dashboard par lagate hain aur baad mein humne dekha ki woh accident aur kaafi ki aap driving karte samay aapka dhyan doosri taraf jaata hai. TV dekhne lagte hain. Kisi scene ko dekhne lagte hain. Toh is wajah se ek tarah se aapka jo assumption tha woh galat tha aur woh baad mein saabit bhi hua aur isi wajah se aaj ke time pe jitni bhi nayi companiyan ya jitni bhi companiyan car banati hain bilkul woh aaj ke time pe bhi bade-bade screen ya achhe screen ko saamne rakhti hain. But ek tarah se usmein jo video wala app hota hai woh disable hota hai. Jaise aap YouTube pe wahan par music toh sun sakte hain lekin YouTube pe aap video nahi dekh sakte. Toh yeh ek

tarah se alag-alag alag-alag dhaaranayein jo shuru mein hoti hain woh samay ke saath sahi bhi ki jaati hain aur jaise aapko user feedback waghera milta hai. Toh claim ek tarah se ek tarah se aapki jo daawa hai woh bolta hai ki aap yeh daawa kar rahe hain ki aapka jo system hai woh yeh kar dega, woh yeh woh kar dega. But kis had tak karega? Again woh usko check karne ki zaroorat hai. Jaise example ke taur pe aap yahan pe daawa kar sakte hain. Providing visual feedback for the button press increases user confidence. Toh ek tarah se yeh sahi hai. Jaise button jab aap dabate hain, jab uska color change hota hai, toh ek tarah se user ko feel hota hai, mahsoos hota hai ki aapne woh button dabaya hai. Aap yeh khud se bhi dekh sakte hain. Jab bhi aap user interface banate hain, koi button banate hain, agar usko dabaya aur usmein koi changes nahi hue, toh bada mushkil hai. Aur us user ko pata lagna ki sach mein woh daba ki nahi daba. Otherwise woh baar-baar usko dabata rahega aur ek tarah se system aapka hang ho jayega ya ek tarah se galat cheezein ho sakti hain. Aur bhi claim de sakte hain. Simplifying navigation option reduces cognitive. Ek tarah se yeh daawa bhi sahi hai ki agar aap jo dher saare jo options hain usko aap ek tarah se kam kar dein group ke madhyam se jaise menu jaise aapke paas 100 option hai agar usko aap 10 ya paanch group karke banayein toh unke relation ke madhyam se unke toh ek tarah se woh aasan hota hai. Jaise website with menu with fewer or more clear defined category help user find information easily fast. Ek aur daawa jaise aap dekh sakte hain using consistent icon across interface improves learnability. Toh main bhi is baat se bhi sehmata hoon. Agar aap jab tak ek tarah se consistency rakhte hue matlab cheezon ko change nahi karte hue jis tarike se aadmi dekh raha hai usi tarike se karte hue alag-alag interface ka nirman karenge toh usko seekhna aasan hota hai. Toh again yeh saari jo claims hai pehle assumption raha hoga. Iske corresponding assumption raha hoga lekin unhone usko validate kiya hoga. User study ke madhyam se usko mulyankan ke madhyam se aur uske baad jab usko apne assumption ko sahi paya toh usko phir unhone ek tarah se us pe daawa kiya ki hamara yeh hai. Toh aaj ke time pe bhi ab jaise alag-alag product use karte hain, alag-alag advertisement dekhte hain toh usmein batata hai ki dekhiye isko karne se aap yeh kar lenge, usko karne se aap yeh kar lenge. Toh assumption dhaaranayein ho sakti hain. Daawa bhi ho sakta hai aur kabhi-kabhi yeh daawe galat bhi hote hain. Toh un daawon ko isiliye mulyankan ke madhyam se check karna zaroori hai ki jo daawa unhone kiya hai woh sahi hai ki nahi hai. Kitna sahi hai. Toh ek tarah se aap ek tarah se yeh jo dhaaranayein aur daawa hain woh aapko madadgaar saabit hote hain. Kaise aap apni company ko ya apne vichar ko naye level par le ja sakte hain. Aapki dhaaranayein aapko madad karti hain. Ek conceptual modeling ke liye. Aapka daawa agar sahi hai toh woh ek tarah se aapke navachar ko aage badhane mein madad karta hai aur batata hai ki kaise aap achha karya kar kar pa rahe hain. Aapke jo utpaad banaye gaye hain ya seva banaye gaye hain. Toh jaise ek example ke taur pe dekhein khaastaur pe hum Bhartiya log aur usmein bhi agar hum baat karein toh North Indian log toh roti hamari bhojan ki ek integral part hota hai. Toh ek company thi Singapore mein jiska naam tha RotiMatic toh aap dekh sakte hain ki woh Bhartiya aur jinke bachhe the toh unhone ek tarah se unhone ek tarah se ek pareshaniyon ka saamna karna pada. Unko apne rotiyon nahi mil pa rahi thi. Ab ghar ke maa ke haath ki roti ki toh baat hi alag hai. Toh woh toh har jagah milega nahi. Ya toh mummy ko le jaaiye ya ghar waalon ko le jaaiye. Again woh feasible hai nahi. Agar

aap padhne ja rahe hain, karya karne ja rahe hain ya unke khud ke karya hain toh us case mein kya hum koi upkaran bana sakte hain jo ki ghar jaisi roti banakar de de. Toh yahi karya unhone kiya tha. Ek tarah se unhone machine banayi jismein aap aata dalenge, bagal mein paani dalenge toh apne aap usko aata goonth dega. Goonthne ke baad chhote-chhote loi ya gole bana dega. Usko bel dega aur belne ke baad ek tarah se jo rotian hain is tarah se nikal payengi. Aur aisa toh hai nahi ki aapko roti chahiye. Aapko puri bhi chahiye toh puri bhi ban sakta hai. Alag-alag tarike ki rotian ban sakti hain. Toh more than just roti ek tarah se aap dekh sakte hain. Yeh dhaaranayein unki thi ki bhai mujhe toh ghar ki roti bahar chahiye. Ghar jaisi roti chahiye. Lekin gharwaale nahi hain. Gharwaali nahi hai toh ab kaise milega? Toh us case mein upkaran ko unhone bana diya. Ek krantikari vichaar se bolenge aur us tarike se aap dekh sakte hain ki samay ke saath kyunki yeh purana stats hai. 2008 tak alag-alag round mein VC funding ke madhyam se 50 million dollar ki funding unhone ikattha kar li thi aur aaj ke time pe toh kaafi badi company hogi aur is tarike se aap dekh sakte hain ki aap agar aapke dimaag mein vichaar hai aur aap zarooraton, apne dhaarnaon ke hisaab se aap unke baare mein kuch solution nikalte hain aur usko validate karte hain. Jaise inhone claim assumption inka yeh raha hoga ki haan logon ko bhale hi woh ghar se bahar chale jaaye, videsh chale jaaye lekin roti chahiye aur daawa inka yeh tha ki aap is upkaran ke madhyam se ghar jaisi roti bana sakte hain, kha sakte hain toh ek tarah se yeh hai toh aapko agar navachar ka naya idea aata hai toh aap bhi kyun nahi dosa-matic banaiye, idli-matic banaiye aur laakhon karodon rupaye kamaiye. Usi tarike se aap yeh karya main aapko deta hoon. Aap yeh dekhiye agar aap alag-alag restaurant mein jaate hain. Agar wahan ke jo aapke waiter hote hain unki jagah agar main ek robot de doon toh aap kitna achha experience feel karenge ya kitna sugamta se karya karenge woh cheezein aap dekh sakte hain. Usi tarike se hum main Japan gaya hua tha toh wahan pe kuch restaurant mein ek tarah se wahan pe aapke tables pe ek tarah se unki elevator trolley type ki hoti hai jo ki conveyor belt ki tarah hota hai. Chalta rehta hai aur aapke order ke madhyam se apne seat par baithe hue aap order de sakte hain aur aapke seat pe bina waiter ke aaye hue us conveyor belt ke madhyam se khana aapke table pe aa jayega aur aap usko le sakte hain. Toh again is tarah ke alag-alag tarike ke vichaar honge toh uske baare mein aap dhaaranayein banayenge ki assumption banayenge ki sach mein iski zaroorat hai. Yeh agar hum isko lenge toh log khush honge. Log aasani se order place kar payenge. Aasani se unka saamaan unka jo khana hai unko mil payega. Jaldi mil payega. Yeh saari dhaarna hai. Aur ek tarah se company phir claim karegi ki uske liye aap jo uska solution banayenge chahe woh robot bana de chahe conveyor belt bana de. Aap daawa thokenge. Dekho ki pehle aap jaise aaj ke time pe aap dekhte hain ki jo quick delivery hai woh bolte hain 10 minute mein daawa karte hain ki 10 minute ke andar aapko hum grocery laake de denge. Toh ek tarah se yeh unka daawa hai aur assumption kya tha? Unki dhaaranayein kya thi? Logon ko jo saamaan hai turant chahiye. Jaise mujhe bread sandwich khana hai toh mujhe bread turant chahiye. Mujhe shaadi mein jaana hai toh mujhe kurte turant chahiye waghera-waghera. Toh iske benefit ek tarah se aap dekh sakte hain. Is particular jo example ke jo humne diya tha toh robot can take order and entertain customer by having a conversation with them. Aur khaastaur pe aaj ke time pe aap videshon mein jaate hain. Aapko Hindi nahi aati, aapko Angrezi nahi aati ya

French nahi aati. Toh robot ek tarah se saari bhashayein bol sakta hai. Simple aap usse apni bhasha mein baat kariye aur woh aapko order de dega. Again alag-alag recommendation de sakta hai waghera-waghera. Toh they are just assumption aur uske basis par aap jo actual problem hai samasya usko solve kar sakte hain. Toh kaafi time pe aisa hota hai ki aisa nahi hota ki aapko saari cheezein us baare mein pata hi hai. Aap sabse zyada jo cheezein pata hoti hain keh sakte hain expert ko hoti hain. Aur lekin woh bhi saare saari cheezon ko nahi jaanta. Khaastaur pe jo upyogkarta honge woh kaise use karenge? Unki behavior kya hai? Woh kaise use karte hain? Unki zarooratein kya hai? Woh sab cheezein samajhne ki zaroorat hoti hai. Toh there are many unknowns need to be considered in initial stage. Kyunki jab saari cheezein nahi pata hoti hain toh aap uske hisaab se apni dhaarna banate hain. Apne assumption rakhte hain aur us tarike se aap apne jo bhi banana chahte hain aage banana. Lekin usko banane ke liye alag-alag level pe aap apne upyogkarta ke madhyam se expert ke madhyam se jo aapki dhaaranayein hain usko validate karne ki koshish karte hain. Aur in dhaaranayon ke madhyam se aur inko clear karne ke madhyam se early ideation process mein hi aap dher saare question poochte hain, prashn poochte hain. Apne jo assumption aapne banayi hai usko sahi karte hain, reconsider karte hain aur jo bhi usmein concern hai usko likhte hain, batate hain, articulate karte hain. Toh ek tarah se aap dekh sakte hain ki ek tarah se ek framework ke madhyam se yeh ek tarah se rooprekha ke madhyam se woh anveshan karta hai aur problem space ko jo samasya kshetra hai usko aur achhe se janne ki koshish karta hai. Toh aur yeh ismein ek tarah se madadgaar saabit hota hai. Are there any problem with the existing product or experience? Jo bhi abhi ke time pe product hai usko log jaise use kar rahe hain agar hai toh nahi hai tab toh samasya aapko dikh hi rahi hai woh kya-kya kar raha hai kaise kar raha hai aur agar kar bhi raha hai toh usko kya samasyaon ko jaise aisa toh hai nahi ki quick grocery ke pehle jo hum the-minute delivery, instant delivery ki baat karte hain uske pehle delivery nahi tha Amazon se aap khana sabji order karte the agle din aata tha, cheezein aap order karte the agle din aata tha lekin unhone ek tarah se assumption banaya ki bhai logon ko turant turant chahiye. Agar main grocery order kar raha hoon toh mujhe Maggi turant chahiye. Banana hai turant. Nahi toh us tarike se aap iske madhyam se assumption ko verify karte hain aur existing user ki jo dikkatein hain unko samajhte hain aur uske uske baad ek tarah se ab 10 minute mein jo quick delivery wale companies hain chahe woh Zepto ho, chahe woh Blinkit ho, chahe woh Instamart ho, chahe woh Big Basket ho aapko turant order dene ki koshish karte hain. Toh ek tarah se aap pata karte hain ki unko kya dikkatein ho rahi hain aur kya aapko lagta hai ki jo aapka solution jo aap samasya samadhaan nikal rahe hain kis had tak un samasyaon ko poora karega if you are designing for a new user experience? How do you think your proposed design idea will support, change or extend the ways they are doing things. Toh ek tarah se in cheezon ka dhyan rakhte hue ek aur ek aur basically karya main aapko deta hoon. Aap sochiye aapka assumption yeh hai ki kya assumption aur claim hoga is baare mein 3D TV ke baare mein. 3D TV jab banayi gayi ya banayi jaaye toh unke baare mein unka kya vichaar raha hoga? 3D TV ki zaroorat kyun hai? Toh again vichaar toh assumption toh yeh raha hoga ki bhai woh zyada se zyada experience enjoy karenge aur woh zyada paisa dene mein koi dikkato ka saamna unko nahi karna padega. Yeh jo experience lena chahte hain. Bhale hi woh jo traditional

TV hai toh use 10 guna paisa zyada dena pade. Aisa unka dhaarna tha. Vichaar aur claim unka yeh tha ki bhai ab is TV ko dekhne ke baad, 3D TV dekhne ke baad aapko lagega ki ekdam real duniya mein aap dekh rahe hain toh yeh sab cheezein assumption on claim hongi. Kis had tak sahi hongi nahi hongi yeh saari cheezein again baad mein validate karne ki zaroorat hai. Toh is tarah se aap dekh sakte hain ki aap kya samasyaon ka pehle unko saamna karna pada tha existing TV dekhne mein aur unka assumption kya tha? Unka claim tha. Yeh saari cheezein aap dekh sakte hain. Toh ek tarah se hum jo vaicharik cheezon ki baat kar rahe hain, vaicharik design ki baat kar rahe hain, toh alag-alag tarike se humein madadgaar saabit hota hai humein orientation, parichay dene mein ki bhai yeh dekho aisa hamara system hai aur toh it enables design teams to ask specific question about how the conceptual model will be understood by the target user. Kaise woh usko use karenge khule vichaar ke saath. Prevent design themes from becoming narrow down focus early on humein matlab particularly exact aise nahi karna hai. Aap khule vichaar ke saath alag-alag upyogkartaon se baat kariye, dekhiye, samjhiye aur ek tarah se ek common ground, ek common interpretation ke saath, common understanding ke saath aap apne design team ko jo dono upyogkarta, designer ya navachar jo kar raha hai dono ko common ground pe laane ke liye hum aisa banana chahte hain. Toh ek tarah se jo upyogkarta hai woh bhi hona chahiye. Bolna, samajhna chahiye ki haan hum aisa chahte hain. Is tarike se chahte hain. Toh jis tarike se aap is conceptual design ke madhyam se us karya ko kar sakte hain. Toh ek tarah se hum dekhein toh jaisa hum jab design process ki baat kar rahe the wahan pe do kshetra tha, samasya kshetra aur samadhaan kshetra. Toh samasya kshetra aur samadhaan kshetra ke beech mein agar hum dekhein toh ek tarah se design kshetra hai jo ki humein un dono ke beech mein ek common ground banane mein madad karta hai. Toh having a good understanding of the problem space can help inform the good design space. Jaise kis tarah ka interface hona chahiye, kya behavior hona chahiye, kya functionality hona chahiye waghera-waghera. So before deciding upon all this it isn't to develop a conceptual model. Jo ek tarah se conceptual model humein madad karta hai ki hum aisa kuch bana rahe hain aur is tarah se probably karya karega aur humein jo hum concrete thos upkaran ya thos seva ya utpaad mein banana chahte hain utna kharch karne se pehle ek tarah se humein ek common ground apne upyogkarta ke baare mein aur bhi jaankari prapt karne mein madad karta hai. Toh ek tarah se agar hum paribhashit ise karein toh conceptual model is a high level description of how a system is organized and operate. Kaise yeh karya karta hai, kaise organize rahega? Iska ek uchw star par ek tarah se description yeh deta hai. Yeh basically enable karta hai designer ko straighten out their thinking before they start laying out their widgets. Toh in sab cheezon ko banane se pehle ek tarah se unko pehle unki jo soch hai usmein aur mazbooti laane ka prayaas karta hai. Unko aur confidence deta hai ki haan aap ab aisa bana sakte hain jo actual banana chahte hain. Toh provides a working strategy and framework to general concept and their interrelation. Kaise ek tarah se jo rooprekha banana chahte hain aapki strategy kya honi chahiye? Ismein yeh madadgaar saabit hota hai. Toh agar hum dekhein toh conceptual modeling mein yeh ek tarah se kayi cheezein hoti hain jo ek tarah se aapko madadgaar saabit hongi. Toh yeh jo vaicharik aapka gyan hai kaise woh aapke design, design aur basically jo anusandhan hai woh usmein madad karta hai. Toh jo agar hum ismein

alag-alag cheezein dekhein toh paradigm ek tarah se woh aapke vichaar roop drishtikon mein madad karta hai. Vision ek tarah se kalpana jo aapki hai usmein kaise madad karta hai. Theory jo ki alag-alag siddhant ismein honge woh kya usmein honge, kis tarah ke model honge aur finally kis tarah ki jo rooprekha hogi woh yahan pe darshata hai. Toh agar hum unke baare mein sabke baare mein bari-bari se baat karein toh paradigm ek tarah se inspiration for the conceptual model hota hai. Toh jaise ki jaisa aap drishtikon hai aapka ki kaisa aap banana chahte hain? Kis tarah ke logon ke liye banana chahte hain. Toh ek tarah se jo conceptual model ki rooprekha hai, inspiration hai, woh is tarike se hai. Toh kaafi ismein general approach hai adopted by the community jaise shared definition, concept, values and practices jaise ki hum desktop, ubiquitous computing in the wild yeh sab sab cheezein banana chahte hain. Toh iske alag-alag drishtikon hai. Jaise aap baat karte hain ubiquitous computing. Jaise computing har jagah hai adrishya roop mein. Jaise ki hum smart light ki baat karte hain. Smart light jaise hi aap kamre ke andar ghuste hain light jal jaati hai aur jaise hi aap nikalte hain woh band ho jaati hai. Toh yeh aapne dekha hoga. Similarly aap jo Amazon ka Echo hai, Alexa hai ya Google Nest hai, Google Assistant waghera hai un sab kaise aap baat karte hain. Ek tarah se sadrishya roop mein hote hain. Pervasive computing yeh bhi ek tarah se har taraf computing ki baat hoti hai. Lekin har chhote se chhote jo ki har samay available hoti hai. Har taraf available hoti hai waghera-waghera. Jaise pehle banking system agar aapko karna hota tha toh aap office hour mein jaate the. 9:00 se 5:00 ke beech mein jaate the. Lunch ke beech mein waise hi band rehta tha aur Shanivar Ravivar band rehta tha toh aap har samay banking nahi kar sakte the toh pervasive computing ke madhyam se aap dekh sakte hain kaise aaj aap kisi bhi samay aap turant banking kar sakte hain apne net banking app ke madhyam se aur paise transfer kar sakte hain le sakte hain jo aapka merchant hai usko pay kar sakte hain waghera waghera. Wearable computing ek tarah se pehne योग्य उपकरण है वहाँ पे जो computing है जैसे smart watches ki baat karte hain, smart ring ki baat karte hain aur alag-alag जैसे hum Google Glass ki baat karte hain. Amazon के भी वैसे कुछ product होंगे. Facebook Meta का भी अभी smart glass आया है जो कि हमने पichle adhyay mein baat kiya था. Internet of Things ek tarah se aap जो vastuon का internet ek tarah se connected है वो उसके बारे में बात करते हैं. जैसे कि आजकल आप देखते हैं कि आपके fridge में भी ek tarah se sensor alag-alag sensor है जिसके madhyam से ek tarah से वो batata है कि अच्छा सब्जी खतम हो गई या खराब हो गई है, doodh खतम हो गया. Toh ek tarah से आपको smart तरीके से आपको batata है कि similarly आप washing machine, आप washing machine use करते हैं तो usमें ek tarah से देखते हैं कि जितना ganda है, जिस तरह का kapda है उस तरीके से वो usको धुलेगा waghera-waghera. Toh kalpana ki hum baat kar rahe the जैसे a driving force that frame research and development तो ek tarah से जो अनुसंधान और जो development हम कर्ना चाहे हैं वो kalpana के madhyam से ही हो सकता है. आप पहले उस बारे में kalpana करेंगे. उसके madhyam से फिर करेंगे. जैसे कि हम Apple's 1987 Knowledge Navigator हुआ. Smart city की आप kalpana करते हैं. Smart health की kalpana करते हैं. और उस फिर उस kalpana के अनुरूप usको पूरन करने के लिये अपने alag-alag चीजों का निर्माण करते हैं. Human centered AI कैसे हम मानव को केंद्र में रख के उसी samasyaon को कृत्रिम बुद्धिमत्ता के madhyam से solve कर सकते हैं. उस बारे में हम बात

karte hain. Toh jab tak aap kalpana nahi karenge tab tak aap uske aage uske liye karya nahi karenge. Uske bal conceptual modeling nahi karenge aur usko ek concrete level pe aage nahi le jayenge. Toh this provides concrete scenario of how society can use next generation of imagined technology. Toh aap soch sakte hain ki kaise ab aage jo abhi delivery boy aapke ghar pe saamaan laata hai uski jagah ek drone aayega woh aapke ghar saamaan rakh dega. Ek robot aayega aapke ghar saamaan rakh dega. Autonomous vehicle car se aayega waghera-waghera. Toh ek tarah se iske neetigat questions bhi hain. Gopniyata aur trust ki baat bhi hai. Toh woh saari cheezon ka bhi humein dhyanpurvak karna chahiye. Toh again uske liye ab samay ke saath alag-alag deshon mein alag-alag jagahon pe unke liye alag-alag guideline banane ja ban rahe hain, standard ban rahe hain. Jisko hum aage ke lectures mein bhi thoda detail mein discuss karenge. So jab hum vision ki baat karte hain toh question by take jo visions hote hain jaise how to enable people to access and interact with information in their everyday life jaise hum apne niiji jeevan mein har din alag-alag tarike ke information se interact karte hain. Inko lete hain. Kaise usko use kar rahe hain? How to design user experience when there is no obvious user control. Jab clear, obvious user control nahi hai toh phir bhi hum kaise user ke anubhav ko badha sakte hain? How and in what form provide contextual relevant information to people. Usi tarike se how to ensure the information pass around interconnected device and object is secure jaise aaj ke time pe hum jo light hai, jo Alexa hai, jo dher saare upkaran hai jo hamari ghadi hai, smart glass hai, saari cheezein mobile se connect aajkal pe toh hamari cars aur bike bhi mobile se connected hai toh kis tarike se hum usko secure bana pa rahe hain, us baare mein bhi humein bahut zyada dhyan dene ki zaroorat hai. Jab bhi hum bade level par kalpana karte hain, durdarshi kalpana karte hain, toh uske liye humein alag-alag ek tarah se siddhanton ka bhi dhyan dena padta hai. Toh explanation of phenomenon, kaise ho raha hai? Kya uske peeche koi siddhant hai? Hum apne mann se toh kuch nahi bol sakte na. Toh aapko kuch siddhant ko agar follow karenge toh usko aur yeh sab siddhant ek tarah se bade experimental tarike se achhe tarike se validate kiye ja chuke hote hain. Toh humein phir se ek tarah se wheel ko invent nahi karne ki zaroorat thi. Jab humein pata hai ki ab yeh wheel ban chuki hai. Tab hum is wheel ka, pahiyee ka use karke kyun na hum gaadi banayein na ki hum phir se ek naya pahiyee banayein. Toh us tarike se aap dekh sakte hain. For example information processing that explain how the mind or some aspect of it assume it work. So it can help identify factors relevant to design and evaluation of interactive products such as cognitive, social and effective and can be used to predict what user will do with different interfaces. Alag-alag jo sampark bindu hain, alag-alag jo unko kriya karni hai, kis tarike se use karenge? Toh uske baad hum model ki baat karte hain. Kaise ek tarah se simplification of an HCI jo bhi HCI phenomenon ki hum baat karte hain. Kaise hum usko uska sarlikaran kar sakte hain. Toh model ek tarah se uska sarlikaran karta hai. Toh it enable designer to predict and evaluate alternative design. Jaise jahan aapke paas ek se zyada jaise design hote hain. Toh wahan pe kaise aap jo unmein choose karna hai, kaise aap karte hain? Abstracted from a theory coming from a computing discipline for example jaise Don Norman model of seven stage of action, usi tarike se model mark model of user experience. Toh is tarike se aap dekh sakte hain. Toh finally ek jab iske basis pe aap ek rooprekha banayenge, framework banayenge jo ki a set of interrelated

concept and or specific question what to look for, provide advice on how to design user experience. Kaise hum user experience ko badha sakte hain? Toh uske liye humein kis tarah se design karna padega? Toh jaise helping designer think about how to conceptualize learning, working, socializing, fun and emotion. Similarly ek tarah se yeh madad karega focus on how to design particular kind of interface to evoke certain response. Jaise kuch response ko aapko jagana hai toh uske liye humein kis tarah ka interface banana padega. And yeh alag-alag form mein ek tarah se aate hain. Jaise woh question hue, concepts hue, challenges hue, principles, dimension waghera-waghera. Toh agar hum classical jo HCI framework ki baat karein toh Don Norman ne ek tarah se framework diya tha. The relationship between the design of a conceptual model and a user understanding of it. Toh, ek tarah se iske teen interacting components hain. The designer model, system model, the user model. Matlab jo overall aap cheezein bana rahe hain, kaise ek designer usko dekhega. Kaise overall system aap kisi bhi ko dikhega aur kaise a user uski uski samajh rakhega. Woh kaise dekhega ki kaise system kaam karta hai. Toh, jaise designer ke model ke baare mein hum baat karein. The model of designer has how the system work. Toh kis-kis cheezon ko design karna padega aur again design karne ke liye woh alag-alag sampark bindu jo usko banane hain, alag-alag kriyaon ko support karna hai aur woh interface kaise hone chahiye, in sab cheezon pe dhyan deta hai. Aur kaise user experience ko badha sakta hai, kaise woh sarlikaran kar sakta hai? Yeh sab cheezon pe designer dhyan dega. System image mein how to system actually work? Kaise actual mein kaam karta hai? Uske andar mein kya-kya cheezein actual mein ho rahi hain? Which is portrayed to the user through the interface manuals, user help, facilitate and so on. Toh ek tarah se poore system ka image jo usmein saari functionality uske baare mein batata hai. User model how the user understand the system, how the system work. Toh ek tarah se user ke liye mainly yeh system kaise karya kar raha hai? Kya uski samajh hai system ke baare mein? Uske baare mein baat karte hain. Toh agar hum is poori cheez ko summarize karein toh developing conceptual model involves understanding the problem space. Aur yeh isko samajhne ke liye jaise ki humne bataya alag-alag dhaaranayein hoti hain unke madhyam se karta hai. So being clear about your assumption and the claims jo bhi aapki dhaaranayein aur daawe hain usko aap clear rahiye aur usko aapko is baat pe ensure karna padega ki woh saari cheezein sahi hai. Jo aapki dhaaranayein hain woh bhi sahi hai aur jo daawa kar raha hai woh bhi sahi hai. Specifying how to the proposed system will support system. Toh humein ek tarah se clear tarike se batana hai ki kaise jo bhi upyogkarta hoga woh iska laabh kaise lega jo bhi aapne system banaya hua hai. So a conceptual modeling is a high level uchh stariya description hota hai jo aapka product hota hai in terms of what user will do with it. Kya usse karega aur and the concept they need to understand how to interact with. Kya unko janne ki zaroorat hai agar woh isko use karega, kaise karega? Toh interaction types provides a way of thinking about how the support system activities. Ab jaise humne paradigms, theories, model, framework ke baare mein baat ki thi. And basically yeh provides a way of framing, design and research. Toh agar hum conceptual model ke components ke baare mein baat karein, toh yahan pe kuch core components hain jaise metaphor and analogies. Toh jo roopak hote hain woh roopak aur analogy jo aap usse nikalte hain woh ek tarah se madadgaar saabit hote hain ki user

usko kaise use karega jo uski pehle ki knowledge hai usko kaise wahan pe apply karega. Toh ek tarah se understand what a product is for and how it will use for an activity. Jaise example ke taur par aap browsing metaphor roopak use karte hain. Bookmarking metaphor use karte hain. Concept that people are exposed to through the product. Jaise task domain object they create, manipulate their attribute and operation can be performed on them. Jaise hum saving karte hain, revisiting karte hain, organizing karte hain waghera-waghera. Aur relationship and the mapping between these concept jaise whether one object contain another waghera-waghera toh ek tarah se is cheezon ko aapko madad karta hai toh agar aapko conceptual model banana hai toh aapko kya karna padega? So what will the user doing while carrying out the? Toh aapko dekhna padega ki jab bhi upyogkarta hai aapke system ko use karta hai toh woh kya kaise karta hai, kya karta hai, how will the system support this? Ab aapne jo system banaya hai ya banayenge, woh us karya ko karne mein kaise madad karta hai? Kis tarike se us karya ko kar sakta hai? What kind of interface metaphor if any will be appropriate? Usko karne ke liye jo sampark bindu hota hai, usko aapko kya bolne ki zaroorat hai? Uska naam aapko kya dene ki zaroorat hota hai? Jisse usko padh ke ya usko dekh ke uske turant woh samajh jaaye woh karna kya chahta hai. So what kind of interaction modes and the style used? Toh aap jaise alag-alag tarike ke jo interaction modes hain style hai woh kisko use karega? So always keep in mind how will the user will understand underlying conceptual model. Toh is tarike se aap conceptual model ka nirman kar sakte hain. Toh alag-alag tarike ke way hain usko classify karne ke liye. The best conceptual model are often those that appear obvious and simple, intuitive hona chahiye, sahad hona chahiye, simple hona chahiye, saral hona chahiye and the operation they support are intuitive to use, bahut sahad tarike se usko aasani se jitne bhi usmein operation ya kriya karni hai woh aasani se ho paaye jaise a concrete model based on a core concept of the customer experience when shopping mall underlies most online shopping website. Toh jab bhi aap ek tarah se dekh sakte hain agar aapko kisi online shopping website pe jaana hai toh jo bhi cheezein woh real shopping ke dauran jaanta hai, samajhta hai, jaise karta hai agar woh cheezein hum support kar payenge toh ek bade achhe se aap uska conceptual model ka nirman kar sakte hain. Toh hum interface metaphor ki baat kar rahe the. Toh jo roopak hota hai alag-alag sampark bindu ke liye woh kya hona chahiye? Toh interface design is to be similar to a physical entity but also has its own property. Jaise hum desktop metaphor ki baat karte hain, web portal ki baat karte hain. Toh desktop metaphor ek tarah se hota hai ki jo table hota hai jahan pe aap saari cheezein rakhte hain. Toh usi tarah se aapke computer mein jo desktop ek tarah se hota hai jo pehla interface hota hai jahan pe alag-alag cheezein rakhi hoti hain. Woh ek is tarah se uska roopak liya gaya hai. Similarly web portal ke baare mein aap dekh sakte hain. Kaise jo web hota hai woh aise connected hai. Usi tarike se alag-alag filein internet pe ek doosre se connected hoti hain. Toh uske baare mein ek tarah se aap iska roopak nikaal sakte hain. Usi tarike se aur bhi cheezein jo aap computer mein use karte hain ya mobile mein use karte hain, alag-alag jagah use karte hain. Uska roopak aap kya use kar sakte hain? So can be used, can be based on activity, object or combination of both. So, it exploits user's familiar knowledge. Yeh bahut hi zaroori baat hai. Aapko jo familiar knowledge hai, jo user ko already pata hai, us gyan ko use karte hue, usse relate karte hue agar

koi metaphor use karenge, roopak use karenge, toh aapke upyogkarta ko usko samajhne mein, dekhne mein aasani hogi. Helping them to understand the unfamiliar jo bhi nayi cheezein ya jo bhi cheezein aap apne system mein karna chahte hain bade aasani se usko relate karke woh kar sakta hai. Toh ek tarah se it conjunction on essence of the unfamiliar activity enabling user to leverage this to understand more aspect of unfamiliar concepts. Toh ek tarah se aap dekh sakte hain example ke taur par conceptualizing what user is doing jaise surfing on the web, browsing instantiated at the interface jaise aap bolte hain desktop par humne baat ki thi visualizing an interface for instance icon on shopping cart in which the user places the item. Jaise hum mall mein jaate hain ek shopping cart trolley type ka liye rehte hain. Usmein jo bhi cheezein khareedni hain usmein rakhte jaate hain. Toh agar hum usko digital world mein apne e-commerce app ke through shopping, shopping app ke saath karna chahte hain toh wahan par ek tarah se aap dekhte hain cart button hota hai aur us cart mein aap jo bhi cheezein karte hain na 'add to cart', 'add to cart' kar rahe hain toh ek tarah se us trolley mein virtual trolley mein add hoti jaati hai aur payment ke time pe jab aap payment karte hain toh us trolley mein jitni cheezein hoti hain virtual cart mein jitni cheezein hoti hain saari cheezein add ho ke aap uska payment kar sakte hain. Toh usi tarike se card metaphor hum dekh lein. Jaise hum card hota hai jab advertisement karte hain, batate hain, toh ab usi tarike se us UI ka use karte hue us familiar knowledge ka use karte hue Google ne ek tarah se card banaya restaurant recommendation ke liye aur usmein jo bhi basic cheezein jaise hoti hain ki itna rating hai, kitne logon ne match kiya hai aur ek tarah se kitna aap pehle ja chuke hain waghera jo bhi cheezein jo basic zaroori hoti hain ek photo de deta hai aur waghera-waghera is tarah se cheezein aapko dikha deta hai. Card jo pamphlet jise hum bolte hain pamphlet ki jo understanding hoti hai pehle advertisement ke liye haan is restaurant mein jaaiye yahan pe aaiye toh Google ab us information ko ek tarah se card form mein dikhata hai jisse ki aap apne jo familiar knowledge hai uska use karte hue yahan pe aap usko kar sakte hain. Toh it has a familiar form, the factor it can easily be fixed to sorted waghera-waghera aasani se kar sakte hain. Its structure contain two meaningful chunk. Jaise alag-alag meaningful chunks aap dekh sakte hain yahan pe use kiye gaye hain. Its material properties gives the appearance of a surface on the paper. Toh dikhne mein ek tarah se yeh paper ke upar dikh raha hai. Toh benefit ek tarah se interface metaphor ke hain. Jo roopak aap alag-alag sampark bindu ke liye use kar rahe hain. So it makes learning new system easier. Bahut aasani se naye system ko aap apne purva familiar jo knowledge hai usko use karke aap samajh sakte hain. It help user understand and the underlying conceptual model. Jo bhi vaicharik model hai usko aasani se woh samajh leta hai. And can be very innovative and enable the realm of computers and their applications to be made more accessible to a greater drive. Kaise hum vividh jo hamare upyogkarta hain unki zarooratein hain bade aasani se sahay tarike se sugamtapoorvak hum unko sahyog kar sakte hain. Aisa toh hai nahi ki har cheezein ki achhi cheezein hoti hain. Kuch confusion bhi usse create ho sakta hai. Toh wahi cheezein yahan pe dikhane ki koshish ki gayi hai. Jaise sometime yeh break conventional aur cultural rule jaise yahan pe dikhaya gaya ki computer mein aap dekhte hain toh jo recycle bin hota hai woh aapke desktop ke upar hota hai. But real life mein toh aisa hota nahi hai. Real life mein jo dustbin hota hai woh aap neeche rakhte

hain. Woh apne table ke upar nahi rakhte. But wahi hai ek tarah se can constrain design in the way they conceptualize the problem space, conflict with the design principles. So it forces user to understand only the system in terms of metaphor. Keval metaphor ke madhyam se hi samjhenge toh system ki poori samajh nahi hogi. Designer can inadvertently use bad existing design and transfer the bad parts over, limit designers imagination in coming up with the new conceptual model toh yeh main aapko karya de raha hoon. Aap isko kariyega. So describe the components of conceptual model underlying most online shopping website jaise shopping cart hua, proceed to check out hua, one-click hua, gift wrapping hua, cash register hua waghera-waghera. Toh chaliye ab hum cognitive aspect ke baare mein baat karte hain. Toh ek tarah se perception, attention, memory, kaise yeh jo aspect hai, cognitive aspect hai humein ek achha interface banane mein design karne mein madad karte hain. Perception ek tarah se jo aapka upyog karta hai usko kaise perceive karta hai. Kis tarah ki dhaaranayein woh banata hai. Jaise aap dekh sakte hain ki how user perceive visual and auditory elements of a interface. Kaise jo bhi, kaise jo alag-alag buttons hai usko dekh ke woh apni dhaarna bana ke us pe karya karta hai. Jaise jo interface pe agar play ka button hai toh kaise usko woh play karne ki jo media hai usko play karne ki dhaarna banata hai. Pause karne ki dhaarna banata hai. Humne shopping cart ki baat ki toh shopping cart ko dekhte kaise woh dhaarna banata hai ki aap kisi item ko us cart mein add karna hai. Attention ek tarah se kaise dhyan deta hai? Jo aap nayi cheezein apne user ko dena chahte hain. Jo zaroori cheezein apne user, apne jo upyogkarta hai uska dhyan aakarshit karna chahte hain. Jaise aap website pe sale dikhte hain. Sale, sale, sale ya jo offer hota hai uska ya aap yeh lenge iske saath yeh bhi lenge toh aur 10% extra discount milega. Toh yeh saari cheezein aap saari jo alag-alag aap shopping cart, shopping app use karte hain usmein dhyan diya hoga. Usi tarah koi bhi aap app use kar sakte ho kuch cheezon pe jahan pe jo aapka system hai ya aapka website hai kaise woh aapka dhyan aakarshit karna chahta hai aur kitni aasani se aapka dhyan us pe jaata hai kyunki uski placement, uski size yeh saari cheezein bhi kaafi zaroori saabit hoti hain. Jaise notification of pop up and highlighting error message karte samay kuch galti ho jaati hai. Jaise dher koi form bharte samay mandatory field zaroori hoti hai usmein fill karna lekin aapne bhara nahi hai. Ab jaise maan lijiye main 100 field fill karna tha. Ab usko ek ke baad ek dhoond toh sakte nahi hain. Toh kaise aap jahan pe missing hai us particular part ko red color ya red ya kisi aur color mein highlight karte hain kisi bhi tarike se toh ek tarah se woh attention aapka dhyan aakarshit karta hai. Smriti, kaise hum ek tarah se jo cognitive load hai usko kam se kam kar sakte hain. Jaise ki aap dheron aise form bharte hain. Jaise hum form ka example de rahe the. Usmein aise kaafi aise prashn hote hain jo repetitive hote hain jo aapne already kisi aur form mein bhar rakhe hote hain. Example ke taur par aapka naam, aapka pata, aapka mobile number, aapka email ID waghera-waghera. Toh un speedo fields ko agar already cache screen ke madhyam se jo information meri save ki gayi hai usko already bhar dein toh mere kaam aasan ho gaya mere liye. Toh ek tarah se jo cognitive load hua woh kam hua. Toh auto-fill feature in the online form to avoid re-entering the data. Toh agar usmein se kuch cheez change karni hai toh aap usko edit karke badal dijiye. Lekin usmein se dher saare jo fields the usko already bhar diya tha. Us tarah se hamara kaam aasan ho gaya. Toh enhances user experience and reduces error.

Toh usi tarique se agar hum cognitive aspect ki baat karein toh mental model ek tarah se jo ho raha hai. So align user interface design with user expectation and the prior knowledge. Toh jo aapne mental model banaya uske madhyam se aap dono ko align kar pa rahe hain. Aapka jo upyogkarta hai woh kya soch raha hai aapke system ke baare mein aur aap usi hisaab se uska interface banayenge. Jaise placing a shopping cart item at the top right corner of the e-commerce website. Kyun banaya gaya? Making navigation intuitive and predictable. Toh decision making usi tarah simplifying choices to help user make decision quickly. Jaise example ke taur pe dekh sakte hain. Highlighting the recommended option in the subscription. Subscription plan jo alag-alag subscription plan hai usmein aap kaise difference dikhate hain waghera-waghera toh woh aapko aasan jaise aap dikhate hain jab bhi koi for example ki koi online game pe aap register karna chahte hain toh usmein dikhata hai ki aap 10 din ke liye free mein dikhayenge. Uske baad aapko 1 mahine ka itna pay karna padega. 10 din, ek saal ka itna pay karna padega waghera-waghera. Toh is tarah se agar woh humein clearly pata hoti hain toh hum decision making thoda aasan ho jaati hai. Toh yeh bhi interface ke madhyam se aap dikha sakte hain clearly sab mein kya difference hai. Problem solving toh support user in complex completing the task efficiently. Jaise providing clear step-by-step instruction in the wizard interface. Jab bhi aap naya utpaad system banate hain, naya app download karte hain, toh aap dekhte hain ki ek tarah se aapko step-by-step nirdesh milta hai ki achha aap isko aise kar sakte hain, aise kar sakte hain, aise kar sakte hain aur apne karya ko kar sakte hain. Toh jisse ki hamara overall jo frustration hota hai ya task success rate hota hai woh badh jaata hai. Toh alag-alag jo principle hai jo ki humein is tarah ke interface design mein madad karti hain. Jaise ki Hick's Law hai. Hick's Law bolta hai the time to make decision increases the number of choice. Dher saare choice doge toh of course jo ab usmein samay lagega woh badhega. Toh us tarique se aap is tarique se ek optimal number of kabhi-kabhi yeh bhi hota hai ki aapko saare choice dikhane hai. Aap kaise karenge? Toh usko aap ek tarah se group kar sakte hain. Jo grouping the menu items into category for the easy navigation. Toh aap humein ek tarah se maan lijiye 100 option jo total choices hain usmein se aap unhein 10-10 karke 10 group mein bana diya. Toh ab pehle group karke jo main group mein jaana hai usmein jaayenge. Phir usmein ab 10 option select karenge. Toh is tarah se samay kam lagega. Rather ki aap saare 100 option mein choose karna pade. Toh Hick's Law ek tarah se aapko jo cognitive principle ki hum baat kar rahe hain interface banane mein madad karta hai. Isi tarique se Fitts' Law. Fitts' Law bolta hai the time to target an object depends on its size and distance. Kitna door hai aur kitna bada hai. Toh usi tarique se aap jab dekh sakte hain ki jo bhi alag-alag button aap place karte hain usko aise jagah rakhein aur uski size aise rakhein ki kam se kam samay lage. Toh iska application ek tarah se larger clickable buttons close to the user focus area. Jahan par aap focus kar rahe hain jahan par uske aaspaas rahega toh usko apne us button ko dabane ke liye zyada move nahi karna padega aur uski size bhi appropriate rakhegi jisse ki aasani se usko click kar sake. Usi tarique se agar hum Gestalt principle ki baat karein toh user perspective element as part of whole usko poore ki tarah samajhta hai. Toh kisi tarique se grouping related items control together in the toolbar. Miller's Law ki baat karein toh average person can remember 7 plus minus 2 items in their working, jo unka working memory hai. Aisa toh hai nahi ki aap usmein

saari cheezein yaad rakhe hue hain. Toh ek toh hota hai long-term memory hota hai working memory. Long-term jo bahut pehle se apne yaad, dimaag ke kisi kone mein hai, aap usko koshish karte hain yaad karne ke liye. Lekin jo working memory hoti hai woh jaise RAM ki tarah hota hai. Turant aap wahan se information kar sakte hain. Toh Miller's Law bolta hai ki aap jo recent kiya, jo main cheezein aapke dimaag mein hoti hain 7 plus minus 2, depends on ki aapki capability kitni hai, woh turant aap bata sakte hain. Toh limiting the number of option displayed at once toh aisa nahi karna chahiye ki hum dher saari cheezein dikhayein. Kam cheezein dikhayein jisse ki woh usko yaad rakh sake. Toh iske alag-alag real world vyavaharik jeevan mein examples aap dekh sakte hain. Chahe Google search ho, chahe Spotify app ho, ATM interface ho. Toh jaise hum in sab jo principles ki baat kiye, cognitive principles ki baat ki, woh saari cheezein wahan par apply hoti hain aur logon ne kiya hai usko aise interface banane ke liye jaise minimalistic search with a clear focus on search bar jaise Google search mein toh clear focus wahan pe search mein humein kya dikhana hai, kya-kya option hai, bahut bada simple tarika hai, usi tarike se Spotify recommended tailored user preferences reduces decision making load, usi tarike se ATM mein aap dekhte hain simple workflow on screen in instruction align with a mental model and the ensure usability. Toh, good interface ki in saari cheezon ko dhyan mein rakhte hue agar hum good interface ko batana pade ki aapke interface ko achha banane ke liye kya karna padega, toh yeh characteristics honi chahiye. Usko maanav kendrit hona padega. Usko consistent hona padega. Feedback aapko provide karna padega. Error agar koi hota hai uski handling bade achhe se karni padegi. Aur aesthetic agar appeal hota hai toh aur bhi sundar dekhne mein lagta hai. Dekhne mein lagta hai. Toh is tarike se aap dekh sakte hain user-centric ke liye design with the user needs in mind. Jo aapke upyogkarta hai uski zarooraton ko dhyan mein rakhte agar banayenge toh bada achha rahega kyunki ultimately aap unhi ke liye bana rahe hain. Predictable behavior across the system. Agar consistent hoga toh familiar lagega. Usko aasan lagega, similar lagega aur bade aasani se woh cheez kar lega. Clear response to the user jo bhi aap action le rahe hain uske liye agar kuch kriya de rahe hain, pratikriya de rahe hain toh usko pata ho jaise aapne email bheja toh dikhata hai email sent toh ab aapko pata hai ki mail chala gaya. Usi tarike se error handling jaise user recover from mistake, kabhi-kabhi galti ho jaati hai toh aap undo waghera ka option de karke Google Docs mein ya jaise kar sakte hain. Abhi kaafi samay tak aisa hota tha, galti se agar aapne email bhej diya aur email likhte samay beech mein send dab gaya, chala jaata tha toh bada aap awkward feel karte the, bura feel karte the toh Google ne at least ab woh option de diya hai pichle kuch saalon mein ki aap email agar aapne bheja hai toh kuch chand second aapko deta hai ki usko aap undo kar sakte hain. Pehle hota tha ki aap 'please find attached my CV' waghera-waghera toh yeh badi common galti thi. 'Attached CV' likh diya lekin 'attached CV' ko attach karna hi bhool gaye. Bhej dete the, bhej chala jaata tha. Toh Google ne realize kiya ki bhai isko ab humein achha banana hai toh isko hum handle karne ke liye kya karna padega? Toh jab bhi dekhta tha aap attach is tarah ke word use kiye hain aur aapne attach nahi kiya toh aapko ek alert deta tha ki you forgot to attach the file waghera-waghera. Toh ek tarah se error handling aap bade achhe se kar rahe hain. Aesthetic appeal balance functionality with visual design. Toh agar aap clean karein jaise Airbnb ki humne

baat ki pehle unka design kaisa tha aur ab kitna sundar hai. Minimalistic interface hai toh badi achhi baat hai. So if a user can't use it, it doesn't work. Toh aapko apne user ko use karne dena hai bade saahaj, saralta ke saath, sugamta ke saath. Aur aaj ke time par agar hum naye trends ki baat karein interface mein ab toh bhari AI interface power interface hai jo ki adaptive system for the learn user preference, alag-alag user preference ke hisaab se bana deta hai aur woh poora interface hi aapke liye design kar deta hai based on aapki needs waghera. Multimodal interaction hai jahan pe aap combining jo voice hai, touch hai, gesture, alag-alag jo modality hai unko combine karta hai jaise Google Nest Hub using touch and voice, augmented reality, mixed reality yeh bhi ek tarah se naye tarike ke trend hai. Is tarah se bhi ab interaction kaafi ho raha hai. Toh kaise is sampark bindu jo aapka interface hai iske liye in sab cheezon ko support karne ke liye banaya ja sakta hai. Brain computer interaction, brain computer interaction jo hum karte hain toh uske liye brain computer interface bana sakte hain. Jaise kaise directly communicate between the brain and the device woh saari cheezein aap dekh sakte hain. Jaise Neuralink exploring brain control system. Aur agar hum challenges ki baat karein real world mein interface design ke liye toh humein in cheezon ka dhyan dena hai. Kaise hum jo vividh prakaar ke jo disabilities hain, diverse abilities hain, vividh prakaar ki jo abilities hain usmein hum unke liye hum kaise bana sakte hain? Captioning of hearing impaired users on YouTube. Cross-cultural usability hum kaise bana sakte hain? Jaise interface must work across language and the culture. Toh jaise Google ka translate multi-language UI jo hai ek tarah se ismein madadgaar saabit hoti hai. Humne nijata aur nijata aur ethics, naitikta ki baat ki thi. Toh inke beech mein jab bhi agar aap is pe focus karna chahte hain toh kisi had tak kuch had tak aapki functionality affect hoti hai. Toh kaise aap in dono mein balance kar sakte hain functionality with the user data protection aur hardware ki bhi kuch limitation hoti hai. Jaise designing for devices varying specs, light weight UI for budget smartphone har kisi ke paas toh Apple phone hai nahi. Agar kisi ke paas budget smartphone hai toh kaise hum UI wahan pe handle karte hain, kar sakte hain alag-alag OS ke liye, alag-alag system ke liye, woh cheezon ka dhyan dene ki zaroorat hai. Usi tarike se ubiquitous interface jaise ki humne baat kiya tha ki har taraf hai, adrishya hai toh uske liye hum kaise kar sakte hain? Toh seamless integration with the daily life. This is smart home ecosystem like Amazon Echo, emotion aware interface. Bhari usko dekh ke khushi ho. Toh system that adapt the user emotions, wearable tracking emotion states waghera-waghera aur example ke taur pe aap case study ke taur pe dekh sakte hain. Jaise yeh Oculus hai. So interface features jaise immersive 3D environment for gaming and education, isko use kar sakte hain. Ismein hand controllers hain. HCI contribution yahan par aap dekhenge toh enhances usability by simulating environment application and therapy waghera-waghera kar sakte hain. Education bhi kar sakte hain. Lesson learns a dance of reducing motion sickness, ek cheez jo ki baar-baar complain ki jaati hai aise user se. Prioritizing user comfort in immersive design. Toh un cheezon ko dhyan dene ki zaroorat hai. Aur agar hum interactive activity aapko dein toh aap kariye sketch an interface for a new smart home activity. Identify feature that align with HCI principle and discuss how this interface support usability, feedback and accessibility. Yeh aap kariye. Aur agar hum ab is saptah ko summarize karein, toh humne interface ke baare mein baat ki thi. Humne interaction ke baare

mein baat ki thi ki kaise alag-alag interaction hai. Kaise alag-alag interface hai woh ek doosre ko support karte hain. Toh interface mein humne dekha tha the key interaction of between the user and the system. The point of interaction between the user and the system. A well designed interface facilitate ease of use and intuitive, intuitive interaction. Toh ismein alag-alag key aspect humne discuss kiye usability, feedback, consistency and visual clarity. Humne conceptual model ke baare mein baat ki thi. Jaise mental health represent, representation that users form about how a system work. Help user predict and understand the system's behavior and design goal align the interface with user's existing mental model for better usability. Aur cognitive aspect ke baare mein humne baat ki thi. Kaise user process in these information and make sense of interfaces. Aur iska mahatva ki baat karein toh designing for cognitive efficiency reduces user frustration and error. Aur jo humein cheezon ka dhyan dene ki zaroorat hai. Cognitive load, memory, limitation, attention and the perception. Aur is saptah mein hum tutorial karenge cognitive aspect ke baare mein. Aur hum tools mein Bēhance aur Adobe Express use karenge aur for further reading aage ki padhai ke liye aap in alag-alag resources ko dekh sakte hain aur inse seekh sakte hain aur aap inko dekhiye inse seekhiye aur isi ke saath is saptah mein main aapse alvida leta hoon aur agle saptah mein punah aapse naye topic ke saath aage aaunga. Dhanyavaad.