Human Computer Interaction (Hindi mein)

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Data Gathering and Analysis

Lec25

[Sangeet] Namaskar main Ritwik Bamba aapke is course Human Computer Interaction ka sahayak shikshak hoon. Aaiye aaj ka tutorial shuru karte hain. Aaj ke tutorial ka hamara vishay hai data gathering aur analysis yaani ki data ikattha karna aur uska vishleshan karna. Sabse pehle hum yeh dekhenge ki humne ab tak kya-kya padha hai. Aaiye sabse pehle humne dekha ki good design versus bad design yaani ki achha design versus kharab design. Phir humne yeh dekha ki kya-kya cheezein aisi hain ek design mein jo use achha design banati hain. Phir humne dekha ki inclusivity aur accessibility kya hoti hai aur unmein kya farak hote hain. Uske baad humne paanch mukhya design principles pe dhyan diya jo ki hain Visibility, Feedback, Consistency, Constraints aur Affordance. Iske baad humne interaction design process mein chaar mukhya gatividhiyon par dhyan diya jo ki shuru hoti hain establishing requirements yaani ki logon ki upyogkartaon ki zarooraton ko samajhna jiske baad hum alternates design karte hain yaani ki aise upkaranon ko design karte hain banate hain jo logon ki zarooraton ko poora kar sake. Uske baad hum unke interactive versions banate hain. Yaani ki aise praroop jo logon se baat kar paayein. Unki asal zindagi mein zarooraton ko poora kar paayein. Aur aakhirkarr hum evaluate karte hain un designs ko. Yaani ki hum yeh pata lagate hain ki kya yeh design asal zindagi mein poori kar rahe hain zarooratein. Kya woh sabhi kaam kar raha hai yeh yantra jo ki poora karne ke liye ise banaya gaya hai. Agar yeh sab poora ho raha hai toh hum aa jaate hain hamare aakhir ke design pe, final design pe, hamare yantra pe aur agar yeh apne maanako par khara nahi utarta toh hum wapas se yahi chakra poora karte hain aur tab tak karte rehte hain jab tak humein ek achha design na mil jaaye. Iske baad humne double diamond of design par dhyan diya. Yaani ki sabse pehle hum upyogkartaon ki dikkato ke baare mein sab kuch samjhenge. Uske baad hum unki sabse mukhya dikkat par dhyan denge. Jiske baad hum us dikkat ko hal karne ke alag-alag tarikon ka vishleshan karenge aur aakhirkarr unmein se sabse achhe hal ko chunenge aur usi ke saath aage badhenge. Iske baad humne kuch aur cheezon par dhyan diya. Jaise ki user persona kaise banate hain user persona, empathy mapping, mental model, conceptual model aur information architecture aadi jiske baad hum cognition, cognitive load yaani ki maansik cheezein jo hamare dimaag pe asar daalti hain. Chhoti-chhoti cheezein jinse hamara koi kaam karna aasan banta hai. Woh hamara cognitive load yaani ki maansik bhaar kam karti hain. Aisi kya cheezein hain jo hamara maansik bhaar badhati hain? Phir uske baad humne kuch niyam dekhe Miller aur Gestalt ke aur aakhirkarr humne kuch aur alag tarike ki cognitions par dhyan diya. Chaliye ab aaj

ke vishay ko shuru karte hain. Sabse pehle hum kuch tarike dekhenge jinse hum data ko ikattha kar sakte hain logon se. Sabse pehle hai questionnaire yaani ki ek prashnavali. Yeh do tarike ka ho sakta hai. Pehla quantitative yaani ki maatratmak jismein hamare paas kuch maatra mein data present hota hai, data hota hai aur close ended question hote hain. Yaani ki humein kuch diye gaye options mein se hi un koi diye hue vikalpon mein se hi chunna hai. Hamara jo sahi uttar hai. Uske baad hum dekhte hain qualitative prashnavali yaani ki gunatmak prashnavali jismein open ended questions hote hain jisse hum aur gehre tarike se ek gehan jaanch kar sakte hain upyogkartaon ke kaam ke baare mein. Prashnavali ke baad hum data ko interview ke madhyam se bhi ikattha kar sakte hain. Interview yaani ki sakshatkar yeh humein gunatmak data ko ikattha karne mein kaafi madad karta hai. Hum logon ke khud ke jo experience hain, unki zindagi ki seekh hai, hum yeh sab bahut hi ek gehan tarike se pata kar sakte hain. Ek sakshatkar ke madhyam se. Iske baad hum observation studies bhi kar sakte hain. Kaafi aur alag-alag tarike ki observation study hoti hain. Yaani ki data ikattha karne ke studies hoti hain. Jismein kuch maatratmak bhi ho sakti hain jisse hum ek frequency count pata kar sakein ya phir gunatmak bhi ho sakti hain. Unke behavior analysis ke liye. Aakhirkarr visuals ke roop se bhi hum observation study kar sakte hain. Jaise ki hum prashnavali ke liye icon de sakte hain. Sakshatkar ke liye mic de sakte hain. Observations ke liye ek aankh de sakte hain. Evam aadi. Aaiye kuch alag-alag tarike ke sakshatkaron ke baare mein jaante hain. Structured interview yaani ki ek vyavasthit sakshatkar. Vyavasthit sakshatkar mein hum ek pehle se diye gaye prashnon ke hi sawaal jawaab karte hain. Isse sabhi upyogkartaon logon ko ek hi tarah ke sawaal diye jaate hain aur usi ke aaspaas humein uttar milte hain. Isse humein aapas mein compare karne ke liye data mil jaata hai. Magar iska ek khaamiyan bhi hai. Jaise ki ismein hum bahut zyada gehri jaanch nahi kar sakte aur hum ismein thoda sa bandh jaate hain. Hum bahut zyada khule tarike se ek bade view ko nahi dekh paate hain. Jo hamara upyogkarta batana chahta hai. Iske baad hamare paas aate hain ardhvyavasthit sakshatkar. Ismein kuch sawaal toh hote hain hamare vyavasthit sakshatkar waale par kuch sawaal aise daal diye jaate hain jisse hum thoda sa ek gehri jaanch kar paayein. Unke baare mein thoda aur jaan paayein. Isse hum jo hamara sakshatkar hai hum usko ek achhe tarike se control kar paate hain. Usko dhyan mein rakhte hue hum ek flow bana sakte hain hamare sakshatkar ka. Isse hum jo data collect karna chah rahe hain uski hum gunavatta behtar kar sakte hain aur ek behtar tarike se hum jaan sakte hain ki user kya kehna chah raha hai. Aakhirkarr hamare paas gair vyavasthit sakshatkar aate hain. Yaani ki unstructured interviews. Yeh ekdam khule evam dheele dhaale sawalon se bhara hota hai. Jismein hum user se yeh chahte hain ki woh ek kahani ki tarah apna sakshatkar de. Humein batayein ki uske kya-kya anubhav rahe hamare yantra ke saath taaki hamara jo vishleshan hai woh aur gehan ho paaye. Par ismein kuch khaamiyan hain. Jaise ki jo vishleshan hai hamara woh thoda sa mushkil ho jaata hai. Thoda sa zyada samay lagta hai use vishleshan karne mein aur ek jo consistency hoti hai hamari woh chali jaati hai kyunki alag-alag upyogkarta alag-alag user interview ko sakshatkar ko ek alag disha mein le jaata hai. Ek hamare paas focus group naam ki cheez bhi hoti hai jo sakshatkar lene mein madad karti hai. Ab ismein farak kya hai ki ismein jo sakshatkar hai woh kisi ek vyakti se nahi hota. Kaafi saare logon ko ek kamre mein bithaya jaata hai aur ek facilitator moderator ko

rakha jaata hai. Jo ki unse sawaal jawaab karta hai. Isse humein ek saath hi kaafi alag-alag tarike ke anubhav sunne ko milte hain. Par yeh thoda sa mushkil bhi ho jaata hai vishleshan karne mein kyunki ismein jo vyaktigat cheezein hoti hain kuch aisi vyaktigat baatein hoti hain woh theek se hum vishleshan nahi kar paate unka kyunki woh ek kaafi saare logon ke samooh hone ki vajah se log kabhi-kabhi apne baare mein apne vyaktigat vicharon ke baare mein theek se bol nahi paate hain. Aaiye sakshatkaron mein pooche jaane waale kuch sawalon ke baare mein dekhte hain. Yeh do mukhyat do tarah ke hote hain. Yaani ki humne pehle jaise baat kari open ended aur close ended. Open ended yaani ki hum kisi bhi tarike se unka jawaab de sakte hain. Close ended mein hamare paas kuch diye gaye vikalp hote hain aur humein unmein se hi chunna hota hai. Yaani ki haan ya na ya phir kuch jagah aapne dekha hoga aise kaafi saare diye gaye hote hain ki aapko koi cheez ek se paanch ke star par kitni achhi lagi. Toh aapko vikalp diye jaate hain ek se paanch tak ki aapko inmein se hi chunna hai. Toh udaharan ke liye hum kahein ki humne chuna chaar. Ab agar yahi ek open ended question hota toh humein seedha de diya jaata ki apne anubhav ke baare mein bataiye. Ab yeh thoda sa mushkil ho jaata hai ek upyogkarta ke liye likhna. Thoda sa use aur dimaag lagana padega. Thoda sa sochna padega yeh likhne ke liye ki uska anubhav kaisa raha. Humne likha ki hamara anubhav achha raha. Ab yeh ho gaya hamara ek open. Ab jaisa ki aap samajh sakte hain jo hamare close ended question hai unko hamare liye vishleshan karna unka kaafi aasan rehta hai. Par jo open ended hain unke mein thoda humein samay lagane ki zaroorat hai. Yahan pe humein kuch cheezein di gayi hain jinka hum dhyan mein rakh ke ek achhi prashnavali bana sakte hain hamare sakshatkar ke liye. Humein lambe sawalon ko nahi poochna. Sankshipt evam chhote sawaal hum poochenge toh hamare upyogkarta humein ek behtar tarike se bata payenge uska jawaab. Jahan bhi ek sanyukt vakya ban raha hai, usko hum do saral vakyon mein tod dein taaki upyogkarta ke liye use samajhna aasan ho. Mushkil evam bhaari shabdon ko istemal humein kam se kam karna hai taaki ek upyogkarta aasani se samajh sake ki hum kya poochna chah rahe hain. Humein koi bhi assumptions nahi leni. Yaani ki humein khud se kuch soch ke nahi chalna ki upyogkarta ko toh yeh pata hi hoga. Ya phir humein agar koi yeh sawaal de ki aapko yeh ek khane ki jagah kyun pasand hai? Aapka sawaal unse hoga ki kya yeh zaroori hai ki mujhe yeh jagah pasand hi hai? Toh yeh sawaal poochna galat hai ki aapko yeh jagah kyun pasand hai? Ek behtar sawaal hoga kya aapko yeh jagah pasand hai? Aur agla sawaal hoga phir agar haan toh kyun aur agar na toh kyun? Uske baad humein koi bhi unconscious bias yaani ki jo hamare kuch aise chhoti-chhoti cheezein hoti hain jo hum jinke baare mein itna sochte nahi hai par hum likh dete hain aur phir humein prashnavali mein jaane ke baad sochna padta hai ki yeh thoda sa hum agar soch lete toh in par thoda sa humein dhyan dene ki zaroorat hai. Ab prashnavali mein hum kya-kya daal sakte hain? Wahi hamare open ended questions aur close ended questions. Close ended questions yahan pe zyada tar maatratmak rahenge yaani ki quantitative. Kuch humein vikalp diye jayenge. Humein unmein se sahi jawaab ko chunna hai. Kuch humein open ended bhi diye jayenge yaani ki gunatmak jismein hum apni marzi se likh sakte hain. Ab hamare paas prashnavali ke liye kuch fayde bhi hain. Kuch nuksan bhi hain. Fayde iske yeh hote hain ki aasan hai inhein karna. Zyada logon se karwa sakte hain aur inka vishleshan karna aasan rehta hai. Par kuch khaamiyan bhi aa sakti hain ismein. Jaise ki ek

kharab tarike se banayi gayi prashnavali kaafi gair zaroorati cheezein humein de sakta hai jinka koi arth nahi hota. Isse door rehne ke liye humein saral chhote shabdon ka istemal karna chahiye. Jo prashn hai woh seedhe aasan hone chahiye samajhne mein aur jo prashnavali hai humein use kisi ko bhi bhejne se pehle ek baar test kar lena chahiye. Designers ke beech mein hi ya phir apni hi team ke baaki logon ke beech mein. Yahan humein kuch cheezein di gayi hain. Ek prashnavali ko design karte hue jinhein dhyan rakhna chahiye. Jaise ki ek sawaal ka jo asar hai upyogkarta pe woh prashnavali mein kahan diya gaya hai isse bahut farak padta hai. Yadi koi sawaal pehle hi number par diya gaya hai aur ek sawaal aakhiri number par diya gaya hai wahi toh woh pehle sawaal ka bhaar zyada ho sakta hai user ke dimaag mein aakhiri sawaal se. Aapko yeh bhi dhyan mein rakhne ki zaroorat hai ki ek hi prashnavali ke kuch alag-alag version kuch alag-alag praroop alag-alag logon ke liye zaroorat pad sakti hai aapko. Jaise ki ek hi prashnavali teen ya chaar bhashaon mein alag-alag. Ab woh prashnavali toh ek hi hai par woh uske kuch alag-alag praroop bana diye gaye. Bas humein users ko logon ko seedha-seedha batana chahiye ki unhein kis tarike se yeh prashnavali ko poora karna hai. Kahan pe open ended question hai, kahan close ended questions hain. Kahan pe gunatmak cheezein di gayi hain, kahan pe maatratmak cheezein di gayi hain. Yeh sab upyogkarta ko user ko batana behad zaroori hai. Humein yeh bhi dekhne ki zaroorat hai ki kya hamari prashnavali kuch zyada badi toh nahi hai. Kya woh poori karte-karte upyogkarta thak toh nahi jayenge? Aur agar yeh lambi hai toh kya humein upyogkartaon ko ya phir hamare jo participant hain kya humein unko ek vikalp dena chahiye? Woh kabhi bhi apni marzi se bahar nikal sakte hain us gatividhi se aur aakhirkarr humein us prashnavali ke saleeke par thoda sa dhyan dena chahiye. Use kis tezi se poora kiya jaana chahiye is par dhyan dena chahiye aur in sab cheezon par hum dhyan dekar ek behtar prashnavali ko design kar sakte hain. Ab ek hum vyavasthit roop se dekh lete hain ki ek prashnavali mein kya-kya hum kis tarah de sakte hain. Jo hamare close ended response hote hain, hum unmein radio button de sakte hain. Yaani ki gol button is tarike se aur jab bhi hum kisi ko chunenge toh woh aise zara bhar jayega jabki baaki khaali rahenge. Jabki yeh cheez hum tab use karte hain, tab hum iska istemal karte hain. Jab keval ek hi humein vikalp ko choose karna hai. Sirf ek. Jabki agar humein kaafi saare vikalpon ko choose karna hai. Sochiye humein agar in chaar vikalpon mein se kinhi do ko chunna hai toh hum isko kuch is tarike se dein ek check box ke roop mein toh yeh behtar rahega. Agar humein rating scale banane hain toh uske liye hamare paas kuch vyavasthit tarike hain jo pehle se bane hue hain. Jaise ki Likert scale, semantic differential scale ya phir teen, paanch ya saat tarike se hum scale bana sakte hain. Jaise ki yahan par diya gaya hai ek se paanch tak ka ek hamara scale hai jismein ek hai sabse sasta. Jahan par ek hai sabse mehenga aur paanch hai sabse sasta. Aakhirkarr kuch open ended response bhi diye ja sakte hain jahan par hum khud de sakte hain upyogkarta ko likhne ke liye ki unka anubhav kaisa raha. Yeh ho gaya udaharan ke roop mein radio button. Yeh ho gaye hamare check box. Yahan par aap dekh sakte hain ki jab hum kisi ek vikalp ko chunenge toh yeh keval ek hi hamara vikalp hai woh gehre roop mein jayega. Jabki agar humein kuch zyada ek se zyada vikalpon ko chunna hai toh hum yeh check box dein woh behtar rahenge upyogkarta ke liye. Iske baad hum ek paanch point ka Likert scale bhi dekh lete hain. Jismein humein yeh dekhna hai ki ek hai hamara strongly agree yaani ki haan agree yaani

ki bilkul haan toh nahi hai par haan ek halki si haan neutral yaani ki haan ya na koi bhi farak nahi padta. Strongly disagree matlab bilkul na aur disagree matlab theek hai na ki taraf jhuk rahe hain hum par ek bahut hi sangeen roop se na nahi hai. Ab hum ek prashnavali ko kis tarike se bharwa sakte hain? Kis tarike se hum logon ko unhein poora karwa sakte hain. Humein ek timeline banane ki zaroorat hai ki kab hum apni prashnavali ko banayenge. Kab hum logon ko denge. Kab hum vishleshan karenge aur kab hum us vishleshan se hum yeh jo humein pata chalega jo hamari findings hongi hum unko pata laga sakenge. Hum sabse pehle use offline banayenge. Aap likh sakte hain. Hum likh ke ek prashnavali bana sakte hain. Phir uske baad jab woh ek template ban jaaye jab ek baar hum use poora bana lein toh hum usko online ya phir computer ke roop mein jis bhi tarah hum chahein hum usmein poora kar sakte hain. Uske baad hum use test kar lenge. Ek baar yeh dekh lenge. Jaanch lenge use ki kya woh sahi dhang se chal raha hai. Iske baad hum ek samooh se logon ke ek samooh se bhi use jaanch karwa lenge. Jo asal roop mein asal zindagi mein us prashnavali ko nahi poora karne waale. Hum unse yeh bharwa sakte hain yeh jaanchne ke liye ki kya woh prashnavali jaanna chah rahi hai jo hum pata kar rahe hain. Kya woh sahi tarike se bata pa rahi hai? Hamare upyogkartaon ko ki woh kya poochna chah rahe hain aur aakhirkarr hum jo log hain jo bharenge yeh prashnavali hum unko ikattha karna shuru kar sakte hain. Koi bhi hum data ko agar ikattha karna chahein aur uska vishleshan karna chahein toh hum do tarike se kar sakte hain. Ek ho gaya hamara within the group aur ek ho gaya between the group. Ab in dono mein farak kya hai within group aur between the group mein? Between the group yaani ki hamare paas do group hain. Humne ek group ko ek design de diya. Doosre group ko doosra design de diya. Aur hum yeh dekhenge ki is group ka jo vyavahar hai woh is group se kis tarike se alag hai. Ismein hum ho sakta hai ki is group mein hum kuch bade buzurgon ko daal dein. Jabki ismein kuch bachhon ko daal dein hum. Isse hum alag-alag samooh ke madhyam se hum yeh samajh sakte hain ki hamara jo yantra hai, hamara jo design hai, woh alag-alag samooh ke saath kis tarike se kaam karta hai. Within the group yaani ki ek group hai. Hamare paas ek samooh hai. Usmein hamare paas kaafi saare log hain. Toh hum un logon se ek vyaktigat roop se yeh jaan sakte hain ki us samooh mein yeh kis tarike se humein alag-alag bata rahe hain. Har aadmi kis tarike se prashnavali ko alag se kaise poora karta hai? Toh hum jo comparison hai jo hum alag-alag tarike se dekh sakte hain woh hum ek hi samooh mein kaafi saare alag-alag perspective se dekh payenge. Aaiye kuch tarike dekhte hain ki hum jo data ko ikattha kaise kar sakte hain aur kis tarike se hum kya-kya technology kya-kya takneek use karke hum aur ek achhe tarike se jaanch kar sakte hain. Photos, videos, audio yeh sab hum use kar sakte hain. Unka istemal hum akele kar sakte hain ya phir ek samooh mein kar sakte hain. Jaise ki hum ek tasveer ke saath hum aawaz ko jod sakte hain. Hum notes ke saath tasveeron ko jod sakte hain. Hum video bhi alag se de sakte hain. Har alag-alag jo tarike ki data recording hai, hum uske saath hamare kuch fayde hain aur kuch nuksan hai. Aaiye ab hum vishleshan ki ore chalte hain ki kis tarah hum jo humne data ikattha kiya hai hum uska kis tarah vishleshan kar paayein. Ab hamara jis tarike ka data hoga usi tarike ka vishleshan bhi hoga. Toh sabse pehle jo hamara ek quantitative analysis hai yaani ki maatratmak vishleshan. Ismein hamare paas alag-alag maatraon mein humein cheezein di jaati hain. Kitni maatra mein logon ne ek yantra ko achhe roop mein

prastut kiya hai. Uske baad hamara jo humne qualitative data ikattha kiya tha yaani ki gunatmak data jo usko hum samajh sakte hain ki kis tarike se logon ke jo anubhav rahe hain unhone kis tarike se humein bataya hai ki kya-kya hamare yantra ke baare mein sahi hai. Ek kahani ke praroop mein ek kahani ke roop mein humein yeh pata chal raha hai ki kaise hamara jo yantra hai usne user ki zarooraton ko poora kiya. Ab hum sabse pehle jo hamara maatratmak vishleshan hai uske baare mein thoda sa dekh lete hain. Yeh thoda sa hamara maths ki taraf jaa raha hai jo mean yaani ki average hamari jo hoti hai median mode aur phir hum ek graph ke madhyam se bhi jo hamara data hai usko prastut kar sakte hain. Percentage bhi ek hamara zaroori madhyam ban jaata hai. Hum jo apna data se jo humein findings mili hai unko prastut karne mein. Jo hamara qualitative data hai yaani ki gunatmak vishleshan unke liye hum kuch alag-alag tarike se kar sakte hain. Jaise ki inductive aur deductive approach hoti hai hamari. Hamare kuch hum code karke bata sakte hain ki kuch khaas shabd aise hain jo bata rahe hain ki upyogkarta ka jo anubhav tha woh achha raha. Hum theme identify kar sakte hain ki kya aisi ek parchhayi thi. Kya aisa ek hamara background bana tha jo bata raha hai ki hamara kis tarike se user ka jo vyavahar tha, kis tarike se uska anubhav tha, woh behtar hua. Uske baad hum data ko categorize kar sakte hain. Yaani ki alag-alag samoohon mein baant sakte hain data ko. Aur isko istemal karke hum deductive analysis bhi kar sakte hain. Hum deductive aur inductive dono ko saath mein bhi istemal kar sakte hain. Uske liye bhi hamare paas kuch alag-alag takneek hoti hai. Ek hamare paas conversational analysis naam ka bhi ek aajkal naya takneek ka chalan hua hai. Ab yeh hota kya hai? Do logon ke beech mein ya do se zyada logon ke beech mein koi batchit hai toh hum uska adhyayan kar sakte hain. Uska vishleshan kar sakte hain. Hum ab usmein hum yeh dekhenge ki kahan pe kisne kya bola aur uska kis tarike se uttar diya gaya. Kya sawaal jawaab hua. Is poori batchit se hum kaafi alag-alag tarike ki findings nikaal sakte hain. Isi se aur do kadam aage badh ke hum content analysis ki taraf badhte hain. Jismein hum sabse pehle jo chhoti-chhoti cheezein hoti hain, hum unko bahut hi ek gehre tarike se jaanchte hain, maapte hain. Uske liye hamare paas kuch cheezein di gayi hain yahan pe. Sabse pehle hum dialogue par dhyan dete hain. Jo hamare user hain unka bhaav kya hai? Hum us pe dhyan dete hain. Hum uske baad ek jo objective scientific truth hai, hum usmein vishwas nahi rakhte. Hum ek swatantra roop se samajhne ki koshish karte hain ki jo hamara user keh rahe hain woh sach hi keh rahe honge. Hum is bhavna se yeh samajhne ki koshish karte hain ki humein user ne kya bataya hai. Hum bhasha ko ek constructive tool ke roop mein dekhte hain. Discourse analysis use karte hain hum. Discourse analysis yaani ki user kis tarike ke vyavahar mein yeh jo hamare prashnavali hai isko poora kar raha hai. Isse hum jo ek chhapa hua matlab hai hamare jawabon mein hum usko nikaal sakte hain. Content analysis thoda sa time zaroor leta hai, samay zaroor leta hai. Par isse nikalne waali jo hamari cheezein hain, jo findings hain hamari woh behad hamari zaroori ho jaati hain aur bahut hi ek achhe tarike se hum unhein prastut kar sakte hain aur unhein istemal kar sakte hain hamare design ko behtar karne mein. Aur bhi isi tarike ke kuch humein cheezein di gayi hain yahan pe. Ki kisi bhi zyada text ki jagah hum photo daalein, tasveerein daalein, aawazein, advertisement is tarah ke hum alag-alag cheezein dalenge udaharanon ke taur par toh woh hamare jo upyogkarta hai uske liye aasan rahega. Aur jo content analysis hai woh zyada tar

humein yeh bhi dekhne ko milta hai ki aur baaki jo tarike hain, baaki takneek hain unke saath istemal kiya jaata hai. Aakhirkarr humein jo findings mili hain, hum unko prastut karte hain alag-alag tarike se. Hum ek vyavasthit roop se unko prastut kar sakte hain taaki hum ek jo hum viewpoint banana chah rahe hain, hum uske hisaab se use bata paaye. Hum ek kahani ke roop mein bata sakte hain jo hamara idea hai isse jinko hum batana chah rahe hain kahani unke liye samajhna aasan hai aur aakhirkarr hum kaafi alag-alag tarike ki jo notation hai unka istemal karke hum jo hamari findings hain unko prastut kar sakte hain. Aaiye kuch khaamiyon par bhi dhyan de dete hain jo data vishleshan adhyayan ke samay aa sakti hain. Ek jo hamara bias hota hai woh aa sakta hai ki hum kisi ek cheez ke baare mein thoda sa soch ke baithe hain. Pehle se hamare dimaag mein kuch hai woh thoda sa mushkil bana deta hai. Sawaal jawaab ko ek bias free rakhna, swatantra rakhna. Hum over generalize kar dete hain jisse thoda sa mushkil hota hai ek chhote data se findings nikalna. Agar hum kuch aisi findings nikaal bhi lein toh usko interpret karna usko samajhna agar hum usko samajh galat lenge toh woh hamare liye galat roop mein hum usko istemal kar sakte hain. Woh ek khaami bahut badi ban sakti hai. Aur isi tarike se hum aur bhi kuch tarikon se kuch dikkato mein pad sakte hain. Par in sabko hum agar dhyan dein aur inse door rahe toh hum ek behad achhe tarike se data ka vishleshan kar payenge. Hum hamara jo context hai usko samjhe pehle aur jo hum statistical method hai woh sahi tarike se istemal karein. Jo humein hamare jo pata lagayi hai humne baatein agar woh hum verify kar lein ek doosre tarike se toh hum usko us data ko us data se nikle hue vishleshan ko ek behtar roop se istemal kar payenge aur jab hum data ko prastut karein toh hum usko ek behtar roop mein prastut kar sakte hain visualization ke istemal se. Yeh aapke liye ek in class assignment di gayi hai jismein humein ek fitness tracking app ka udaharan diya gaya hai. Jo app hai woh rozmarra ke jo kaam hain jo workout hain, vyayam log jo karte hain uske baare mein humein thoda sa ek data diya gaya hai. Aur hamare paas chhah logon se liya hua data hai. Unhein yeh kaam poora karne mein kitna samay laga? Kya woh kaam poora kar paaye? Kitni baar galtiyan hui? Evam woh kitna satisfied rahe isse? Ab humein inke baare mein jaanch padtaal karni hai. Toh iske baare mein humein kuch yeh statistics nikalne hain ki kitna average tha. Kya median raha iska aur ek percentage ke roop mein humein yeh bhi likhna hai ki jo task success thi woh kitni thi. Aakhirkarr humein jo hamari insights hain humein unko prastut karna hai usability aur satisfaction ko dhyan mein rakhte hue. Yeh diya gaya hai ki hamara average kareeb kareeb 120 second tha. Median kareeb kareeb chaar aaya hamara. Percentage hamari kareeb 67% banti hai aur humne yeh sab pata lagaya ki zyada tar logon ko jo hamari app hai woh istemal karna aasan laga. Kuch ek log ho sakte hain jinhein dikkat rahi hai app ka istemal karne mein aur hum usko dhyan mein rakhte hue apne app ko behtar kar sakte hain. Yeh kitabein ab hum website use karke aap padhaye gaye vishayon ke baare mein aur jaan sakte hain. Aaj ke liye itna hi. Dhanyavaad.