

## **Human Computer Interaction (Hindi mein)**

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### **Prototyping and Smart UI: Lecture 7**

#### **Lec27**

[Sangeet] Namaskar saptah saat mein aapka swagat hai. Human Computer Interaction ke is saptah mein hum prototype aur smart UI ke baare mein charcha karenge. Prototype ek tarah se namoona hota hai. Jo bhi utpaad ya seva aap banana chahte hain smart UI kaise aap user interface sampark bindu jo hai usko smart tarike se bana sakte hain, change kar sakte hain. Woh hum is saptah mein discuss karenge. Iske pehle hum pichle saptah mein data requirement gathering aur analysis ke upar vistar mein charcha ki thi. Humne yeh discuss kiya tha kaise alag-alag jo data ki zarooratein hoti hain aur kis tarike se yeh humein jo aapke upyogkarta hain unke baare mein janne ke liye alag-alag insight nikalne ke liye alag-alag pattern nikalne ke liye kaise sahayak hote hain. Uske madhyam se hum pata karte hain ki kaise aapke vibhavkarta aapke system ko use kar pa rahe hain ya unko kya dikkato ka saamna karna pad raha hai. Kaise woh apne karya ko kar rahe hain aur dher saare aise useron ke data se hum ek alag-alag insight nikalte hain, pattern nikalte hain, nayi functionality banate hain aur jo humein lagta hai ki in cheezon ko badalne ki zaroorat hai, sahi karne ki zaroorat hai, usko aur improve karte hain. Aur isi wajah se aap dekhte hain ki alag-alag utpaad seva jo aap dekhte hain, woh alag-alag versions mein aapke saamne aate rehte hain. Isi wajah se khaastaur pe jaise aap mobile apps use karte hain toh mobile apps mein samay-samay pe aap dekhte hain ki woh aapko bolta hai ki aapke app ka ek naya version aaya hai aur aap isko update kariye. Toh yeh kya hai? Yeh kuch nahi ek tarah se punravritti ke madhyam se user feedback ke madhyam se jo naye-naye data woh collect kar raha hai uske madhyam se apne app ko further improve karta jaata hai. Apne website ko further improve karta jaata hai. Jisse ki jo upyogkarta hai bade saralta ke saath sugamta ke saath apne saare karya ko bade achhe se kar paayein aur bahut hi kam effort ke saath kushalta purvak aur prabhavshali tarike se apne karya ko kar paayein. Toh humne discuss kiya tha kaise alag-alag tarah ke data hote hain. Alag-alag humne techniques aur tools discuss kiye the. Kis tarah ke data ke liye kis tarah ka tool use kar sakte hain. Humne specifically discuss kiya tha. Hamare paas quantitative data hota hai. Hamare paas qualitative data hota hai. Un tarah ke data pe hum kis tarah ke techniques ke madhyam se alag-alag insight nikalte hain. Toh, yeh humne details mein detail mein discuss kiya tha. Uske baad humne ek case study ke madhyam se yeh further discuss kiya tha. Kaise hum jo BVI student hain jo blind aur visually impaired student hain unki learning ko aur independent kaise bana sakte hain. Humne discuss kiya tha kaise alag-alag modality unke seekhne ki preferences ko darshata hai. Kaise multimodal interface jo hai multimodal

multimodal jo techniques hain uske madhyam se overall unki learning improve ho pa rahi hai kam samay ke saath. Toh yeh sab cheezein humne case study ke madhyam se discuss kiya tha aur humne IRB ke upar kaafi vishesh roop se dhyan diya tha. Humne bataya tha jab bhi hum koi data collect karte hain ikattha karte hain usko use karte hain apne research mein chahe usko apne utpaad banane mein recommendation preference banane mein toh humein usko neetigat tarike se karna bahut zaroori hota hai. Humne bataya tha ki humein gopniyata ka bade achhe se dhyan dena padta hai ki jisse ki hamara upyogkarta ki koi bhi sensitive jaankari kisi aur ke paas na jaaye. Humne discuss kiya tha kaise humein ek fair model banane ke liye ek fair data ki zaroorat hoti hai. Toh kaise jab bhi aap data collect karte hain toh usko fair tarike se sahi tarike se neetigat tarike se usko ikattha karein aur humne is baare mein bhi baat ki thi ki data bias ho sakta hai. Usmein kisi bhi tarike ka agar bias hai toh woh corresponding jo model hoga usmein bhi usi tarike ka bias dikhega. Aur humne is baat par bhi kaafi vishesh roop se charcha ki thi ki hamare paas jo data hona chahiye woh diverse hona chahiye kyunki hamare jo upyogkarta hain woh vividh prakaar ke hain. Woh vividh prakaar ke upyogkarta jo hain woh alag-alag jagahon pe alag-alag demographics ke hain. Alag-alag umra ke hain. Toh unki zarooratein alag hain. Unke har tarah ki cheezein alag hain. Toh is vividhta ko address karne ke liye humein is baat ka bahut achhe se dhyan dena padega ki jab bhi hum data collect karte hain, use karte hain, insight nikalte hain toh woh data ek diverse tarike se ikattha kiya gaya ho. Jismein diverse set of user hone chahiye. Alag-alag persona ke log hone chahiye. Alag-alag stakeholders hone chahiye. Jisse ki hum ek ek combined tarike se bade achhe tarike se aap bana sakein ya jo bhi utpaad aap banana chah rahe hain bana sakein jo upyogkarta use karte samay bhale hi woh alag tarike ka upyogkarta ho hamare system mein usko handle karne ki situation honi chahiye. Toh iske upar humne panel discussion mein vistar se charcha ki thi aur last mein humne ek assignment diya tha aur mujhe aasha karta hoon aap sabhi ne saare prashnon ka uttar bade aasani se de diya hoga. Toh yeh is saptah ki rooprekha hai jismein hum baat karenge prototype kya hai? Prototype ek tarah se namoona hota hai jis jo ek tarah se pratibimb hota hai jo actual system ya seva ya keh sakte hain utpaad aap product use karne waale hain kyunki woh ek tarah se toy product hota hai toy service hota hai jiske madhyam se kaafi limited functionality ke saath kaafi limited feature ke saath woh aapke saamne aata hai jisse ki alag-alag level pe chahe woh user study ke level ke baad apne useron ko jaanna ho aur unki zarooraton ke hisaab se jo aapne low fidelity prototype banayi hai nimn star ka ek namoona banaya hai woh sketch ho sakta hai woh ek simple drawing ho sakti hai woh card paper prototype ho sakta hai uske madhyam se at least hum janne ki koshish karte hain ki agar hum aisa kuch banate hain toh hamare jo upyogkarta hai usko kis tarike se use karne jaa rahe hain. Usi tarike se ab ismein jaise-jaise hum aage badhte hain aur jaise-jaise hum apne useron ke feedback ko handle karte hain, hum higher level ka prototype banate jaate hain aur ultimately woh higher level ka prototype badhte-badhte actual product ka roop le leta hai. Toh hum iske baare mein vistar se charcha karenge. Phir hum baat karenge ki prototyping interaction design mein kya role play karta hai? Uski kya zaroorat hai. Uske baad hum smart UI user interface ke baare mein baat karenge. Humne baat ki thi ki user interface ek tarah se interface woh sampark bindu ya antar falak hota hai jiske madhyam se jo maanav hai manushya hai woh

upkaranon ke saath ya computer ke saath, mobile ke saath ya jo bhi aapne utpaad banaye usse interact karta hai. Uske pehle ke saptah mein humne detail mein discuss kiya tha. Alag-alag tarike ke interaction types hote hain aur un alag-alag tarike ke interaction type ko handle karne ke liye hamare paas alag-alag tarike ke sampark bindu hote hain jiska humne vistar se saptah paanch mein discussion kiya tha. Uske baad is saptah mein hum ek prototype ke upar ek tutorial lenge aur hum ek panel discussion bhi karenge prototype ke upar. Prototype kisi bhi utpaad ko maanav kendrit maanav kendrit system ka solution banane ka ek aham bindu hota hai aur bina aap prototype ke apne useron ko apne upbhogtaon ko achhe se samajh nahi sakte hain unki zarooratein kya hai. Jaisa ki humne pehle bhi discuss kiya tha. Kabhi-kabhi yeh aasan nahi hota hai jaanna ki aapke upyogkarta ki zarooratein kya hain aur kaafi zarooratein hum jab woh prototype se use karte hain, prototype ke saath khelte hain, usko upyog mein laate hain, tab woh zarooratein nikal ke aati hain. Kabhi-kabhi agar hum apne upyogkarta se poochein ki aisa existing solution already hai. Aap usko use karte samay kya-kya dikkato ka saamna karte hain? Toh yeh again jab unse poochte hain toh shayad woh nahi batate. Lekin jab hum unko observe karte hain kaise real environment mein natural environment mein us ko use kar rahe hain toh as a designer as a expert hum woh samajh paate hain designer ke lens se design ke lens se ki unhein kya-kya samasyaon ka saamna karna pada unhein kya jo hum functionality hum dena chahte hain jo hum unse button dabana chahte hain kisi karya ko karne ke liye kya hum unko koi news flash kar rahe hain unko dikhana chahte hain kya unko timely dikh raha hai toh ek hum jab achha interface banate hain toh in baaton ka bhi dhyan dete hain ki keval functionality ke liye button hone ki zaroorat nahi hai. Us pe jo text hai woh hone ki zaroorat nahi hai. Usmein aur bhi dher saari cheezein hoti hain. Jaisa ki humne discuss kiya tha interface metaphor hona chahiye. Jo ek tarah se roopak hota hai kisi bhi functionality ke baare mein batane ke liye jaise browsing find search play stop is tarah ke aap ek tarah se alag-alag roopak use karte hain. Toh chaliye aage badhte hain aur is saptah mein hum prototype aur smart UI ke upar discussion karte hain. Toh chaliye start karte hain. Toh jaisa ki humne bola ki yeh is saptah ki rooprekha hai. Chaliye sabse pehle jaante hain ki prototype kya hai? Prototype ek tarah se jaise maine bataya ek namoona hota hai, ek manifestation hota hai jo ki alag-alag jo aapke stakeholder hain, woh unse ek tarah se interaction establish karne mein madad karta hai. Toh in other design fields jaise prototype jo hai ek simple miniature car ho sakta hai. Jaise agar hum baat karein agar aapko car banana hai. Jaise agar aapko ek camera banana hai. Aapko ek manager building ya town banana hai ya is tarah se digital hand banana hai toh alag-alag tarike se simple sa hai. Yeh ek tarah se prototype is the conversation you have with your ideas. Jaisa ki Tom ne bola tha ki aapke mann mein dheron navachar ho sakte hain, vichaar ho sakte hain. But woh kitna feasible hai, kitna real hai, kitna log usko pasand kar rahe hain. Logon ki zarooratein hain. Kitne had tak usse poori ho rahi hain. Yeh tabhi ho sakta hai jab actual system nahi kyunki actual system banana toh bahut hi time taking costly process hai. Toh wahan tak toh aur usko humne bana liya toh phir humne user se baat toh ki nahi. Humein ek final level ka product ya seva banane ke liye humein uske pehle apne users ko alag-alag level par alag-alag tarike se alag-alag environment mein involve karna padega. Jisse ki hum unki zarooraton ko jaan paayein. Unki samasyaon ko jaan paayein. Unki taakaton ko jaan

paayein. Toh aisa hamara aim hota hai. Toh prototype ek tarah se ek tarika hota hai jisse aap apne ideas ko kuch had tak reality mein laate hain. Jo ki ek tarah se keh sakte hain try example hota hai. Ek simple sa namoona hota hai jisse kuch limited functionality ke saath jo upyogkarta hai woh dekh sakta hai, chhu sakta hai, prayaas kar sakta hai, karya kar sakta hai. Toh uske pehle jab bhi hum prototype banana chahte hain toh hamare vichar jo ki ek tarah se kaafi aspasht hai jo ki kaafi vague hai. Hamare vague ideas ko ek tarah se jab kuch concrete banana hota hai, kuch tangible banana hota hai toh us case mein humein kuch prototypes banane ki zaroorat padti hai. Toh conceptual design ke madhyam se jaisa ki humne pehle bhi discuss kiya tha. Conceptual design ke madhyam se initial phase mein jo design process where the foundation ideas and structure are online outlined toh hum ek tarah se hamara jo focus hota hai establishing a high level framework for what people can do with a product how a system will function and interact with the user toh is framework ke madhyam se hum chahte hain ki jo upyogkarta hai aapke system se sampark banaye aapke system se converse kare samvaad kare usse alag-alag jo bhi functionalities possible hai usko karne ki koshish karein. Zaroori nahi hai ki woh saari functionalities complete honi chahiye prototype level pe. At least at least aap usmein kehte hain ki aisa bhi kar sakte hain ki zaroori nahi ki functionality karein. Aap ka jo interface hona chahiye woh ek tarah jaise aap aise maan ke chalein ki aapko ek prototype banana hai jismein aap claim kar rahe hain ki hum AI ke madhyam se hum AI ke madhyam se agar aap mujhe koi resume denge toh main job description se uski matching karke aapko bata dunga ki yeh suitable hai ki nahi. Toh in reality jab actual product ya service aap banayenge toh woh aapka interface ek tarah se resume lega ya set up resume lega. Usko job description ke corresponding process karega. Uski suitability aur match nikalega aur aapko batayega ki yeh rank list of resume hai jo ki is job profile ke liye suitable hai. Toh actual system mein yeh saari cheezein jo hongii usko resume ko parsing karna, usse information extract karna, usko job description se match karna aur finally usko rank order mein likh ke dena. Yeh saari cheezein AI ke through hongii. Lekin prototype ke time pe aap assume kar sakte hain ki woh jo functionality aap aadmi se karate hain jaisa aap real life mein karte hain. Toh ek tarah se user ko ek tarah se feel aa jaata hai ki hum aisa input denge aur humein aisa output milega. Theek hai? Actual functionality hum samay ke saath usko aadmi ko AI se replace kar sakte hain. Dono ko hybrid mein use kar sakte hain. Jo bhi best tarika hoga. Toh is tarah se aap dekh sakte hain conceptual design defines the core concept user interaction and the system requirement before detail design begins. Kyunki jab hum detail design aur development baad mein shuru karenge uske pehle humein at least pata hona chahiye ki hamara jo user hai uski aashayein kya hai? Uska lakshya kya hai? Aur usko apne core concept, interaction aur system requirement ke hisaab se humein align karna padega. Aur hamare system ki jo detail design hogi woh unke aashaon aur unke zarooraton ke anuroop hogi. So understanding problem space and current requirement. Toh yeh conceptual design ke madhyam se hum problems samasya jo kshetra tha usko achhe se samajhne ki koshish karte hain. Unki zarooraton ko samajhne ki koshish karte hain. Uske hisaab se hum jo problem hai usko define karne ki koshish karte hain. Aur apne jo upyogkarta hain unki unse sahanubhuti dikhate hain. Sahanubhuti dikhane ke liye hum dekhte hain ki unki zarooratein kya hain? Unki challenges kya hai? Unki

pareshaniyan kya hain? Aur yeh humein ek tarah se boost karta hai alag-alag navachar aur jo brainstorming charcha ke madhyam se hum uske baare mein aur janne ki koshish karte hain. So mood board make capture desired feel and consider alternative scenarios prototypes help. Ab jaise alag-alag aap jab solution banate hain toh for example ek functionality ke liye aapke paas do interface hai. Aapko lagta hai dono achhe hain. Dono achha lekin jo maanav ki maansikta hoti hai, maanav ka jo behavior hota hai kaafi alag hota hai. Isko pata karna bahut hi mushkil hai. Toh best tarika hai ki aap unhin se feedback lein. Toh aapne do achhe alternative banaye. Aapne jo aapko upyog karte hain unko diya aur unse poocha ki aap kaun se design ko ya interface ko kisko zyada pasand karte hain. Toh us tarike se aap jo alag-alag jo alternatives hain woh prototype ke madhyam se do alag prototype aapne banaya aur aapne dekha ki kis tarah ke prototype ko zyada tar ya kis tarah ke scenario ko zyada tar aapke upyogkarta pasand karte hain. Toh ismein key concept conceptual designing and prototyping hai defining goals kyunki jab tak aap apne uddeshya ko achhe se paribhashit nahi karenge aap uske anusaar kaam nahi kar sakenge. Toh ismein hota hai ki what is the primary objective of your prototype is prototype jo hum banana chahte hain uska mukhya uddeshya ki kya hum isko bas isliye banana chahte hain ki log door se dekh lein. Kya hum isliye banana chahte hain ki kuch log isko touch karke feel kar rahe hain. Kuch log aisa bhi karna chahte hain. Kuch functionalities ko woh apne se chala ke dekhna chahte hain kitna achha chal raha hai. Kis tarah se kitni sugamta purvak woh aasani se use kar pa rahe hain. What problem does it address? Kis tarah ki samasyaon ka woh samadhaan kar raha hai. Jab ek baar humne apne uddeshya ko paribhashit kar diya toh humein apne jo bhi upyogkarta hai unki zarooraton ko achhe se samajhne ki zaroorat hai. Unko khojne ki zaroorat hai. Jaisa ki humne bataya kuch zarooratein toh woh khud se bata sakte hain. Kuch zarooratein aisi bhi hoti hain jo ki aapko dekh ke observe karke samajh ke literature survey karke expert se discussion karke pata karni hongii. So what are the core task and interaction the users should be able to perform woh cheezein aapko dekhne ki zaroorat hai. Outlining features toh which features are crucial in this phase jaise prototype ke case mein humne bataya ki zaroori nahi ki saari full fledged functionality ho. Lekin at least prototype ke time pe hum kin functionality ko at least unko dikhana chahte hain, karya ke liye dena chahte hain. And what functionality should be included. Toh woh cheez humein ek keh sakte hain ki alag-alag constraint ke hisaab se choose karni padengi aur apne jo upyogkartayein hain unko deni padegi. User interaction model? So how will users interact with the system? Kaise alag-alag upyogkarta kis-kis environment mein phone jo bhi system use karenge. Jaise example ke taur pe humne mobile phone ka example diya tha. Agar aapko yaad ho toh Henry Dreyfuss ne example diya tha ki koi bhi designer successful tab hota hai jab woh ek tarah se jab alag-alag characteristics ko good characteristics ko follow kare. Humne baat ki thi so it could be ridden upon, sat on and basically alag-alag dher saari humne aisi baatein ki thi. Toh zaroori nahi hai ki jo mobile phone hum agar example ke taur par baat karein toh keval hum phone par baat karne ke liye kar rahe hain. Isko hum jeb mein rakhte hain. Isse map ke liye use karne ke liye apne dashboard pe lagate hain. Isko hum kabhi-kabhi gusse mein utha ke maar bhi dete hain kisi ko. Tab bhi robust hona chahiye. Bachha isko phenk deta hai. Gir jaata hai haath se. Kabhi-kabhi hum iske upar baith jaate hain, so jaate hain. Toh, un saare

cheezon mein achhe se karya karna chahiye. Toh is wajah se yeh dekhna bahut zaroori hai ki how will the user interact with the system. Toh yeh cheezon ka user interaction model alag-alag tarike se jis bhi tarike se woh interaction kar raha hai woh humein dekhne ki zaroorat hai. And what is the user journey? Kaise woh apne poore jeevan mein poore journey mein alag-alag tarike se usko use kar raha hai. Information architecture ki koi bhi hum system banate hain toh chaaron taraf data hota hai. Alag-alag tarike ke data jaise ki humne pichle saptah mein discuss kiya alag-alag data hai hamare paas alag-alag phase mein alag-alag iteration mein alag-alag user ka, alag-alag system ka data hai, user ka data hai aur dheron aise data hain. Toh kaise hum usko achhe se structure karenge, kaise hum usko use karenge, save karenge, secure karenge. Yeh saari cheezein humein information architecture mein dekhne ki zaroorat hai. Uska information ka flow kya hoga? Yeh saari cheezein yahan pe dekhne ki zaroorat hai. Toh agar hum is tarike se dekhein why conceptual design important in prototyping, it clarifies scope. Kyunki ek tarah se jo aapka scope hai, jo daayra hai, usko achhe se clearly batane ki koshish karta hai. It helps in focusing the primary user interaction without getting lost in the detail. Kyunki user ko hum nahi chahte ki woh detail mein kho jaaye. Usko jo mukhya karya karna hai usko achhe se karne ki zaroorat hai. Aur zaroori nahi ki hum saare possible cheezon ko handle karen. At least jo hum kar sakte hain given the constraint chahe woh internet ka ho chahe woh paise ka ho chahe bandwidth ka ho chahe latency ka ho woh saari jo bhi constraint hone chahiye uske hisaab se jo cheezein aap kar sakte hain aap clearly define kariye apne scope ko ki main is seva ya utpaad ke madhyam se keval yeh yeh saari cheezein kar sakta hoon. Baaki cheezein hum future scope mein discuss karenge. So guides development toh ek tarah se humein ki hamare paas clear direction hoti hai toh hum aaram se low fidelity to high fidelity prototypes bana sakte hain. Toh yahan pe lo uhh lo star ka nimn star ka feed prototype high fidelity prototype matlab ek tarah se uhh star ka prototype toh lo matlab uhh nimn star ka jo prototype hoga woh kaafi crude hoga kaafi rough hoga kaafi simple hoga jaise ki keval ek tarah se aapke jaise humne baat ki ki prototype ek tarah se aapke idea se communicate karne mein help karta hai. Toh yeh aapki idea ka ek bahut hi abstract version hoga jo ki dikhayega ki kya kar sakte hain us case mein jaise humne bataya ki ek simple ek cardboard ho sakta hai woh simple ek sketch ho sakta hai design ho sakta hai aur jaise-jaise hum upar jayenge low fidelity to mid fidelity to high fidelity finally hum apne jo actual product ya seva hogi uske aur paas hote jayenge toh ultimately hamara aim hota hai ki hum user feedback lete jaayein unki zarooraton ko samajhte jaayein unki zarooraton ke hisaab se change karte jaayein aur finally high fidelity ek high end keh sakte hain ki prototype namoona banayein jis jo kaafi had tak dikhne mein karya karne mein actual system jaisa lage. It enhances communication. So act as a shared vision of stakeholder, designer and developer. Kyunki yahan par saare log involved hain. Designer hai jo ki design karna chahta hai. Developer hai jo ki us design ko dekh ke development karega. Koding karega. Stakeholder jo ki user hoga woh apne user perspective se drishtikon se batayega ki usko kya chahiye kya karna chahta hai usko use karne mein kya pareshaniyan ya dikkato ka saamna karna pad raha hai aur jo entrepreneur hai jo apne idea ko lekar aaya hai ho sakta hai ki jo jiske paas yeh idea ho woh technically savvy na ho woh utna designer na ho woh keval apne user ko ki zarooraton ko samajhta hai uske hisaab se

apne navachar ke madhyam se apne idea ko laaye toh ek tarah se yeh saare log milke ek common ground pe aate hain aur aise namoone ke namoona ya keh sakte hain ki prototype ka nirman karte hain jo ki upyogkarta aaram se use karke bata sake ki haan uske prototype se satisfied hai ki nahi hai. Uski zarooratein पूरी हो रही है कि नही हो रही या isko bhi use karne mein usko kisi bhi tarah ki samasya ka saamna karna pad raha hai. It reduces risk since it identifies potential problem early. Kyunki jitna jaldi aap samasya ko pata karenge utna jaldi uska samadhaan karenge aur woh aage propagate nahi hoga. Aap isko is tarike se dekh sakte hain ki jaise agar koi samasya aapko early stage mein kisi bhi tarike se miss ho gayi aur woh aage jaati gayi jaati gayi jaati gayi jab aapne product launch kar diya. Agar kisi tarike se aapko us samay pata chala toh aapko phir se saari cheezein ek tarah se major scale pe major overhaul karna padega aur jo ki bahut hi dikkat ki baat hai. Isliye better hoga jitna zyada se zyada problem aap early stages mein pata kar paayein. Early prototype mein pata kar paayein utna hi achha aapke liye hoga aur utna hi robust utna hi achha system aap apne upyogkartaon ko de payenge. Toh ek tarah se identify potential early problems. Samay bachata hai saving time and resources in later design stages. Toh chaliye example ke taur pe dekhte hain ki in developing a prototype for a health app. Agar humein health app ka ek prototype banana hai. The conceptual design follows would outline. Jitne bhi core user task hai jaise ki aapko appointment book karna hai ya aapko apne symptom ko track karna hai. Navigation flow from home screen to detail health record jaise aap home screen se start karte hain aur kaise-kaise apne health record ko dekhte hain ya past jo aapne visit kiye the doctor ko us samay ka dekhte hain aur essential feature such as search personality and reminder jaise ki aapne appointment book kiya hai aapko probably kuch samay pehle reminder aa jaaye ki haan is din aapko appointment ke liye jaana hai. Kuch information aapko search karni hai. Jaise agar aap kisi health app pe jayenge toh wahan pe hazaron doctors hain. For example Practo ke upar toh aap kis doctor ko dikhana chahte hain? Toh kaise aap bade saralta aur sugamta ke saath apne zarooraton ke mutabik se doctor ko choose kar sakte hain. Search kar sakte hain. So ek tarah se conceptual design is a blueprint. Ek tarah se khaaka hota hai for successful prototype. Ek tarah se aisa namoona banane mein jinke saath aap khel sakte hain. Apne karya ko kar sakte hain. Ensuring that prototypes are aligned with user needs and the system goal. Aur yeh humein ismein bhi ensure karne mein madad karta hai ki jo humne prototype banaya hai, woh hamare idea se kitna match karta hai. Hamara idea tha ki humein is tarah ke user ko is tarah ki functionality deni hai jisse woh aasani se kar paayein. Toh kya woh prototype usko fulfill kar pa raha hai? Kya woh prototype usmein usko karne mein madad kar pa raha hai? Toh ek tarah se conceptual design aapke paas jo bhi idea tha is idea ko aapne conceptual design kiya. Usse aapne low prototype low fidelity prototype, high fidelity prototype, mid fidelity prototype aur finally launch kiya toh agar humne is journey mein alag-alag stakeholder ko sahi samay pe sahi feedback leke handle kiya toh hamara jo launch hoga woh successful hoga otherwise woh fail hone ki sambhavna hai. Toh jaisa ki humne bataya ki interface metaphor ek bahut hi aham role play karta hai. Toh kaise hum choose karen? Interface metaphor combine familiar knowledge. Kyunki iska roopak ka matlab hi hota hai ki aapko koi cheez pata hai. Uski uska example deke ya uska baare mein bata ke aap batana chahte hain ki yeh yeh karta hai. Toh jaise metaphor

combine familiar knowledge with new knowledge in a way that will help the user understand the product. Ki kyunki aap uska jo paryay hai usko achhe se jaante hain. Toh agar hum uska roopak leke aapko batayein ki dekhiye yeh jo cheez hai is jo aap pehle se jaante hain wahi hai. Bas uska naam alag hai ya naam bhi same hai. Functionality same hai. Toh ismein three steps hote hain. Understand functionality, identify potential problem areas and generate metaphor corresponding to that. Toh ab hum metaphor ko jo bhi humne banaya evaluate kaise karein? Uska mulyankan kaise karein? Toh dekhna padega how much structure does it provide. How much is relevant to the problem. Kyunki jab bhi hum metaphor use karte hain at least jis problem ke liye kaam kar rahe hain usse relevant toh hona chahiye. Agar aap poori tarike se vipreet koi cheez use karein toh it doesn't make sense. Uska koi matlab nahi reh jaata hai. So is it easy to represent? Kya isko hum aasani se represent kar sakte hain? Will the audience understand it? Kya aapke jo bhi stakeholder hai, upyog karta hai, usko samjhenge. Uska matlab samjhenge. How extensible is it? Agar yeh saari cheezein achhe se hoti hain, toh hum bolte hain ki hamara jo metaphor tha woh achha tha. Otherwise aur better karne ki zaroorat hai. Toh humne jaise baat ki thi ki hamare paas alag-alag interaction and interface types hain. Toh jaise hum is example ke taur pe dekhein which interaction type humein use karna chahiye. Toh jaise how do user invoke action. Jaise hum yahan pe ChatGPT ka agar example dein toh ChatGPT ke example mein aap dekh sakte hain aapne invoke kaise kiya? Aapne ek prashn poocha who is your co who is your founder? Toh ideally dekhiyega toh agar your ka usne apne se matlab samajh liya jaise hum coreference resolution NLP mein padhte hain. Toh your yahan pe reference refer kar raha hai ChatGPT. Nahi toh how user invoke action. Toh usne phir koi instruction diya, converse kiya, manipulate kiya, explore kiya, respond kiya. Yeh humne alag-alag instruction type seekhe the. Toh yahan pe kaise kiya? Yahan pe ek tarah se usne converse karne ki koshish ki. Yahan pe usne converse karne ki koshish ki aur usne bola who is your founder? Toh us tarike se toh do different interface types provide inside shareable, tangible AR and so forth. Ab jaise yahan pe yahan pe jo interface tha usne conversation wala jo tha uske hisaab se usne bataya I was created by OpenAI and AI research organization. OpenAI was founded by several notable figures in tech industry. Shayad aapko na pata ho. Elon Musk bhi iske one of the cofounder the. Baad mein woh company se nikal gaye alag-alag reasonon se kyunki ChatGPT ko for non profit company se for profit company bana diya gaya Sam Altman aur uske baaki logon ke dwara. Sam Altman jo ki again one of the notable figure hain. Toh yeh jo Y Combinator ki hum baat kar rahe the uske former president bhi reh chuke hain. Toh aise waise aadmi nahi hai. Similarly Greg hain, Ilya hai jo ki again researcher co-founder hain. Aaj ke time pe shayad woh apni khud ki educational company bana rahe hain. AI based John hai aur isi tarike se yeh saare log hain jin logon ne milke ChatGPT ko banaya. Toh yahan pe aap dekhenge toh alag-alag interface jo output aaya ek toh text ke form mein aaya. Yahan pe agar aap isko click karenge toh accessibility jo humne learn ki thi jo koi banda dekh nahi sakta uske liye read aloud ek tarah se isko jo bhi response aaya woh bol ke sunayega. Yahan pe alag-alag jo frequent feature ho sakte hain jaise frequent feature hai. Jab bhi aap ChatGPT se kuch poochte hain toh jo response aaya aap usko copy karte hain. Uske baad usko edit karte hain jo bhi karte hain. Toh agar usko immediate copy karna ho toh aap is button

se copy kar sakte hain. Aur again yeh jo read aloud hai ek tarah se metaphor hai. Yahan pe copy jo hai ek tarah se metaphor hai. Ab yahan pe dekhiye jaise humne baat ki thi ki jo visibility honi chahiye clear honi chahiye. Ab jaise yeh by default like button dikha raha hai. By default unlike button ya dislike button dikha raha hai. Ek tarah se yeh ek tarah se regenerate button dikha raha hai. Agar aap is pe click karein toh matlab ek tarah se yeh bata raha hai more details aur bhi option aapke paas aa jayenge. Toh ek tarah se aapne dekha ki yahan par conversation interaction ko support karne ke liye kitna behtareen ek tarah se interface inhone banaya hai aur apne jo bhi karya karna hai kar pa rahe hain aur yahan pe again saare design jo knowledge hai us sabko unhone paryay banaya. Ab is level ke interface ko banane ke liye unhone kai prototypes banaye honge. Pehli baar toh keval yeh banaya hoga. Phir unhone jab user interact karne lage honge toh unhone bola hoga ki aapka jo response hai bahut bekaar hai. Mujhe dislike button chahiye toh yeh add kiya hoga. Kuch logon ne bola bada achha hai. Mujhe like karna hai toh like button kiya hoga. Kuch log bola mujhe copy karna hai toh copy button diya hoga. Ab ismein accessibility feature daalni hai. Jo log padh dekh nahi sakte unke liye read aloud ka feature diya. Toh is tarah se alag-alag alag-alag user ko consider karte hue is poore interface ka design banaya gaya hai. From low level prototype to high level prototype dheere-dheere badha gaya hoga. Toh expanding the initial conceptual model. So what what functions will the product perform? Toh ek tarah se what will the product do and what will the human do? Toh ek tarah se human kya karega? Woh kuch had tak input dega, prashn poochega aur product kya karega? Woh ek tarah se uttar dega. Uska kuch solution nikalega, kuch information process karega. Aur human phir kya kar sakta hai? Feedback de sakta hai ya satisfy ho sakta hai ya unsatisfied ho ke kuch aur prashn pooch sakta hai. So, what are the functions related to each other? Sequential hoga, parallel hoga. Toh, yeh depend karta hai ki alag-alag alag-alag jaise functionality hogi. Kuch had tak yeh parallel bhi ho sakta hai. Kuch had tak yeh sequential bhi ho sakta hai. Categorization for example all action related to privacy on a smartphone. Similarly what information is needed? So what data is needed to perform the task. Similarly how is the data to be transformed by the system. Toh yeh saari cheezein ek tarah se initial agar aap conceptual level model ko aur badhayenge toh in sab factors in sab baaton pe aapko dhyan dena padega. Toh concrete design conceptual design mein hum mainly ek tarah se ek dhancha banate hain. Concrete design mein hum usko kuch concrete matlab thos banane ki koshish karte hain. Ab us jo hamare paas ek tarah se vague idea tha conceptual design ke madhyam se humne uska rough dhancha banaya. Ab us rough dhaanche ko further aage badhate hue uska humein kuch concrete banana hai. Toh agar isiliye aap antar dekhenge the difference between conceptual and concrete is emphasis. Kiska emphasis zor kis pe zyada hai. So many aspect of the concrete design. Ab yahan pe hum color, icon, button, interaction, device saari cheezon pe aur detail mein baat karte hain. User characteristics and the context. So inclusive, input, output, mode yeh saari cheezon pe hum detail mein baat karte hain. Concrete design mein accessibility. Ab yahan pe alag-alag jo guideline jaise WCAG guideline hai us pe bhi zor diya jaata hai. Prototype mein probably aap miss kar sakte hain. But going forward jab aap actual system banate hain, high level design banate hain toh usmein usko include karenge. Cross cultural design jaise language color, icons, information, architecture, indigenous

knowledge and perspective. Toh ek tarah se concrete design mein emphasis jo hota hai woh thoda sa real product ki taraf le jaane ka hota hai. Aur conceptual design mein phir bhi thode bahut vague cheezein hoti hain. Kuch cheezein bade abstract level pe hoti hain. Kuch cheezein thoda sa bade ek tarah se halke level pe hoti hain. Toh generating prototypes toh jaisa aap kai tarike se kar sakte hain. Aapko yeh scenario de sakte hain. Jaise breakdown scenario in to steps create a scene for each step agar aapko banana hai toh yahan pe sketch out a story board from design to think about design issues toh yahan pe aapke paas generate a card based prototype from a story board of from a use case. So consider each step in each step in use case what interaction element is related block card. Toh ek tarah se aap dekhenge ki kaise jo problem aapko di gayi hai usko aap alag-alag steps mein kaise karenge. Jaise yahan pe pehla jo step hai Thomas family gather around Claire joins remotely. Toh ek tarah se aapne dikhaya ki yahan pe yeh saare ikattha hue aur yeh jo Claire tha woh remotely join kiya. Right? Will tells their initial idea. Toh yahan par jo yeh Will hai woh initial idea jo uska tha usne bataya system suggest flotilla toh system ne ek tarah se bataya ki aap is tarah se flotilla bana sakte hain. Uske baad phir ek tarah se system shows description. Toh is tarah ki jo bhi description thi system ne aapko bataya. So Will ask for more details. Will ne jab aur detail bataya toh usne jo bhi detail dena tha de diya. Uske baad kyunki yeh Claire remotely join ki thi toh ek tarah se usko ab detail bhejna hai toh ek tarah se yeh details email send toh ek tarah se ek tarah se aap isko story board ke madhyam se kaise ek ke baad doosra step ke baad teesra step yeh jo bhi conversation ho rahe hain ek story ke form mein aap present kar pa rahe hain. Ab uske baad again yeh thoda sa keh sakte hain ki bade low level pe aap low prototype low fidelity prototype level pe aap yahan pe isko dikhaya hai aapne. Ab isko further karna hai toh aap isko proper ek tarah se iska interface banayenge. Uska user interface banayenge. Uska functionality add karenge. Saari cheezein karenge. Toh isi tarike se card base prototype pichla wala jo tha woh story board ke tarike se tha aur agar aapko generate karna hai prototype low fidelity card base toh aap kuch is tarike se kar sakte hain ki alag-alag card hai aur usmein aapka jaise where do you want to go toh aap uske baad destination yahan pe karte hain. So uske baad aap batate hain ki when your passport was issued aapki nationality kya hai? Why are you going? Jaise tourism ke liye business ke liye the purpose of my trip is jo bhi tha. Is tarah se agar aap dekhenge toh aap ek card based prototype banate hain. Jahan pe low cost ideation, low cost ideation, quick user feedback, collaborative design yeh saari cheezein aap kar paate hain aur user se feedback le paate hain prashnon par, aapke initial design par yeh saari cheezon par. Toh explore the user experience. Tab hum apne jo upyogkarta hai uske anubhav ko hum kaise explore karenge janne ki koshish karenge. Toh humne pehle discuss kiya tha humein persona banane ki zaroorat hai. Toh you can use persona card base prototype and stickies to model the user experience. Us tarike se aap ek tarah se aap isko bana denge. And visual representation called design map, customer journey or user journey map. Toh kaise aapka jo upyog karta hai alag-alag phase se aage badhte hue apne karya ko karta hai aur sabhi ke liye aap apna alag-alag persona ke liye alag-alag jo bhi card prototype bana rahe hain woh aap bana sakte hain. Toh is tarah se aap experience map bana sakte hain. Aur iske do common representation hai wheel ke saath aur timeline ke saath. Isko hum aage aur detail mein discuss karenge. A design

map is more about structuring the system while experience map is focus on the users emotion and behavior journey. Toh design map jaise hum poore system ke baare mein baat karte hain. Experience map hum primary jo upyog karta hai uske baare mein baat karte hain. A design map is more about structuring the system. While experience map is focused on users emotion behavior. Yeh humne abhi pichli slide mein bhi baat ki thi. Aur user journey maps are task focused and linear while experience map provide a holistic emotion and multi touch point view of the entire user experience. Toh kahan-kahan aapka user alag-alag interface se alag-alag pages ke madhyam se kaise woh navigate karta hai. Apne karya ko poorn karta hai. Toh woh ek tarah se aap dekh sakte hain entire user experience map mein aa jayega. Toh chaliye user experience map ko thoda aur detail mein dekhte hain. So an user experience map is a prototype that is visual tool that represents users entire journey. Jab woh system ko use karna start kiya aur kaise apne karya ko poora kar pa raha hai woh ek tarah se uske entire user journey ki baat karta hai when interacting with the product service or system. It capture the user experience emotion motivation jo bhi dikkato ka saamna karna pad raha hai jo bhi key touch point hai jahan jahan woh interact kar raha hai jo bhi interface sampark bindu hain across stages of interaction kyunki kai baar kai tarike se woh interact kar raha hai apne karya ko poora karne ke liye system pe onboard hone ke baad woh saari cheezon ko hum experience map mein include karte hain. So experience maps are often created during the prototype phase to help designer and stakeholder understand the full context of user experience. So humein ek bada achha holistic view dikhata hai. Kaise jo user hota hai woh samay ke saath poore alag-alag faces ke saath aage badhta hai aur apne karya ko complete karta hai. Allowing them to identify the areas of improvement or innovation. Aur jab unko dekhta hai ki aapka jo user hai jab poore journey ke dauran kahan par woh frustrate hota hai. Kahan par woh apne karya ko bade jaldi se kar leta hai. Kahan pe apne karya ko karne mein usko struggle karna padta hai. Uske basis pe aap improvement aur further innovation kar sakte hain. Aapko lagta hai ki koi karya woh baar-baar karta hai toh aap wahan par kuch shortcut bana sakte hain aur repetitive aise task ke liye. So experience me provide a comprehensive view of user journey, identify gaps, prioritize focus area, maintain user centered design and evolve with user feedback for continuous improvement toh humein apne jo user hain upyogkarta hai usko kendra mein rakhte hue kaise hum unke feedback ke hisaab se continuous feedback ke hisaab se hum continually apne prototype ko bhi apne system ko bhi improve karte hain. Yeh bahut dekhne ki zaroorat hai. Har upyogkarta ki alag-alag zarooratein hain. Unmein se kuch bahut zaroori hain. Kuch pe aap baad mein karya kar sakte hain. Toh unki jo priority hai usko bhi dhyan mein rakhte hue apne system ka nirman kar sakte hain. So tools for creating experience map including Miro, Mural for visual mapping, UX Pressia and Smaply for specialized journey map and Adobe XD, Sketch for visual journey. Toh alag-alag toolon ke madhyam se aap aap is user journey map ko bana sakte hain. Toh an experience map can be drawn as a timeline to the or wheel jaisa humne pehle bataya tha is suited to different types of user journey. Toh timeline wahan pe zyada upyogi ho toh jahan pe linear tarike se a linear format emphasizing a chronological sequence of year. Ek ke baad doosri cheez hoti hain. And ideal for experiences with a clear start and clear end. Jahan pe humein pata hai ki hum yahan se start karenge. Yahan pe khatam karenge. Jaise ki

e-commerce mein app mein aap onboard karta hai. Apne item ko search karta hai. Usko dhoondta hai. Uske baare mein jaanta hai. Uske baad usko cart mein add karta hai. Phir uska payment karta hai aur apne ghar pe deliver karata hai. So it helps in identifying gaps visual dependency and create step by step narrative. Jabki wheel ke case mein wahan pe jahan pe yeh ek tarah se cyclic cyclical format focusing on repetitive or iterative task jahan pe woh cheezein baar-baar karti hai. Jaise yahan pe aapne koi item order kiya toh phir usko dobara jaake usi ko order nahi kar rahe hain. So it processes wheel ke case mein ideal for ongoing interaction like loyalty program. So it highlights continuous interconnectivity and bottleneck in recurring stages. Toh jaise credit card payment ka dekh sakte hain. Ek baar credit card payment kiya phir dobara karega. Phir teesri baar karega. Har baar credit card payment ke baad aap usko kuch points de rahe hain ya cashback de rahe hain. Toh woh saari cheezein agar aap dekhein toh ek tarah se wheel ke taur pe agar uska pichla experience aapke platform ke through card payment ka achha raha toh dobara aayega. Otherwise wahin se woh chala jayega. Toh credit ka jo humne example diya tha wahan par aap is user experience map ko wheel mein fit karke aap dekh sakte hain. Toh jaise yahan pe ek wheel ke madhyam se experience map ko drawn karne ki koshish ki gayi hai. Jaise yahan pe aap dekh rahe hain before, during aur after. Toh yahan par user experience mein aapko primarily teen face mein divide kiya gaya hai. Jaise yahan pe jo customer hai passenger hai. So he through airport express train to airport check in at Paddington train station receive ticket book ticket contact travel depot. Toh ek tarah se yeh saari cheezein karta hai apne journey ko start karne ke pehle. That's why it's called before. Toh yeh saari cheezein ek tarah se journey start karne ke pehle woh karta hai aur ek baar journey start ho gayi toh usmein kya karega? Board kar lega. Safety procedure follow karega. Take off karega. Probably seating wide comfort seat pe jaana chahega. Sleep in fold out beds pe karna chahega. Movie dekhna chahega. Toh yeh saari cheezein woh poore apne yatra ke dauran kar sakta hai. Yatra ke baad kya karega? Yatra ke baad woh kya karega? Hotel jo uska book hai wahan jaana chahega aur meet driver ko meet karega. Customer fast track, luggage collection karega. Jo bhi usne saamaan check in kiya tha usko lene ki koshish karega. Immigration karwayega. Short walk in airport jo bhi yeh saari cheezein ek tarah se uske baad hongai. Toh ek tarah se yeh chaar cheezein kai baar hoti reh sakti hain. Toh ek tarah se uska experience map as a wheel kiya hai. Aur experience mein map as a timeline jaise humne saamaan e-commerce se saamaan khareedne ki baat ki thi. Usi tarike se yahan pe aap dekh sakte hain ki agar slide mein ka presentation dena hai ya usmein changes karne hain. Toh kaise yahan pe sequence timeline ki tarah us pe kiya gaya hai. Toh aap is example ko phir se dekh sakte hain. Toh user experience map ki baat karein in summary toh timeline is the best for capturing experience that unfold a clear linear order and allowing detailed analysis of each steps progression while is suited for visualizing ongoing or repeated process jahan pe us process ko baar-baar kiya jaata hai. Showing the interconnected nature of the user experience as a continuous journey. Toh timeline example ka example hai booking a flight online with stages from search to booking to payment and finally to post flight feedback wheel ke case mein loyalty program for a retail store where the journey cycle through the earning point redeem awards and re-imagining repeating in a loop. Chaliye, ab aapko kuch physical prototype bhi

banane pad sakte hain. Jaise Arduino board kaafi popular hai. Toh, build a code prototype using electronics. Toh, alag-alag toolkits available hain. Jaise Arduino hai, LilyPad hai, Sense board hai, BBC micro hai and so on. So, yeh basically design hai for wide range of people for wide range of applications. Toh in sabko banane ke liye aapke paas ka often SDK hota hai. Software development kits hote hain. Toh jo programming tool hote hain, component to develop for a specific platform jaise iOS, Android open ya is tarah se aur toh yeh kya include karte hain? Ek tarah se integrated development ID hote hain, documentation hote hain, drivers hote hain, sample code hote hain, applications hote hain, application programming interface hote hain, API jiske madhyam se aap code ke madhyam se communication kar sakte hain. Jo aapka libraries hai. Make development much easier. Jaise example ke taur pe Amazon ka Alexa skill set hai. Voice based services ke liye. Apple ka AR kit hai. Microsoft Kinect SDK hai. OpenAI ke bhi API hain jo ki aap unke models ko use karna chahte hain apne system mein. Toh is tarike se abhi tak humne ek prototype ke baare mein ek charcha ki ki prototype hota kya hai? Kaise woh use hota hai? Aur kaise woh ek tarah se aapke jo alag-alag upyogkarta hain unse samvaad banane ki koshish karta hai? Aur prototype ek tarah se jaisa ki humne bataya jo bhi idea vague idea aapke dimaag mein usko ek tarah se concrete roop dene mein aapki madad karta hai. Toh chaliye ab jaante hain prototype interaction design ke andar kya hai? Ki hum hamara jo mukhya purpose hai human centered design banana. Human centered system banana jahan pe interaction hota hai alag-alag jo uske upyog karta hai aur system ke beech mein. Toh in interaction design a prototype can be a series of screen sketches jaisa humne pehle bataya story board jaisa humne pehle bataya a cartoon like series of scenes ek Power Point slide bhi ho sakti hai a video simulation ho sakta hai lump of wood hota hai simple Palm Pilot ki tarah a cardboard markup bhi ho sakta hai a piece of software with limited functionality written in target language or in another language itself jisse ki aap jaldi-jaldi usko kar paayein aur ek namoona bana paayein jisse ki aapka upyogkarta uske saath interact kar sake, use kar sake. Toh prototype banane ka fayda kya hua? Jo bhi aapka idea tha usko aap jaldi aap jaldi se jaldi usko test kar sakte hain. Us pe mulyankan karke apne user ka feedback le sakte hain. Stakeholder jo bhi hain woh usko dekh sakte hain. Keval aapke idea ko sunne ki bajaye aap usko dekh sakte hain. Hold kar sakte hain. Interact kar sakte hain. As compared to aapko bhi jo document aapne bheja hai ya jo aapne drawing batayi hai. Identify usability issues earlier. Jo bhi upyogita mein badhayein hoti hain unko jaldi samajh ke unko baare mein pehle se hi karya kar leta hai. Iterate design based on the user feedbacks kyunki hum apne alag-alag upyogkartaon ko alag-alag prototype ke madhyam se unse interact kar rahe hain. Toh alag-alag upyogkartaon ki jo bhi dikkato ka saamna karna pad raha hai. Unke jo feedback hain unki zarooratein hain unko hum samajhne ki koshish karke usko incorporate karte hain. So team members can communicate effectively. Ki kyunki yeh concrete hai toh team members bhi aapas mein achhe se batchit karke changes suggest kar sakte hain. Ek doosre ko unki madad le sakte hain. Protective increases reflection and important aspect of design. Toh ek tarah se reflect karta hai actual jo system hoga. Prototype answer questions and support designer in choosing between alternative. Toh jaisa ki humne pehle bataya ki kabhi-kabhi aap same karya ko karne ke liye alag-alag tarike se kar sakte hain. Alag-alag design

bana sakte hain. Toh kaun sa prototype zyada better hai yeh aap user se feedback leke choose kar sakte hain aur user us pe apne karya ko kar sakte hain. Toh kis tarah ke prototype hote hain? Mukhyat ek tarah se teen tarah ke prototype hote hain. Low fidelity prototype jise hum bolte hain nimn stariya namoona. Mid fidelity prototype jo ki uchh stariya aur nimn stariya prototype ke beech mein kahin aata hai. High fidelity prototype jo ki kaafi close hota hai actual system ke actual jo aap banana chahte hain. Toh yahan pe fidelity jo bol raha hai fidelity refers to kitna close hai kitna similar hai kitna samaan hai jo prototype aapne banaya hai jo actual system baad mein aap launch karenge toh different types of prototypes are used depending on the project force phase and objective jis bhi phase mein hai aur jo bhi aapka uddeshya uske hisaab se aap prototype choose kar sakte hain dikha sakte hain aur jaise ki maine bataya fidelity refers to how close the prototype resembles the final product in details and interactivity toh prototype should be quick and dirty jisse ki jaldi se jaldi bana ke jaldi se jaldi apne user se feedback le paayein. The important part of part is learning not artifact. Yahan pe seekhna zaroori hai. Yahan pe mukhya uddeshya hamara apne user ko jaanna zaroori hai. Unke baare mein jaanna zaroori hai. Jisse ki aap aage ke iterations mein bade achhe se unke zarooraton ke mutabik changes kar paayein. Toh chaliye start karte hain alag-alag prototype se. Toh pehle hum start karte hain low fidelity prototype. Yeh bahut hi simple, rough and often haath se banaya gaya sketches aur model hota hai. Yeh early stages mein use hota hai design process ke to brainstorm ideas. Jo bhi aap charcha ke madhyam se alag-alag vichaar hain jo in prototype low fidelity prototype ke madhyam se aap jaldi se jaldi feedback lete hain. It's a quick cheap and easily change. Kyunki yeh bade jaldi se banaya gaya. Bade saste mein banaya gaya keval ek kaafi low level ka prototype hota hai. Isko achhe bahut aasani se change bhi kiya ja sakta hai. Alag-alag feedback ke hisaab se. Toh ismein dher saare techniques hain. Paper ke madhyam se kar sakte hain. Paper sketches kar sakte hain. White board drawing kar sakte hain. Card sorting kar sakte hain. Post it notes ke through kar sakte hain. Wizard of Oz kar sakte hain. Wire frame using basic tools like pen paper or sticky notes kar sakte hain. Alag-alag tarike hain. Aur usko support karne ke liye dher saare tools hain jo ki aap use kar sakte hain. Jaise Adobe Express use kar sakte hain. Paper prototyping kits use kar sakte hain. Sketch use kar sakte hain. And so on. Toh ek tarah se jo paper prototypes hote hain allows you to get ideas out quickly and changes them even quicker. Toh kis tarike se aap depend karta hai ki jaise aapka uddeshya kya hai aur aapka timeline kya hai us hisaab se aap alag-alag technique aur tools use kar sakte hain low fidelity prototype banane ke liye. Jaise example ke taur pe Adobe Express is a user friendly cloud based design tool for creating visual stunning graphics, videos and web pages offers pre-design template and drag and drop interface for quick and professional result. Toh aap isko try kar sakte hain. Iska humne hands on experience bhi demo ke madhyam se diya hai jisko aap dekh sakte hain. Toh key features ismein Adobe Express mein dekhiye jaise hain. Template yahan pe available hai. Yeh yeh bahut hi aasan hai use karna. Ismein alag-alag creative tool hai. Jaise access to font stock images and filter for unique designs. Aur yeh cross platform access isko kar sakte hain. Seamlessly switch between the desktop and mobile. Bahut aasani se aap kahin bhi changes karke doosri jagah dekh sakte hain. Aur collaboration karna isse bahut aasan hai. Jaise share and

co-edit project in real time jisse ki ek se zyada log milke is kisi bhi product prototype ko bade aasani se bade tezi se bana paayein. Toh use cases in HCI toh prototyping UI design quickly for stakeholder presentation crafting use journey visuals for experience mapping. Toh jaisa bola gaya hai Adobe Express ke baare mein with Adobe Express creativity is just a few clicks away baaki se alag kaise hai? Toh because no prior design knowledge required. Aapki agar bahut zyada design knowledge nahi hai tab bhi aap bade aasani se is par onboard karke is par karya kar sakte hain. It integrates with Adobe Creative Cloud for advance option. Adobe Creative Cloud mein dheron aise dher saare tools hain jahan pe aap isko saath mein integrate karke use kar sakte hain. Save time while delivering professional quality outputs. Toh aap bade kam samay mein professional level ka aap karya kar sakte hain Adobe Express ke madhyam se. Toh amazing tool hai. Aapko must try karna chahiye. So real world example aap dekh sakte hain. Small business marketing, educational use, content creation, bahutere aise dher saare keh sakte hain examples hain jahan pe isko use kiya ja sakta hai. Toh Adobe Express ke baare mein aur bhi jaankari ke liye aap in resources ko dekh sakte hain. Aur agar aap ke mann mein koi prashn aa rahe hain toh aap is feedback form ko bhi bhar sakte hain. Aur jo ki directly Adobe ke researchers ke dwara uske employees ke dwara usko dekha jayega aur aapse directly samvaad kiya jayega aur ho sakta hai ki woh aapko further opportunity Adobe mein dene mein bhi sahayak ho sakte hain. So hands on using Adobe Express toh jaise yahan pe design mockup for mobile app using express process for design process using drawing art generative technology using text to template LLM ka ek tarah se use karke rewrite various text into professional style project word to create brush using Adobe Express features toh yeh saari cheezein aap dekh sakte hain. Bahut hi laabhkari aur bahut hi achha tool hai yeh aur aapko bilkul isko use karna chahiye aur apne feedback share karna chahiye kyunki who knows ki aapko ek bahut achhi opportunity iske madhyam se Adobe mein mil paaye. Toh chaliye hum dobara project pe aate hain jahan par hum prototype banane ki baat karte hain. Toh jaisa ki hum har week mein apne lectures mein hum baat kar rahe hain ki kaise hum jo bhi cheezein hum seekh rahe hain apne project WAVE jo ki hum visually impaired students ke liye aur corresponding teachers organization ke liye hum jo banana chahte hain kaise bana sakte hain. Toh hum chaliye aaj is vyakhyan mein is saptah mein iske prototype ko banane ke baare mein baat karte hain. Toh toh ismein aap dekh sakte hain ki yeh ek tarah se iska low fidelity prototype hai. Ek tarah simple design keh sakte hain jismein hum dikhana chahte hain each glove consists of three flex sensors three button vibrator. Theek hai? Vibrator guide users gesture if gesture detected the sensor value signals are transmitted. Ek tarah se aapko yaad hoga Braille mein humne baat ki thi six dots hote hain. Agar aap isko number de de 1 2 3 4 5 6 toh depend karta hai ki aapne kis number ko activate kiya hai. Corresponding letter type hoga. Toh yeh aapke ek tarah se vibration se jo bhi gesture aap aap kar rahe hain uske basis pe woh detect karta hai aur batata hai ki aapne kaun se kaun se dot ko activate kiya. Usi hisaab se signal combined are matched and with translated with the Braille data aur ek tarah se custom gestures are also mapped to the set shortcuts. So translate script is and displayed on the screen. Jo bhi aapne Braille character type kiya hai woh aapke fingers ke movement ke hisaab se wahan pe type ho jayega. Toh is tarah se aap dekhein for low fidelity prototype sabse pehle humne ek tarah se

hand drawn low fidelity prototype banaya Braille learning website ke liye ki jab aap Braille learning seekh rahe hain toh ek tarah se simple haath ke madhyam se unhone ek tarah se sketches banaye ki yeh ek tarah se prototype hoga aur aisa hum kuch jaise ismein hello Manya yahan par connect karne ke liye yeh karenge. Practice mode select karne ke liye yeh karenge aur learning mode select karne ke liye yeh karenge. Jab aap practice mode click karenge toh yeh saare option aayenge aur jab aap learning mode select karenge toh yeh saare option aayenge. Toh usi tarike se yahan pe aap dekh sakte hain jab aap yeh select karte hain toh yeh hoga. Us tarike se dikh raha hai. Ab ab hum iski conceptual modeling karte hain ki kaise work karega? Kya hoga? Toh conceptual modeling pipeline for Braille learning app. Toh ek tarah se aap iska conceptual modeling ho gaya. Yahan se aap start karenge. Aapke hand ki gesture ke hisaab se analog value sensor hoga. If signal recognized toh woh phir aage transmission for converse karega. Text to speech karega. Shortcut karega aur hoga. Agar woh recognize nahi kar paata toh woh phir se woh karya karega aur bolega ki aap phir se apne input ko dijiye aur hand gesture ko kariye jisse ki main aapke dwara likhe gaye Braille character ko identify kar paaoon. Toh usi tarike se conceptual task flow for using Braille learning website and that. Toh usko aap dekh sakte hain ki kaise woh poora process conceptual model ke through kiya gaya hai. Aap kar sakte hain. Jaise aap pehle aap sabse pehle yeh glove jo humne banaya hai woh pehnenge. Connect the glove to the system using wire. Uske baad website ko kholenge. Connect the Arduino karenge. Uske baad select mode karenge. Learning mode hai ya practice mode hai. Toh learning mode mein aap yeh saari cheezein karenge aur practice mode mein aap yeh saari cheezein karenge. Uske hisaab se aapki jo learning hai woh complete hogi. Yeh task flow ke madhyam se conceptual task flow ke madhyam se humne isko dikhane ki koshish ki. Chaliye wapas aate hain low fidelity prototype mein. Toh jo gloves humein banana tha toh humne ek tarah se is tarike se banaya aur kuch is tarike se karya karega. Toh dekh rahe hain na toh ismein flex sensors hain. Teen humne idhar laga diye. Teen idhar laga diye aur yeh teen aur yeh teen ek tarah se in six dots ko represent karta hai. Depend on ki aapne kaun si activity ki hai uske hisaab se woh corresponding jo sensors hain woh activate ho jayenge aur woh corresponding jo Braille letter hai woh likh diya jayega. Toh ek tarah se iska saamne ka view hoga. Yeh iska side view hoga. Kuch aisa dikhega. Toh hand drawn low-fi model mein aap dekh sakte hain ki variable glove with flex sensor to detect finger folds and buzz with haptic feedback aur drawback hai high cognitive load since user is unaware of the finger mapping toh ismein practice ki zaroorat hai thodi bahut aur kabhi-kabhi jab aap banate hain toh humne bataya ki aap ek se zyada possibility ho sakti hai kisi bhi cheez ko karne ke liye toh alternative low fidelity bhi aap bana sakte hain. Toh ek tarah se agar aap yahan pe pichle pehle ek banaya tha aur yahan pe ek alternative low fidelity banaya. Yahan pe aise hona chahiye. Jaise yahan bolt hona chahiye. Yahan pe tensile wire hona chahiye. Yahan microwave controller hona chahiye. Jaise ki yahan pe dikhaya gaya hai. So this model use skin friendly adhesive bolt and tensile wire to detect finger pull based on wire tension. Toh iske drawback hai dekhiye lacks haptic feedback require visual for bolt placement and calibration toh uske basis pe aap kar sakte hain low fidelity prototype mein jaise ki humne bataya tha aap story board bhi kar sakte hain toh similar to this example aap yahan pe project WAVE ke liye bhi story boarding bana sakte hain.

Story boarding mein jaisa humne pehle discuss kiya tha. It is series of sketches using how user might progress through a task using the product of often use scenario and bringing in more details and chance to role play. Toh story board mein aap dekh sakte hain. Toh jaise is case mein yahan aap alag-alag cheezein use kar jaise logon ke liye use kar sakte hain aur transfer receive dene ke liye use kar sakte hain. Aur alag-alag toh ek tarah se yeh bhale hi aapko bahut zyada design ki knowledge na ho. In sab cheezon ko aasani se use karke aap ek tarah se story board bana sakte hain. Kis stage mein kaun hai? Aage kya kiya? Phir usse kya hua? Yeh saari cheezein keh sakte hain. Toh story board ek tarah se low fidelity prototype of realize on sketching and don't be inhibited about drawing ability. Jaisa ki humne bataya simple yeh symbols use kariye aur apne karya ko kariye. Uske baad prototyping with index card. Toh, yeh humne pehle bhi discuss kiya tha. Is tarike se aap index card ke madhyam se aap low fidelity prototype bana sakte hain. Toh main chahta hoon ki agar aapko card prototype hamare is project WAVE ke liye banana pade toh aap sochiye aapko kaise banana padega ya koi bhi project jo aap kar rahe hain uske liye kaise banana padega. Toh low fidelity put of often relies on sketching. Jaise ki humne dikhaya index card three to 5 inches. Each card represent element of interaction evaluation can step through the cards. Aur Wizard Oz prototype hai jiska example humne pehle bhi diya tha. Yahan pe user sochta hai ki woh computer se interact kar raha hai. Yeh jo user hai usko lagta hai computer interact kar raha hai. But a human is responding rather than computer. But iski jagah ek tarah se aap dekh sakte hain ki jo karya computer karna chahiye tha prototype mein yeh ek user usko karke deta hai deta hai toh ek tarah se dekha jaaye toh prototype tak ke liye toh theek hai lekin agar isko actual launch ke time par bhi aap aisi karein tab toh phir galat ho jayega. Abhi pichle hafte hi ek news aayi thi. Microsoft dwara ek company thi UK ki. Agar main galat nahi hoon toh usmein 700 million Microsoft ne invest kiye. Uska idea tha ki yeh AI base company jab bhi aap koi karya dete hain usko toh yeh AI jo model hai woh us karya ko karke de deta hai. But us company ne kya kiya tha? Us company ne jab us company ko koi karya milta tha toh woh backend mein ya peeche ki taraf uske paas 100 aise researcher the ya AI engineer the jo ki Bharat mein based the woh us karya ko dete the. Ek tarah se inhone yeh galat kiya. Kyunki inka daawa tha jo hum claim pichle saptah mein padhe the. Daawa tha ki inka jo system hai woh AI ke madhyam se is karya ko bade kushalta purvak prabhavshali tarike se kar sakta hai. But actual mein ho kya raha tha? Ho yeh raha tha jab bhi usko karya milta tha woh in engineers jo ki India mein engineer shift mein baithe hue hain turant usko karke wapas bhej dete the. Abki usko human kar rahe the toh uski quality bhi thodi achhi thi. Agar AI model utna achha nahi kar raha tha. But woh claim karte the ki yeh AI ne kiya hai aur yahin par dikkat ho gayi. Aaj woh company ne bankruptcy file kar diya. Microsoft ne 700 million dollar jo invest kiye the woh aise ke taise ho gaye. Toh yeh ek tarah se unhone Wizard Oz jo ki keval prototyping ke liye hona chahiye tha. Unhone actual system mein usko use kiya jisse ki yeh poori company toh ek tarah se cheating tha. Toh prototype ke liye theek hai but actual launch ke liye aap aise use nahi kar sakte. Aapko inform karna padega aisa ho raha hai. Ek baar low fidelity prototype ho jaaye toh uske baad aap usko next level pe user jo bhi aapko feedback mile hain aapke upyogkartaon ke dwara low fidelity prototype pe usko mid fidelity prototype mein usko incorporate karke ek better thoda

sa aur achha prototype aap banayenge. Yeh thoda sa more detail hota hai low-fi se aur yahan par jo inka zor hota hai woh structure layout and flow pe hota hai without any final visuals thoda bahut use kar sakte hain but not the final one usually include gray scale wire frame with some interactive elements toh kuch element ho sakte hain ki karya na kar rahe ho example ke taur pe aap dekh sakte hain a wire frame of websites main page showing navigation links and and a basic interactivity without visuals. Toh alag-alag iski technique hai. Aap digital wire frame use kar sakte hain. Clickable wire frame use kar sakte hain. Basic navigation and workflow testing kar sakte hain. Toh dheron iske paas tool hain. Mid fidelity prototyping ke liye. Aap Axure use kar sakte hain. Figma Adobe XD, Adobe Express, Sketch yeh saari cheezein use kar sakte hain. Example ke taur pe agar hum apne project WAVE ki baat karein toh pichle low-five fidelity mein aapne dekha tha ki humne keval sketches banaye the. Ab yahan mid fidelity prototype pe humne gray scale ek tarah se thoda sa structure less interactive yeh banaya. Toh yahan par aap dekh sakte hain yeh Braille learning tool hai jismein aapne Braille learning tool mein jo bhi learning mode aapne select kiya yeh practice ka hai. Yeh learning ka hai. Uske basis pe aapne practice mode mein letter A likha hai aur learning mode mein jo letter B hai usko aap type karne ki koshish kar rahe hain. Yahan pe aapka progress rate dikhayega jaise aap progress kar rahe hain. So mid-fi prototype strike a balance between simplicity and the usability. Yeh poori tarike se upyogi nahi hai. Upyogita complete nahi hai jo ki aap high fidelity aur launch mein use karenge. But simple hai aur at least ek trade off hai dono ke beech mein balancing you iterate effectively. Toh aap jaise yahan pe dekh sakte hain mid fidelity prototype mein yahan pe low fidelity mein kuch aisa tha aur high fidelity mein humne kuch had tak ismein kiya. Aap dekh sakte hain ki saare wire connected nahi hai aur kuch had tak kuch saare connection poori tarah shayad complete nahi hai. Toh ek tarah se humne rough ek tarah se prototype bana diya. Aur uske baad agar hum aage badhein high fidelity prototype mein toh yeh it resembles closer to the jo actual product aapka hoga system hoga toh it's detailed and the polished prototype that closely resembles the final product in terms of visual and interactivity. Ho sakta hai ki again kuch functionality missing ho. But jitne had tak possible ho sakta hai woh usko incorporate karne ki koshish karega. Toh is high fidelity prototype mein mid fidelity mein jitne bhi aapko feedback mile the aapke upyogkarta ke dwara usko bhi incorporate karenge aur yahan pe high fidelity prototype banate samay usko aur bhi achha banane ki koshish karenge. So use for usability testing and the final final design validation. Toh iske liye bhi alag-alag technique hain. Pixel perfect UI design, fully interactive with animation and real data and high level user interaction testing. Aur agar hum tools ki baat karein toh Adobe XD, in Figma, proto.ai, Adobe Express yeh saare dher saare tools hain jo aapko madad karte hain ek fully connect functional prototype banane ke liye. Jaise aapko agar mobile banking app banana hai. So showcasing a final UI color scheme user interaction yeh saari cheezon ke saath aap usko kar sakte hain. Toh ek tarah se hum dekhein toh ek tarah se yeh high fidelity prototype tha aur uske baad high fidelity prototype se hum kaise low fidelity prototype se hum kaise high mid fidelity prototype banayein aur finally hum high fidelity prototype banayein. Jahan pe aap dekh sakte hain saare connections waghera bhi hain jo ki pehle ek tarah se missing the. Toh is tarike se humne dekha ki alag-alag aapke jo

exam projects honge usmein aap low fidelity prototype kaise banayenge? Mid fidelity prototype kaise banayenge aur high fidelity prototype kaise banayenge. Yeh nimn star, madhya star aur uchh star ke jo bhi namoone aapko banane hain aapke product ke liye, service ke liye aap usko kitne achhe se bana sakte hain yahan pe aap dekh sakte hain. Jaise low fidelity mein initial sketches of Google search home page to determine layout simplicity aur mid-fi mein jaise hum wire frames of Netflix streaming interface for test navigation before visual design. Aur hi-fi fully interactive Uber app prototype testing real time interaction do humne yahan pe teeno ke alag-alag example de rakhe hain. Toh aapke liye ek homework yeh hai ki iske liye aap mid fidelity aur low fidelity bhi likhiye. Iske liye aap low fidelity aur high fidelity bhi likhiye. Aur iske liye aap mid aur high fidelity dono likhiye. Toh humein kabhi-kabhi alag-alag compromise karne padte hain prototype banane ke liye. Tabhi toh woh ek namoona hai na ki ek poori tarike se actual system aur yeh compromise aapko alag-alag reasonon se karna pad sakta hai. Chahe woh scope ho, chahe focus ho, chahe resource ho, chahe paise ho, chahe time ho alag-alag wajahon se. Toh for software based prototyping there may be slow response. Jaise aaj ke time pe kai aap aise services banate hain jo GPU based hain jo ki mehenge hote hain. Toh prototype ke time pe aap non GPU based system bana sakte hain jo ki slow hoga aur actual jab deployment hoga toh hum GPU ke madhyam se usko aur tezi se kar lenge. Sketchy icons limited functionality bhi ho sakti hai kyunki saari functionality ko prototype ke time pe karna impossible hai. Toh aap keval ek limited functionality ke saath prototype mein aage badh sakte hain. In the while prototype operation but not necessary robust. Toh uski proper testing nahi ho rakhi toh mulyankan nahi ho rakha hota hai. Is wajah se yeh utna robust nahi hota. Usmein galti ke chance zyada hote hain. Kuch ke cases mein crash bhi ho sakta hai. Toh do common types of compromises ho sakte hain. Ek horizontal hota hai, ek vertical hota hai prototype ko jaldi se complete karne ke liye. Toh, horizontal prototype mein hum kya kehte hain? Provides a wide range of horizontal. Provides a wide range of functionality. But kisi bhi functionality ko bahut detail mein hum nahi jaate hain. Kaafi little details with minimal details hum provide karte hain. Vertical mein hum ek iska doosre tarike se karte hain. Toh yahan pe hum provides a lot of details only for a few jaise dher saari functionality unmein se keval hum kuch ke liye dher saari details denge aur baaki functionality ke baare mein utna detail mein baat nahi karenge. Toh it compromise in prototype must be must not be ignored. Product needs engineering. Toh aap iska ek hybrid version bhi soch sakte hain ki agar aapko banana hai toh horizontal aur vertical ke beech ka bhi kuch bana sakte hain. Woh aapke upar hai. So prototype is a conversing with conversing you have with your idea jaisa ki humne Tom ne pehle bataya tha earlier slides mein. Toh vertical prototype ke case mein jaise humne bataya yeh in-depth exploration hota hai. Aap keval kuch functionalities features ko lete hain aur usko kaafi detail mein batate hain aur kaafi jo bache hue feature hai usko ignore kar dete hain. Toh focus on building a complete feature or function in detail prioritizes depth over breadth allowing you to explore a single functionality in detail and interaction fully helps in understanding technical feasibility and usability of a specific feature. Toh example ke taur pe creating a prototype of a search function on an e-commerce. Toh ek tarah se ab e-commerce mein aapke paas dheron possible functions ho sakte hain. So this vertical prototype might include

everything from search input filtering search result to product details. However the e-commerce app may not have adding the cart functionality. Toh ek tarah se hum uske baare mein baat nahi kar rahe. Vertical mein hum keval yeh wali jo upar wali feature hai usko as detail mein hum kar sakte hain. Search wale pe hi zyada focus kar sakte hain. Toh iske dekhiye benefit yahi hai ki it provide a detailed look of detailed look of one aspect keval ek aspect jaise search wale ki hum baat kar rahe hain toh search ko jitne exploration aap kar sakte hain jitne detail mein aap ja sakte hain jitne tarike se search kar sakte hain woh saari functionality dega but baaki functionality ke baare mein baat nahi karega. It useful for testing specific interaction jaise is case mein search ke baare mein baat kar rahe hain aur getting user feedback is case mein search ke baare mein feedback milega. Achha nahi mujhe toh is tarike se bhi search karna aata hai. Mujhe is tarike se bhi search karna aata hai. So it helps in identifying technical constraint early. Toh agar usmein search karne mein kuch technical constraint aate hain toh aapko shuru mein pata chal jayega. Jaise abhi toh aap search likh ke kar sakte hain, bol ke kar sakte hain. Image de ke kar sakte hain. Ab aap bolein ki mujhe bas soch ke search karna hai. Toh bhai yeh toh feasible nahi hai. Toh ek tarah se jo technical constraint hai aap apne user ko align karte hue shuru mein bata sakte hain. Nahi bhai abhi sochne ke basis pe aap product ko search nahi kar sakte. Aapko batana padega chahe likh ke chahe bol ke chahe photo dikha ke kaun se iska ek tarah se hai lack of holistic view of overall experience abki hum saare features ko nahi bata rahe hain toh ek tarah se poore system ka holistic view usko nahi mil paata hai. Time consumer to develop a detailed protect for every feature toh bhale hi aap ek do feature ko hi fully develop kar rahe hain lekin usko poori tarike se possibility se develop karne mein bahut samay lagta hai toh yeh relatively zyada time consuming hota hai. So good design means making something intelligible and memorable. Great design means making something memorable and meaningful. Toh agar hum horizontal ki baat karein toh jaise humne baat ki it focuses on representing a bread broad range of features with minimal details. Ab hum kisi features ko bahut detail mein hum jaise bolenge search toh search bhale hi chaar tarike se possible hai but yahan pe keval text base search kar dega. Text mein bhi aap fix jo words hain usko sahi se match karein. But natural language mein aapne shortcut de diya abbreviation de diya toh search nahi karega. But cart bhi karega. Cart ko collide kar dega. Usmein ek tarah se modification karne nahi dega. Toh broad range of functionality karega but uske saare details possible nahi honge. So it prioritizes breadth over depth and giving an overview of the system's entire interface and the feature. Toh useful for evaluating the overall user experience and interface flow. Example ke taur pe dekh sakte hain. Creating a prototype for the entire navigation flow of a mobile app without delving into the details of each function. It may show the main screen navigation element and general layout of an e-commerce but not all the possible pages. Not all the depth corresponding pages for those. Toh ek tarah se dekh sakte hain jaisa humne baat ki toh iske benefit dekhiye yeh hain. Yeh ek holistic view provide karta hai system ka aur interface ka. It useful for assessing navigation, layout and overall flow. Facilitates understanding how user will interact with the various features. Ab theek hai woh text ke liye search kar pa raha hai toh bol ke ya usko natural language mein hum theek hai usko extend kar denge. Cons lacks the depth needed to evaluate specific feature in detail aurki hum in depth

feature nahi support kar rahe hain kisi functionality ke liye toh usko evaluate karna test karna mushkil hai. It may overlook technical constraint toh bolne ke liye toh yeh bola ki sab kar denge humne text ke liye kar diya humne uske liye kar denge aawaz ke liye kar denge image ke kar denge. But usko karna utna aasan nahi hai. Text ka usmein thoda aasan ho. But jaise hi aap image aur voice pe jayenge thoda mushkil ho jayega. Toh kisko kab use karna chahiye? So use vertical prototype when you need to validate or test critical feature in depth. Horizontal ko tab karna chahiye jab aap overall feel dekhna chahte hain, dena chahte hain apne user ko experience ke baare mein, product ke baare mein. Jaisa ki maine pehle hi bola ki kabhi-kabhi iska combination bhi use hota hai. A combination of both approaches is used in iterative design. So prototypes are worth of thousand meetings. Very well said. Ek simple prototype banane se aap dher saare cheezon ko concrete steps ki tarah aage badh sakte hain. Apne vague idea ko conceptualize karte hue concrete tarike se aage badh sakte hain. Jo ki aap hazaron meeting se bhi nahi kar sakte. Toh iterative cycle of prototype so start with low-fi, mid-fi, high-fi in terms of testing and iteration at each stage jaisa ki humne bataya kai baar lo-fi karna padta hai. Kai baar mid-fi karna padta hai. Kuch cheezon ko handle karne ke liye probably aapko dobara lo-fi jaana pad sakta hai aur usko handle karke dobara mid-fi aana padta hai. Aur usi tarike se yeh cheezein chalti rehti hai. So iteration is the essence of prototyping. You don't start with the final answer. You iterate to it. Toh summary mein hum agar bolein toh prototyping is essential bahut zaroori hai. Yeh madad karta hai aapke user ko samajhne mein, uski zarooraton ko samajhne mein, testing jo alag-alag concept hai usko try karne mein aur aapke jo vague idea hai usko ek tarah se jo aapne prototype banaya hai, uske madhyam se validate karne mein. Different levels of fidelity ho sakta hai. Kitna close hai. Jo aapne prototype banaya hai actual system se woh nimn star ka ho sakta hai. Madhya star ka ho sakta hai aur uchh star ka ho sakta hai. There are two aspects of design conceptual and concrete. Conceptual ke case mein hum vague idea ko kuch had tak conceptualize karte hain. Concrete mein hum usko prototype ke madhyam se kuch thos banane ki koshish karte hain. Conceptual design developed an outline of what users can do and what concepts are needed to understand the product and concrete design specify design details for layout or navigation. Three approaches to develop an initial conceptual model interface metaphor interaction style or interface style yeh humne baat ki and expand an initial conceptual model by considering whether product or user perform each function how those functions are related and what information is needed to support them aur generating prototype from scenario and use cases usse aapko system level tak jaane mein, ek story banane mein, samajhne mein, journey samajhne mein user ki sahayata milti hai. Aap alag-alag physical computing kit bana sakte hain software development kit ke madhyam se, API ke madhyam se. Alag-alag tools aur technique available hain. Choosing the right tool depends on the project phase and the required fidelity. Toh, jaisa ki maine bataya ki yeh kaafi iterative process hai. Toh, prototyping is not linear. Yeh ek iterative process hai. Involve multiple rounds of user feedback and testing. In prototyping hum alag-alag tarike ke compromises karte hain. Jaisa ki humne bataya vertical compromises, horizontal compromises aur usi hisaab se hum scope ke hisaab se, focus ke hisaab se aur resource ke hisaab se hum apne prototype ka nirman karte hain. Toh fail early to succeed sooner. Tim Brown ne

bahut hi achhe se bola tha jo ki CEO hain IDEO ke aur isi ke saath hum is saptah mein aapse alvida lete hain aur agle saptah mein ek aur adhyay ke saath aapke saamne prastut honge.  
Dhanyavaad. [Sangeet]