

Human Computer Interaction (Hindi mein)

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HCI and AI: Lecture 10

Lec36

[Sangeet]Namaskar saptah 10 mein Human Computer Interaction ke is ank mein aapka punah swagat hai. Chaliye is saptah mein hum jaante hain kaise Artificial Intelligence, kritrim buddhimatta aur large language model badi bhasha model jo hote hain. Kaise woh hamare aaj ke maanav kendrit system ko aur bhi achha automated banane mein suchalit banane mein hamari madad karte hain. Kaise woh jo bhi system aap bana rahe hain, product bana rahe hain, uski upyogita ko aur bhi achhe se kaise badhati hai, iske baare mein hum is saptah mein charcha karenge. Khaastaur pe artificial intelligence ko hum HCI ke intersection ke saath dekhenge. Kaise HCI base system jo bhi hum bana rahe hain ya services jo bhi hum bana rahe hain, kaise AI ke madhyam se usko aur bhi achha banaya ja sakta hai. Chahe woh uske design ki baat ho, chahe development ki baat ho, chahe usko saral banane ki baat ho, chahe usko aur bhi tez banane ki baat ho. Toh yeh saari cheezon ke baare mein hum is saptah mein charcha karenge. Uske pehle ek quick recap kar lete hain. Punravritti kar lete hain. Jaisa ki humne saptah aath mein mulyankan ke baare mein seekha tha. Humne mulyankan ke baare mein discuss karte hue bataya tha ki jo bhi company hai ya utpaad ko banane wali sanstha hai woh kuch bhi bol sakti hai. Uske assumption ke aadhaar pe dhaarnaon ke aadhaar pe woh kuch daawon ko karti hai ki hamara yeh jo seva hai ya utpaad hai woh aise dher saare kaam ko karega achhe se karega aur bhi apne alag-alag daawon ka daawa karti hai. Par woh kitna sahi hai? Woh apne daawon par kitna khara utarti hai, uske liye in system ko alag-alag paimane par mulyankan ki zaroorat hoti hai. Jaisa ki humne pichle adhyay mein humne baat ki thi. Kaise alag-alag tarike ke mulyankan hote hain. Kaise alag-alag mulyankan ki ke methods hote hain. Jiske madhyam se hum alag-alag stages pe unka mulyankan karte hain. Humne baat ki thi kaise formative evaluation hota hai jo ek tarah se vikasatmak mulyankan hota hai jo ki poore vikas ke dauran development ke dauran hota hai. Humne summative evaluation ki baat ki thi jismein ek tarah se nishkarsh aadhaarit evaluation hota hai jismein ek tarah se development ki khatam hone aur uske launch hone ke pehle hum mulyankan karte hain aur bhi humne jaise humne diagnostic evaluation ki baat ki thi. Jaise nidanatmak mulyankan ke madhyam se hum alag-alag alag-alag jo issues hain aapke upyogkarta face kar rahe hain shuruwat mein usko hum handle karne ki koshish karte hain. Humne deerghkaalin evaluation ki baat ki thi. Kaise apne system ka evaluation aap ek lambe samay ke antral ke dauran karte hain. Kaise ek upyogkarta hai 6 mahine saal bhar is tarah se lambe samay tak aapke system ko use karta hai aur woh kaise aapke system se santusht hai? Aapki upyogita se

santusht hai? Kya woh apne karya ko saraltapoorvak kar pa raha hai? Aapke system ko use karne ke dauran kya uski learnability, memorability in saare aspect ko hum achhe se handle kar pa rahe hain. In saari cheezon ke baare mein humne charcha ki thi. Phir humne case study ke madhyam se jismein humne Braille learning app jo ki hum shuruwat se alag-alag saptahon mein uske baare mein charcha karte aa rahe hain. Uske baare mein charcha ki thi. Kaise humne uska mulyankan kiya. Uske baad humne is saptah mein ek tutorial aur hands on experience Adobe Illustrator ke saath kiya tha aur weekly assignment ke madhyam se aap ka mulyankan kiya tha. Uske baad agar hum saptah nau ki baat karein toh usmein HCI aur IoT ke baare mein Internet of Things ke baare mein baat ki gayi thi. Humne kaise un dono ke beech mein significance aur interplay hai uske baare mein baat ki thi. Humne alag-alag applications ke baare mein charcha ki thi aur unke challenges ke baare mein baat ki thi aur humne aur bhi emerging trends aur future direction is area mein aap kar sakte hain uske baare mein charcha ki thi. Ismein do case studies ka discussion kiya gaya tha. Ek Haptic Track aur ek Movable jo ki Dr. Abhijeet ne is saptah mein alag-alag IoT aur HCI ke kendra mein discussion aur charcha ki thi. Toh yeh hua saptah nau mein aur chaliye hum is saptah ki shuruwat karte hain. Yeh is saptah ki rooprekha hai. Sabse pehle hum aapko jo large language models hain, bade buddhimatta bade bhasha models hain, uske baare mein baat karenge. Kaise pehle jo bhasha models hote the woh kis tarike se use hote the aur ab bade bhasha model aane ke baad aur bhi karya ko aap kaise sugamta se aur achhe se kar pa rahe hain. Hum sankshipt tarike se LLM ke architecture ke baare mein baat karenge aur aapko resources denge jisse ki aap uske baare mein aur bhi detail mein jaake dekh sakein, padh sakein. Humne jaise baat ki thi ki jab bhi aap kisi bhi system ke saath karya karna chahte hain toh ek tarah se aapko ek samvaad sthapit karna padta hai manushya ke beech mein aur jo bhi upkaran ya system aap bana rahe hain uske beech mein toh ek tarah se LLM jo badi bhasha model hai usse bhi samvaad karne ki zaroorat hai jisse ki woh hamare anuroop hamare aavashyaktaon ke anuroop woh karya kar sake. Toh prompting ek technique hai jiske madhyam se hum LLM se samvaad kar sakte hain. Toh hum uske baare mein bhi charcha करेंगे. Alag-alag prompting techniques ki hum baat karenge. Kaise woh apne projects mein aap iska prayog kar sakte hain. Kyunki aaj ke samay mein manushya bhi ek tarah se multimedia ka multimodal ka ek bahut achha example hai jismein hum dekh sakte hain ki manushya dekh sakta hai, sun sakta hai, bol sakta hai aur alag-alag sensors ke madhyam se woh cheezon ko mehsoos kar sakta hai. Toh ek tarah se aur hum aaj ke jeevan mein dekhein toh daily jeevan mein ab hamara jo dincharya hai woh single modality se multimodality ki aur bahut tezi se jaata ja raha hai. Jaise hum single modality ki baat karein toh keval likhna hota tha. Computer se aap keval likhne ke madhyam se samvaad karte the aur karya karte the. Lekin agar hum aaj ki duniya mein dekhein toh ab woh multimodality ki taraf ja raha hai. Jaise image ko deal karna, text ko deal karna, videos ko deal karna, audio ko deal karna aur bhi alag jo bhi modalities hain unke madhyam se apne karya ko bade saralta aur sugandhta ke saath karna aur jo upyogkarta hai uske anubhav ko achhe se badhana. Toh is tarike se agar hum dekhein toh multimodal LLM ke hum upar charcha karenge. Hum LLM aur HCI saath mein kaise aapke liye upyogi ho sakte hain woh uske baare mein hum charcha karenge aur hum kuch application ke madhyam se jaise adaptive learning system, personalized content, accessibility

and social inclusion for all toh ek tarah se HCI ke jo alag-alag alag-alag concept hain unke baare mein hum karya karenge. Jaise ki aapke alag-alag upyogkartaon ki zarooratein alag ho sakti hain. Toh kaise hum usko personalize kar sakte hain? Kaise hum accessibility aur inclusion criteria ko usmein include kar sakte hain. Uske baare mein hum baat karenge. Aur adaptive learning toh jaise har vyakti ke seekhne ki kshamata, seekhne ki gati sabhi alag hoti hai. Toh kaise hum adaptive tarike se ek learning system bana sakte hain jo ki unke liye upyogi ho sake. Aur aaj ke time par hum mobile phones ko alag-alag tarike se use karte hain. Toh hum ek tarah se ek use case ke case mein hum mobile phone ko aaj ke aur probably futuristic tarike se kaise usko reimagine kar sakte hain uske upyog ko aur apne alag-alag karyon ko karne ka khaastaur pe jo LLMs aur artificial intelligence ki takneeki hai jis tezi se woh aage badh rahi hai. Kaise hum uska upyog karke alag-alag cheezon ko bade achhe se kar sakte hain aur manushyon ki aavashyaktaon ko bade saralta ke saath bahut hi kam intervention ke saath hum achhe se kar sakte hain aur last mein hum tutorial karenge LLM aur HCI ke upar aur last mein hum ek assignment denge. Toh chaliye sabse pehle hum jaante hain large language model kya hai? Toh ek tarah se large language model ko agar humein samajhna hai toh humein is tarike se samajhna padega ki yeh ek ek tarah se super smart agent hai, assistant hai jo ki general text jo bhi ek aadmi ki tarah manushya ki tarah ek jo bhi natural language conversation hota hai usmein jo bhi aap text likhte hain ya bolte hain woh usko samajh sakta hai aur usi ki tarike se woh usko generate bhi kar sakta hai, likh sakta hai. Jaise uska ek achha example agar hum dekhein toh ChatGPT aajkal aap use karte hain. Toh jo bhi usse aap prashn natural language mein poochte hain, apne saahaj bhasha mein poochte hain toh ChatGPT usko samajh ke aapke prashn ko samajh ke usko uttar nikalta hai process karke aur uske baad aapki bhasha mein punah usko likh ke ya bol ke ya alag-alag modality ke madhyam se aapko uska uttar deta hai. Toh ek tarah se aap jaise simple Google search karte hain us tarike se ek tarah se yeh conversation ke liye aapke paas ek search engine ki tarah keh sakte hain isko. So they are powered by artificial intelligence. Jaise artificial intelligence ka use karte hue ya dher saare bahutere jo internet pe available data hai us pe train kiya gaya hai. Usmein books hote hain, alag-alag websites hote hain. Alag-alag jitne bhi resources internet pe available hain unko use karke aur ab toh usmein images aur videos bhi add hote hain. Multimodal LLM ki baat hum jab karenge toh ek tarah se agar hum is samay market mein dekhein toh aise bahut LLMs available hai kuch open source hain, close kuch close hai jaise GPT ek tarah se close source hai aur agar hum Llama ki baat karen toh jo ki Meta dwara release kiya gaya hai woh iske alag-alag version hai. Ek tarah se yeh open source hai. Us tarike se ek tarah se dheron aise example hum dekh sakte hain jo ki hai jaise DeepSeek hai, Perplexity ek tarike se aap keh sakte hain ki search engine ki tarah hai but usmein aapko information ke saath-saath uske sources ko bhi bataya jaata hai jisse ki aap uske baare mein aur jaankari prapt kar sakein ya usko validate kar sakein. Is tarah se aap dekh sakte hain dheron bade buddhimatta is tarah se dheron bade bhasha model par aadhaarit dheron models hain jinko aap alag-alag use case mein alag-alag tarike se apne hisaab se use kar sakte hain. Zyadatar jo close source model hai agar aap unko use karna hai toh aap API ke madhyam se jo woh API dete hain uske liye woh paise charge karte hain. Aap unko use karke inke models ko bhi use kar sakte hain. Kaafi

companies aisi hain jo ki apne product ko inke API ke madhyam se karti hain. Jaise agar hum Perplexity ki baat karein toh Perplexity AI ek tarah se GPT based hai aur apne karya ko GPT GPT ke jo models hain us us pe aadhaarit apne karya ko karta hai. Toh agar hum jaise is example ki baat karein yeh keval question answer hi tak seemit nahi reh gaya hai. Ismein jo generation kiya jaata hai content ka text ho chahe image ho, uh ya multimodal koi bhi data ho woh ek tarah se usmein creativity bhi add ki ja sakti hai. Jaise yahan pe GPT-4 se humne poocha right a five line poem about pizza in a image of delicious pizza. Toh ek tarah se isko do karya diye gaye. Pehle ek pizza ki image banani hai aur uske baad us pe paanch line ki ek kavita likhni hai. Toh ek tarah se dekhenge yahan pe inhone kavita likha hai. Hot and doughy, creamy, cheesy crust, a dirty dreams, tapping fresh, topping fresh and flavor street, hot and fresh, lovely great, flavorly great waghera waghera is tarah se dekh sakte hain. Unhone ek kavita likh di hai. Toh ab is tarah se jo bhi aapke paas uttar generate ho ke aa rahe hain AI ke AI ke madhyam se aap agar isse santusht hain toh achhi baat hai. Probably aap like kar sakte hain. Asantusht nahi hai toh aap isko further ek apne prompt ya comment ke madhyam se jo bhi aapki requirement hai apni aavashyaktaon ke anusaar usko bolenge isko further change kariye. Jaise aap yahan pe bolna chahte hain ki ismein topping change kar dijiye. Ismein abhi yeh olive hai. Olive ki jagah ismein paneer daal dijiye. Ismein mushroom daal dijiye. Yeh non vegetarian pizza lag raha hai toh aap bol sakte hain isko vegetarian pizza bana dijiye. Apne zarooraton ke hisaab se aap isse samvaad kar sakte hain aur samvaad ke madhyam se yeh model isne jo bhi generate kiya tha usko further change karega aapke aavashyaktaon ke anusaar toh ek tarah se aap dekh sakte hain ki jo upyogkartaayein hain unki zarooraton ke mutabik se yeh apne output ko change kar raha hai aur bade aasani se aur keh sakte hain bade kam samay mein ek tarah se isne image bhi generate kar diya, kavita bhi likh di uske hisaab se aapke hisaab se change bhi kar diya. Toh is tarah se hum dekhein yeh aaj ke samay mein bahut hi mahatvapurna hota ja raha hai. Jaise yeh ek tarah se boost productivity aapki productivity ko bahut tez kar dega kyunki pehle agar aapko is image ko is kavita ke saath banana hota toh shayad aapko ghante lagte, do ghante lagte ya zyada lagte. But abhi ek chand seconds mein aapke liye aisa inhone generate kar diya. Learn anything. Toh yeh kuch bhi seekh sakta hai. Isko aapko sikhane ki zaroorat hai. Example dene ki zaroorat hai. Yeh kisi bhi problem ko, zyada tar problem ko solve kar sakta hai. Agar aap usko batayein ki isko solve kaise karna hai. Creativity spark, ek tarah se creativity dekh rahe hain ki jitne bhi alag-alag isne creativity seekhi hai. Jis tarah ke data pe isko train kiya gaya hai. Ab usko apply karke aapki zaroorat ke hisaab se woh apne output ko generate karta hai. Creativity dikhata hai aur tailored help ek tarah se aapki jitni bhi possible madad ho sakti hai. Aapke customize requirement ke hisaab se woh usko badalta rehta hai. Toh humne jaise Perplexity ki baat ki toh ab chaliye hum Perplexity AI ke baare mein halka-phulka jaante hain. Kaise woh humein madad kar raha hai? Toh Perplexity AI kya hai? Ek tarah se yeh modern AI powered search engine hai. Jaise normal aap Google pe ek search karte hain kisi bhi information ko dhoondte hain toh woh kuch list of pages ko de deta hai. Aur ab aur un pages mein se aap keh sakte hain kabhi kadaar jo top result hota hai uske kuch extract ko de deta hai. Kuch part ko dikha deta hai result ke pehle jisse ki aap samajh paayein ki yeh bolna kya chah raha hai. But zaroori nahi hai ki jo prashn aapne pooche uh exactly us jo

sources ko aap ya jin pages ko Google de raha hai sahi tarike se ya poori tarike se wahan pe answer kiya ho sakta hai usko uttar dene ke liye usko ek se zyada pages ko refer karna pade usse uttar nikalna pade toh Perplexity AI ek tarah se jo ki inke jo CEO hain Arvind, IIT Madras ke alumni hai aur woh is company ko chala rahe hain aur unhone ne ek tarah se jo apna navachar kiya aaj ke time pe bahut badi company banti ja rahi hai. Iske madhyam se aap jab bhi koi prashn poochte hain toh woh alag-alag sources se uska uttar banata hai, generate karta hai aur aapko un sources ke baare mein bhi batata hai. Yeh yeh sources hain. Chahe woh web page ho, chahe video ho, chahe audio ho and so on. Toh ek tarah se aur yeh LLM reasoning jo combine karta hai woh GPT-4 ko use karke karta hai with real time web search. Aur ek tarah se yeh humein pradaan karta hai concise, cited jis source ko se isne liya hai, conversational answer apne prashn ke mutabik aap ismein baat kar sakte hain, answer change kar sakte hain toh yeh kaise alag hai? So it acts like a smart assistant that searches, summarizes and sites jo ki kuch had tak uh iska kuch part hi Google search karta hai. Is wajah se aaj ke samay mein jitne bhi naye companies aa rahe hain, woh Google jaisi badi companiyon ko bhi challenge kar pa rahe hain. Jo ki pehle large language model ke pehle possible nahi ho pa raha tha. Toh it is useful for quick answer research, exploratory queries. Toh alag-alag tarike se aap dekh sakte hain. Toh uh jahan tak mujhe pata hai Perplexity AI ne kaafi dher saare Indian institution ko free license bhi de rakha hai. Toh agar aap in institution se hain toh uska laabh bhi utha sakte hain. Toh kaise Perplexity AI kaam karta hai? Chaliye briefly iske baare mein dekhte hain. Toh agar hum dekhein toh yeh ek jo kyunki hum jaise maine bataya ki kisi bhi AI base system ya kisi bhi system se agar aapko koi karya karna hai toh aapko usse samvaad karna padega. Use apne prashn ko batane padenge. Toh yahan pe input kya hoga? User asks natural language question. Achhi baat hai ki jo bhi aapki bhasha hai saahaj bhasha hai us bhasha mein aap apne prashn poocha aur woh uske mutabik jitne bhi real time mein information web se nikaal sakta hai nikalega aur LLM processing karta hai. Use GPT's model to understand and summarize toh jo prashn aapne poocha usko samajhta hai us prashn ke mutabik phir jo jo information usko nikalni hai process karni hai, process karta hai aur usko phir ek tarah se uski summary bana ke aapko deta hai toh response mein ek tarah se output a concise answer with clickable citation. Kuch citation bhi dete hain. Jahan se jin sources se ek tarah se is inhone answer banaya hai jisse ki aap wahan pe jaake aur bhi detail ke baare mein le sakein. Aap follow up kar sakte hain. Support multi-turn dialogue for deeper queries kyunki saare prashn aise nahi ho sakte ki aap ek baar mein hi nikaal lein. Toh aap prashn follow up question karke pehla question poocha, phir usse follow up doosra question poocha. Teesra poocha hai. Is tarah se aap follow up kar sakte hain. Example taur pe dekh sakte hain. So prashn tha what is the latest update on AI regulation in European Union. Toh uske case mein aap dekh sakte hain ek summarize content dega. Yeh yeh ek tarah se AI regulation hai European Union mein. Uske baad aapko alag-alag ek tarah se link de dega. Aap is web page par ja sakte hain. Is web page pe ja sakte hain. Is video ko dekh sakte hain. Alag-alag modality ke aapko sources de denge jismein jahan pe jaake aap unko refer kar sakte hain. Toh agar hum isko iske key feature aur comparison ki baat karein jo aur bhi available LLMs hain, agents hain toh Perplexity AI ek tarah se dekhein GPT-4 based hota hai aur Google search mein ek tarah se ab dheere-dheere yeh bhi hota ja raha

hai. But shuruwat mein toh utna nahi tha aur real time mein search hota hai. Uh ChatGPT mein browser pe aap use kar rahe hain tabhi hota hai. Otherwise nahi hota hai. Aur Google search toh real time search hota hi hai. Citations yahan pe citations provide karta hai. Aur Google search mein normally jaise maine bataya keval alag-alag web pages de dete hain. Relevance se jo bhi result mein aa rahe hain. Yahan pe aap follow up question kar sakte hain. Google mein at least abhi tak follow up question nahi hai. Anles aap uske advance LLM base search kisi mein jaayein toh. Toh key features ek tarah se dekhein toh yeh real time web access hota hai. Cited answer hota hai jisse ki paadarshita hoti hai. Natural conversational flow hota hai aur kaafi clean aur fast UI hai inka. Toh ek tarah se dekhein aap keh sakte hain ki yeh saari cheezein upyogita ko bahut badhati hain. But agar yeh saari cheezein achhe interface ke saath agar hum nahi denge sampark bindu ke saath nahi denge jisse achhe se samvaad kar paayein toh ek tarah se uski upyogita kam ho jaati hai. User experience kam ho jaata hai. Toh ek tarah se hum dekh rahe hain dono kaise bade bhasha model ko use karte hue kaise LLM aur HCI dono overall Perplexity AI ko ek bahut hi achha system banate hain ek summarized answer ke liye with cited sources. Toh is tarike se aap dekh sakte hain kaise Perplexity AI ek bada achha kaam kar raha hai aur aage badh raha hai. Agar hum iske use case ki baat karein toh kaafi quick aur trustworthy factual answer hote hain kyunki aapko source bhi de raha hai. Academic aur technical research ke liye, anusandhan ke liye kaafi madadgaar saabit hoti hai. Ki yeh summarize kar raha hai current news ya jo bhi prashn aapne poocha toh ek tarah se uske baare mein bata sakta hai. General knowledge aur comparison aap unse pooch sakte hain. In dono mein kya antar hai? Toh again dono sources ko dekh ke aapko comparison karke bata dega. Iske limitation bhi hai. Aisa toh hai nahi ki saare prashn saare samasyaon ko solve kar diya hai. Toh quality depends on source material not suited for long form content creation, limited extensibility compare to ChatGPT plugin. Toh abhi bhi yeh in sab cheezon pe Perplexity AI ko karya karna hai aur kar hi rahe hain. Toh Perplexity AI blends search with AI reasoning ideal for efficient, accurate and citation back in discovery. Toh jis tarike se Perplexity AI ne ek tarah se jis tarike se hum information ko search karte the usko poora paradigm change kar raha hai. Toh DeepSeek ne bhi kuch aisa hi kiya hai. Toh DeepSeek ek tarah se advance open source large language model hai. Develop by Seek, DeepSeek region and DeepSeek code team. Toh jaisa ki Sam Altman jo ki OpenAI ke founder hain. Jab woh India aaye the toh unse poocha gaya ki agar India ko OpenAI jaisa kuch banana hai, ChatGPT jaisa kuch banana hai toh kya karna padega? Unka uttar tha ki aap kar hi nahi sakte. Toh ek tarah se unhone demoralize bhi kiya aur ek tarah se ek unka message tha. Yeh toh meri monopoly hai. Hamari company ke paas jo resources hain aap kisi ke paas nahi hai. But DeepSeek ke jo team ne jo ek amazing changes aur ek tarah se unko challenge kiya ki nahi aisa nahi hai ki aap utne paise aapko kharch karne ki zaroorat hai. Utne resources ki zaroorat hai. Unhone bahut hi buddhimatta ka use karte hue intelligent tarike se, novel tarike se architectural changes kiye jisse ki models ko bade aasani se kam paise mein ek tarah se train kiya ja sake aur inhone isko open source bhi bana diya. Toh ek tarah se OpenAI ki jo monopoly thi usko unhone challenge kiya aur usko bahut hi bada dhakka laga aur OpenAI ko aap dekh sakte hain uske baad kaafi nuksaan bhi hua jaise Microsoft, Nvidia in sabke stocks bhi us din achhe khaase gire the toh chaliye hum aage badhte

hain ismein aur it compete with GPT series jaisa ki humne bataya Gemini, Gemini, Claude, both general code space class in sab se ek tarah se woh compete kar raha hai. Toh iske alag-alag variant hai jaise DeepSeek VL multimodal cheezon ke liye, DeepSeek coder jaise code generation, debugging, programming mein help ke liye, DeepSeek MOE mixture of expert, efficient for large scale performance is tarah se alag-alag yeh model variants hain. Toh agar hum key feature of DeepSeek ki baat karein toh ab ismein bhi multimodal capability jaisa ki humne baat kiya tha using its DeepSeek VL coding proficiency toh humne jaise DeepSeek coder ki baat ki thi aap coding kar sakte hain isse program likhwa sakte hain, program mein madad le sakte hain toh yeh saari documentation kara sakte hain. MOE skill jaise humne pehle baat kiya tha, mixture of expert, boost performance, efficiency hai. Open source yeh iski sabse achhi baat hai aur isne motivate diya baaki aur desh ko apna khud ka ek tarah se LLM banane ke liye. Toh DeepSeek se inspire ho ke ab India mein bhi apna khud ka LLM ban raha hai, baaki bhi desh apne LLM bana rahe hain aur kyunki sabse badi dikkat yeh hoti hai ki models toh available hota hai lekin jo data hota hai woh proprietary hota hai aur har koi privacy ki wajah se, gopniyata ki wajah se, suraksha ki wajah se apne data ko doosre desh ko nahi de sakta hai. Agar hum poori tarike se yeh saara data OpenAI ko de dein, DC ko de dein toh ek tarah se humein un pe poori tarike se nirbhar rehna padega. Isiliye swadeshi nirman bahut zaroori hai aur ek tarah se DeepSeek aur usse related jo open source model hai unka upyog karke hum apna khud ka LLM bana sakte hain aur kaafi aise research lab hai India mein jo ki is direction mein bahut hi achha karya kar rahe hain. Chahe woh IIT Madras ki team ho, chahe IIT Delhi ki team ho, Triple IT Delhi ki team ho, IIT Bombay ki ho, alag-alag aise institution hai jo ki is area mein bada achha karya kar rahe hain. Competitive benchmark ek tarah se jaisa ki humne pichle saptah aath mein baat ki thi ki bolne se nahi hota hai ki aap daawa kar sakte hain DeepSeek jo hai sabse achha ya comparable hai OpenAI se aur jitne bhi aur LLM hai toh bolne se nahi hoga. Uska aapko mulyankan karna padega alag-alag benchmark ke upar. Toh inhone alag-alag competitive benchmark pe sabse compare kiya aur dikhaya ki kaise woh unse achha ya barabar perform kar rahe hain aur with fraction of the cost jitna OpenAI ko lagta hai. Toh agar hum DeepSeek ke application ki baat karein toh yeh bhi alag-alag tarike se aapki madad kar sakta hai. Jaise ki agar hum dekhein toh software development mein madad kar sakta hai. Autocompletion of code generation mein, bug fixes mein, alag-alag language programming language ko support karta hai. Jaise Python hua, Java hua, C++ hua aur agar hum multimodal AI task ki baat karein jaise ki aaj ke time pe cheezein multimodal hain. Jis bhi data ya content ki hum baat karein multimodal hai toh us case mein multimodal AI ki bahut zaroorat hai. Image captioning ke liye, OCR ke liye, documentation ke liye, video understanding ke liye, audio understanding ke liye aur agar hum education aur research ki baat karein toh aap isse AI tutoring system bana sakte hain. LLM research and scale kar sakte hain. Aur bhi bahut research kar sakte hain. Enterprise solution ki baat karein toh aaj ke time pe jaise alag-alag companies ke customer care ki baat karein toh unke paas itne customer care nahi hai. Customer executive ka agent nahi hai jitne hone chahiye. Jaise agar hum State Bank of India ki baat karein aap soch sakte hain uske kitne customer honge? Karodon karodon customer honge. Toh kya un karodon customer karne ke ko handle

karne ke liye kya unke paas karodon ya lakhon customer executive hai? Nahi hai toh us case mein humein AI ke madhyam se LLM ke madhyam se hum ek aisa internal chatbot bana sakte hain jo ki jo alag-alag samasyayein unke upyogkarta face kar rahe hain unko quickly aur bade achhe se bade tezi se unki madad kar sakein. Toh ek tarah se aaj ke time pe is tarah se chatbot kaafi madadgaar saabit ho rahe hain. Again dev operations ko, pilots ko, pilot ek tarah se jo aapke saath aapki madad karta hai kisi karya ko complete karne ke liye chahe woh coding ho chahe koi aur karya ho, chahe poster banana ho, chahe kavita likhna ho jaise humne shuruwat mein example ki toh ek tarah se woh aapke saath aapke zaroorat ko poora karne mein aapki kaafi madad kar raha hai. Toh AI powered customer support jaisa ki humne shuruwat mein baat ki internal chatbot bhi usmein use kar sakte hain ya internal chatbot keval organization ke andar ek doosre se baat karne mein samajhne mein, documentation ko samajhne mein madad kar sakta hai. Agar hum iske competitor se iski comparison karein toh alag-alag jo model DeepSeek aur GPT-4, Claude, Gemini, Mistral jo dher toh agar aap dekhein toh comparison mein open source hote hue bhi yeh bade achhe se almost saari cheezon mein bada achha karya kar raha hai. Jabki baaki jo LLMs hain abhi utna har level pe support nahi karte but woh bhi kar hi rahe honge. Toh chaliye hum aage badhte hain. Toh ek tarah se DeepSeek jo hota hai offers a powerful open LLM for multimodal, code centric and scalable AI application and it poised as a serious GPT competitor. Toh bahut achhi baat hai. Aaj ke time pe OpenAI bhi ek tarah se company bani ki non-profitable company usne ek tarah se jitne open source model aur data usko use karke hi apna model banaya aur aaj ke time pe woh kehti hai ki woh profitable company hai. Toh isliye OpenAI ko ek open source company ke dwara agar aisa competition milta hai toh bahut achhi baat hai. Toh chaliye hum jaante hain ki large language model kya hai aur kaise hum LLM bade bade bhasha model ki taraf aage badhte hain. Toh language model ek tarah se kuch nahi hai. Yeh next word ko ek tarah se predict karta hai aapke sentence mein. Jaise aapka sentence hai Triple ITD students like to. Ab uske paas aapke paas ek tarah se probability ke madhyam se aap keh sakte hain ki jaise jitne bhi aapne example dekhe hain agla word kaun sa hona chahiye? Toh jo sabse zyada probability hai study ki hai toh Triple IT students like to study. Toh ek tarah se auto completion us sentence ka hua. Is tarike se uski madad karta hai. Agar hum dekhein toh yeh language model kahan-kahan use ho sakte hain toh yeh grammar ke task mein aapko madad kar sakte hain. Jaise in my free time I like to. Ab ek tarah se aapke paas jo possible words hain run, banana toh aap run ko choose karenge. Lexical semantics ki baat karein. I want to, I went to zoo to see giraffe, lions and zebra or spoon agar option hai toh obviously yahan pe hum logon ki baat kar rahe hain toh hum wahan pe zebra ko dekhenge na ki spoon ko dekhenge. Toh ek tarah se semantics ko bhi woh samajh raha hai. World knowledge ko samajh raha hai. Jaise the capital of Denmark is. Ab yahan pe London, Copenhagen likha hai. Toh aapne isko Copenhagen choose kiya. Sentiment analysis hum nikaal sakte hain. Jaise koi bhi movie reviews waghera nikaalte hain. Toh hum janana chahte hain ki uska review kaisa raha. Logon ne usko pasand kiya. Positive sentiment raha ya negative sentiment raha, good raha, bad raha. Toh yeh saari cheezein aap ek tarah se sun ke dekh ke aap samajhte hain. Lekin agar aapko aise movies pe jaise lakhon logon ne apne reviews de rakhe hain. Toh aap automatic tarah sabko manually padh ke toh aap nahi nikaal

sakte. Nikaal sakte hain. But kitna samay lagega, kitni resource lagegi, kitne paise lagenge. Agar hum simply ek AI model ke madhyam se in lakhon reviews ko chand second ya minton mein process karke bata paayein ki aisa zyada tar logon ka review hai jo ki ek honest aur sahi review aapko mil payega. Usi tarike se aur hard sentiment analysis keh sakte hain jahan pe jo sentences hai thode se complex ho jayenge. Chahe woh translation ki baat ho, chahe woh special reasoning ki baat ho, chahe woh simple math ke questions ho. Toh is tarike se hum dekhte hain ki jo bhasha model hai bahut hi aham bhumika nibhata hai. Artificial intelligence ke jab hum natural language processing ki baat karte hain toh bahut hi aham bhumika nibhata hai. Lekin kya yeh bhasha model saare problem ko solve karta hai? Toh agar hum dekhein toh jab jaise hum thode se aur complex situations mein jayenge toh jo bhasha model hai bade achhe se kaam nahi karte jahan pe current world knowledge ho. Jaise the stock price of Apple on March 1st 2023 is nahi pata nahi nikaal sakta. Agar bahut bade number sum karne ke liye de de toh shayad woh nahi kaam karega. Agar jahan pe multi-step reasoning ki baat hoti hai wahan pe bhi woh nahi kar payega achhe se. Predict the future nahi jaante, nahi bata sakte future ke baare mein. Information not in the training data. Jaise zyada tar jo bhasha model hote hain jis tarah ke model jis tarah ke data ke upar train hai usi tarike se woh uske uttar ko de paata hai. Agar usne waisa data nahi dekha hai toh ek tarah se us pe uttar nahi de payega. Toh extremely long input bahut lamba aapne input jaise 2000 page ka aapne Harry Potter ka jo fan fiction book tha woh de diya. Ab usse question answer poochenge toh utne bade context ko woh handle nahi kar paata hai aur aapke prashnon ka uttar nahi de payega. Toh is wajah se humein ek tarah se bhasha model se bade bhasha model ki aur jaane ki zaroorat hai. Toh this transition from language model to large language model marked a substantial growth in jo bhi number of parameters hain, complexity hai, adaptability of the model hai. Toh, number of parameter ke badhne se ek tarah se yeh aur bhi world ki jaankari ek tarah se apne andar samahit karta hai. Aur aur bhi kathin prashnon ko aur bhi kathin task ko ab aur bhi better tarike se kar paata hai. Agar hum dono mein antar dekhein toh language model jo hota hai typically features a small parameter count and is suited for basic language task. Jabki iski jagah hum large language model ki baat karein toh yahan pe jo parameter count hai bahut hi zyada hote hain aur woh humein madad karte hain advance language processing capabilities mein. Toh ek tarah se language model hota hai. Yeh achha hota hai jo basic language task hote hain. Jaise text completion, next word prediction ki baat kar rahe the. Sentiment analysis ki baat kar rahe the. Simple jo chatbot jo conversation kar sakta hai simple. But agar hum thode se complex situation mein jaayein ya complex natural language processing ki baat karein toh language model achhe se kaam nahi karta hai. Toh wahan pe large language model bade achhe se language translation, content generation, dialogue system in sab cheezon mein bahut achhe se karya karta hai. Toh iske baare mein aur bhi jaankari ke liye aap is particular resource ko refer kar sakte hain. Aise dher saare aur bhi examples honge jinko aap dekh sakte hain. Toh chaliye hum jaane ki large language model mein number of parameter in sab ki cheezon se badhne se yeh kaise iski capability badh gayi. Toh chaliye agar hum jaane toh science mein jaise bola gaya hai emergence is when quantitative changes in a system result in qualitative changes in the behavior. Toh jaise agar hum quantity ko badha dein toh uske jo qualitative result hote hain woh bahut hi usmein

zyada antar aate hain. Example ke taur pe agar hum dekhein jaise hum uranium ki baat karte hain. Agar hum chhota uranium ka thoda sa part use karte hain. Control tarike se karte hain toh usse hum bijli paida kar sakte hain aur alag-alag bade achhe karya kar sakte hain. Lekin agar hum usko zyada maatra mein use karenge toh woh ek tarah se atom bomb ka ki tarah kaam karta hai. Jaisa atom bomb kya kar sakta hai? Yeh humne Hiroshima, Nagasaki mein dekha tha aur abhi alag-alag desh ke paas atomic power hai. Pehle se aur bhi zyada bade atomic powers hain. Toh aap jaan sakte hain ki jaise-jaise uski size badhti jayegi, woh itna aur khatarnaak hota jayega. Usi tarike se aap dekh sakte hain jaise-jaise number of parameter ismein badh rahe hain. Matlab ek tarah se hum bolein data ko badha rahe hain jis pe hum train kar rahe hain. Parameters ko badha rahe hain. Toh iski quality mein bhi changes ho raha hai. Pehle ek tarah se agar hum is figure ko dekhein toh sabse pehle jab ismein kam parameter the. Jaise ek baar phir se isko shuru hone dete hain. Toh agar hum jaise yahan par dekhein jab 8 billion parameter tha toh yeh keval language understanding, arithmetic aur jaise-jaise parameter badhta ja raha hai toh aap dekh sakte hain naye aur task ko handle kar pa rahe hain jaise summarization hua, code completion hua, translation hua. Ab jaise number of parameter agar aur badhte gaye is bade bhasha model mein toh aur bhi naye task ko complex task ko aur achhe se handle kar payega jaise physics, question answering, joke, explanation, dialogue, general knowledge, reading, comprehension, summarization, logical inference, common sense reasoning ek tarah se aur bhi is tarah se madad karta ja raha hai. So at the scale of model increases the performance improves across task while also unlocking new capabilities. Toh is tarah se hum dekh sakte hain ki kaise LLM ki yeh amazing property hai. Emergence of new capability as the size of the network jo network use kiya ja raha hai isko train karne mein woh bada hota ja raha hai. Toh yeh jo large language model hai ek tarah se transformer based architecture pe nirbharit hote hain. Ismein aap dekhenge toh ismein alag-alag components hote hain. Jaise input embedding hota hai. Yahan pe aap dekh sakte hain aur positional encoding hota hai. Toh jaise aap yahan pe dekh sakte hain alag-alag positional encoding hai. Agar hum GPT aur LLM ki baat karen toh dono ne transformer architecture use kiya. But thode bahut changes in architecture mein inhone apne hisaab se kiye hain. Encoder ki baat karen aur usi tarike se self attention jo ki key hai kisi bhi transformer mein yeh in logon ne kaise use kiya hai? Jaise yahan pe multi-head attention use kiya hai aur Llama ke case mein group query attention use kiya hai. Feed forward network use kiya hai. Jaise yahan pe aap dekh sakte hain decoder layers hain. Uske baad multi-head attention hai. Layer normalization hai, output layer hai. Toh is tarike se agar aap dekhenge toh alag transformer ke alag-alag variants ko inhone ek tarah se use karke apne large language model ko banaya hai. Toh is is transformer ke baare mein architecture ke baare mein aur bhi jaankari ke liye yeh ek seminal paper hai. Attention is all you need jo ki NeurIPS conference mein publish hua tha 2017 mein. Aap isko refer kar sakte hain. One of the best paper hai. Isko bilkul aapko dekhna chahiye aur samajhna chahiye. Toh jaisa ki humne baat ki ki agar hum AI ke madhyam se LLM ke madhyam se koi karya karwana chahte hain toh humein use samvaad karna padega. Apne prashn ko dena padega. Natural language mein dena padega. Toh prompting ek tarah se tarika hai jiske madhyam se aap large language model ko koi instruction dete hain ya apne question ko poochte hain. Aur yeh zaroorat iski iski zaroorat

kyun hai? Because the quality of the prompt affect the relevance and the accuracy of the response. Jitne achhe tarike se aap prashn poochenge utna achha aapko response milega. Toh ismein alag-alag aap dekhenge toh prompting techniques hain. Jaise yeh saari cheezein yahan pe mention kar rakhi hain. Inmein se kuch ke baare mein hum abhi aage discuss karenge. Aap is source pe dekh sakte hain in 12 prompt engineering techniques ko uh jo ki use kiye jaate hain. Ab toh aur bhi hain. Uh toh aap isko zyada detail ke liye isko phir se refer kar sakte hain. Chaliye aage badhte hain. Alag-alag prompting technique ko jaante hain. Toh pehla prompting technique hai zero-shot prompting. Toh yeh ek tarah se sabse simple tarika hota hai prompt karne ka. Jaise is case mein aap simply apne jo bhi aapke prashn hai woh model ko dijiye aur poochiye result kya hai? Jaise yahan pe input hai I I will bet the video game is a lot more fun than the film. Toh us case mein aapne poocha ki iska sentiment kya hai? Toh apne aap bas uska sentiment bata dega. Toh us case mein aap expect kar sakte hain jo bhi us model ko aata hai uske hisaab se simple woh aapko answer de dega. Toh kabhi-kabhi hota hai ki jo uttar dega woh aapke mutabik nahi hai. Toh aap ek tarah se aap model ko batate hain ki nahi achha mujhe is tarike se response do. Mujhe aise response do. Toh jaise us case mein aap few-shot prompting karte hain. Jahan pe yeh ek takneeki hai jiske madhyam se aap in context learning ko karte hain. Ek tarah se context batate hain ki aap kaisa response chahte hain. Where we provide demonstration in the prompt. Jaise hum jo hamara prompt hai usi mein hum ek tarah se demo ke madhyam se example ke madhyam se usko batate hain ki mujhe kaisa chahiye. Jaise yahan pe aap batate hain all over the stage dancing, running, sweating, mopping, his face and waghera-waghera toh iska sentiment positive hai. Toh humein jab hum sentiment poochenge toh humein positive batao aur aise sentences ke liye agar hum poochein despite all evidence to the contrary this clunker has somehow managed to pose as actual. Toh ek tarah se negative sentiment hai. Usi tarike se alag-alag example de diya. Uske baad ab main same prashn isse poochunga jo prashn yahan par poocha tha. Toh yahan par ab yeh mujhe uttar dega positive ya negative. Toh ek tarah se few-shot prompting mein ek tarah se aap model se ko kuch example bhi dete hain, batate hain aur uske hisaab se woh aapko uttar deta hai. Iske baad hai instruction prompting. Usmein aap ek tarah se dekh sakte hain instruction forms mein instruct GPT aur natural terms mein ek tarah se dher saari cheezein hain. Jahan pe we fine tune in model with a high quality tuples of task instruction input ground truth. Toh us case mein jo bhasha model hai woh aur bhi achhe tarike se aapke intention ko samajhta hai aur instruction ko follow karta hai. Jaise is case mein aap dekh sakte hain for example to produce educational material for kid. Toh yahan par aapne bataya describe what is quantum physics to a six year old and safe content. Toh in language that is safe for work. Is tarike se aapne usko instruction diya aur uske mutabik phir woh aapko content dega. Toh is tarah se humne dekha ki kaise large language models emergence, quantitative changes ki vajah se qualitative changes hote hain jab woh emerge karta hai toh humne jaise bataya ki aajkal hamare jeevan mein hum multimodal hote ja rahe hain. Hamari zarooratein multimodal hote ja rahi hai. Hum multimodal data se interact kar rahe hain. Toh humein multimodal LLMs ki bhi zaroorat padegi. Hum keval text tak seemit nahi rehte hain. Hum image, video aur aur bhi jo alag modality hai us pe bhi generation karna chahte hain. Uski understanding karna chahte hain aur usse related

prashnon ko uttar dena chahte hain. Jaise jaisa ki humne pehle ke saptah mein bataya tha ki Audino ke madhyam se aap apne lecture video ko upload kariye aur phir usse natural language mein question answering kariye. Toh ek tarah se woh aapko jo video tha usko samajh liya aur uske mutabik aapko uske uttar dene mein aapki madad kar raha hai jisse aap us video ko achhe se samajh paayein. Jaise aap usse poochein ki isko video ko summarize kariye. Is video mein inka kya tatparya tha? Is video ka conclusion kya tha? Is video ka take away point kya tha? Toh apne hisaab se aap alag-alag answer generate kar sakte hain. Toh multimodal large language model process and integrate multiple types of input such as text, images, audio and video. Toh, ek tarah se yeh prominent subset of large language vision model hai which combine text and image processing. Aur ek tarah se yeh jo model hai convert karte hain text and other data types into a common encoding space and generate response incorporating information from multiple modalities leading to more accurate and contextual output. Jaise is case mein alag-alag input ho sakte hain images ho sakte hain, documents ho sakte hain, text ho sakte hain, audio ho sakta hai ya video ho sakta hai toh where it may multimodal input ek tarah se jaata hai aur multimodal LLM usse seekhta hai aur uske mutabik aapke prashn ke mutabik woh alag-alag multimodal response aapke liye generate karta hai. Jo GPT-4, uske alag jo advance version hai, Gemini, LLaVA ke aur jo naye versions hain LLaVA ke bhi woh ek tarah se in sab cheezon ko multimodal LLM ko support karta hai. Example ke taur pe aap yahan pe dekh sakte hain. Toh jaise enable diverse application like visual question answering. Toh ek hota hai question answer jahan pe aap jo alag-alag text document hai aap usmein text mein question poochte hain. Visual question answering mein aap jo prashn pooch rahe hain woh video ya images ke pe aadhaarit hota hai. Jaise is case mein aapne yeh image upload ki aur poocha what is unusual in this picture? Toh yahan pe ek tarah se LLM jo ki bata raha hai the image is unusual because it creates an optical illusion. Bachpan mein humne ek sardar ji wala photo dekha hoga. Jaise agar hum usko ulta kar de toh female dikhta hai. Seedha kar de toh sardar ji dikhte hain. Toh ek tarah se optical illusion hota hai. Toh at first glance it look like a face with a beard and oddly positioned on a body but upon closer inspection humne dekha ki it appears that the person's head is upside down with their arms bent and making the back of their head resemble as a face. Toh ek tarah se ek tarah se optical illusion ho raha hai aur video isko samajh pa raha hai aur jo aapka multimodal LLM model hai usko achhe se samajh pa raha hai. Usi tarike se yahan pe aap dekh sakte hain aapne yeh image diya aur usko bola ki iska caption bataiye. Toh ek tarah se isne iska caption de diya chasing sunset and dreams, natural vibes and ocean views. Aaj ke time par agar aap alag-alag social media platform use karte hain toh wahan pe ek tarah se multimodal LLMs use ho rahe hain. Jaise aap Instagram pe koi image daalein wahan pe ya ya Twitter pe koi images daalein toh wahan pe ek tarah se option aapko milta hai alag-alag social media pe ki iska caption generate kar do, post generate kar do, hashtag generate kar do. Khaastaur pe LinkedIn pe aapne dekha hoga. Jab bhi aap koi post likhte hain toh wahan par bolta hai generate by AI, rewrite by AI toh ek tarah se jo bhi aapne likha hai usko bade sundar tarike se, bade achhe tarike se ek tarah se usko phir se rewrite karta hai AI ke madhyam se aur alag-alag cheezein likh deta hai. Jaise is case mein kitna sundar isne caption diya hai. Chasing sunset and dreams aur ek tarah se jo

hashtag wahan pe isne de diya aur kuch stickers yahan pe laga diye jo ki dikhne mein bahut sundar lag rahe hain aur ismein fit baithte hain. Usi tarike se agar hum multimodal large language models ki baat karen toh aur bhi cheezein dekh sakte hain. Jaise GPT ke case mein yahan pe dekh sakte hain. Toh yahan pe humne user ne bola image of a sleepy monkey in a room. Toh ek tarah se isne kitna natural aur bada sundar isne image bana diya. Aur jaisa ki humne pehle bhi pehle ke chapters mein bataya tha kaise hamare research ke madhyam se hum alag-alag advertisement ko alag-alag image ko user ke behavior ko consider karte hue generate karte hain. Jo ki behavior optimize image generation ki baat karte hain. Woh humne ki thi pehle saptah mein. Toh usi tarike se yahan pe image generate kiya hai. Sora ek tarah se OpenAI ka hi video generator model hai. Jaise yahan par agar hum dekhein toh kaise isne ek video generate kiya hai. Agar main is video ko play karna chahun. Chaliye nahi ho raha but aap samajh lijiye ek video ban jaaye. Sora ke aap aneko example ko YouTube pe bhi dekh sakte hain. Yahan pe user ka input tha a video of live cafe aur is tarike se yahan pe video generate hoti hai. Toh aap dheron aise example dekh sakte hain. Toh ab hum apne aate hain kaise yeh LLM jo hai HCI ke saath agar hum use karen Human Computer Interaction concept ko use karte hue use karen toh kaise upyogita ko ya jo upyog karta hai uske anubhav ko aur achha bana sakte hain. Toh the intersection of LLM and HCI represent majorly in creating system that are more intuitive, jisse ki woh aur sahaaj hoga, adaptive hoga aur responsive hoga to the human needs. Human ki zarooraton ke hisaab se woh bade sahaaj tarike se unki zarooraton ke hisaab se aur tezi se unko response karega. Traditionally interacting with computers required users to adapt to rigid interfaces. Jaise is case mein aap yahan pe dekh sakte hain. Pehle aap kisi prashn ko poochte the chatbot aur zyada tar abhi ke system mein bhi yahi hota hai. Jab bhi aap koi prashn poochte hain toh woh aapko set of option de deta hai. Bolta hai ki ismein se aap kya chahte hain jo ki kaafi time pe yeh kaafi frustrating hota hai. User ke experience ko neech karta hai, kam karta hai kyunki inmein se jo bhi option de raha hai woh hai hi nahi aapke aur mujhe main sure hoon ki aapko aise dher saare aise jo chatbot aap use karte honge alag-alag kompaniyon ke chahe woh Zomato ho ya Swiggy ho ya alag usmein kaafi time aise chatbot ke response hote hain ki aapko given an option aapko select karna hota hai aur kaafi time aisa hota hai ki jo prashn aap poochna chahte ho woh hai hi nahi. Agar hum bade bhasha model ka prayog karke is interaction ko aur sahaaj bana dein. Jaise aapne yahan pe prashn poocha toh usne bola ki jo bhi bola toh usko samajh ke apne hisaab se natural language mein usne response kiya. Toh usi tarike se jaise best toh yahan pe yeh hota usne bola ki theek hai aap bataiye aapki dikkatein kya hai? Toh wahan pe phir woh aap alag-alag jo apne natural language mein cheezein likhte bolte usko samajh ke agar uttar karta toh jo upyog karta hai uske liye aur aasan hota hai. Usko bolna, apne problem ko batana, samjhana aur usi hisaab se apne prashn ko bade achhe se bade tezi se woh solve kar paata hai. Toh agar hum dekhein agar hum LLM in HCI dekhein toh yeh alag-alag kshetron mein apna kshetra phailata ja raha hai aur usko madad karta ja raha hai. Chahe woh education ho, chahe woh content creation ho, chahe personalization ho, social media ho, networking ho, chahe health care ho, har kshetra mein iski ek amit chhaap mit'ti ja rahi hai. Amit amit chhaap jo hai woh ek tarah se padti ja rahi hai. Jahan pe uska upyog karke aap alag-alag prashnon ko apne upyogkartaon ki

madad kar sakte hain. Unki zarooraton aur aashaon ke mutabik karya kar sakte hain. Jaise agar hum dekhein toh conversational AI ki LLM ke baad se jo aapke prashn hai natural language mein usko samajhna aur aasan ho gaya hai aur sahi tarike se aap samajh pa rahe hain. Isliye jo conversational based AI hai woh bahut tezi se badh raha hai. Har koi apna chatbot aur conversational agent bana raha hai. Toh LLM make it possible for user to interact with system in natural language. Toh yeh natural language ek tarah se key hai. Ab aapko jo fix set of options hain, questions hai, usko nahi choose karna padega. Aap apni saahaj bhasha mein jo bhi aapke prashn hai, aap likhiye, boliye aur uske hisaab se woh aapko uttar dega aur aapke problem ko solve karega. Toh, removing the need of technical knowledge or complex commands aur fix set of jo rigid interface hai. So broader adoption of AI. Toh, from customer support to customer creative tool to LLMs are becoming ubiquitous in HCI application. Toh har taraf hum dekhte reh kaise AI based technology hai woh humein jo bhi hum apne real life mein cheezein use kar rahe hain chahe woh social media ho, Instagram ho, chahe woh Facebook ho, chahe LinkedIn ho, chahe aaj ke time pe GitHub ho alag-alag code generation ke liye abhi aap dekh rahe hain woh use kar raha hai, debugging mein aapki madad kar raha hai. Human centered AI, maanav ko kendra mein rakhte hue kaise aap AI ke madhyam se uske karyon ko kar sakte hain. Sahi tarike se kar sakte hain. Toh yeh saari cheezein hum dekhein toh as an AI system become more capable and it is crucial to align them with the human needs and the value which is more philosophy which is the core philosophy of HCI. Toh agar hum in cheezon ko dhyan mein rakhte hue HCI ke core principal ko dhyan mein rakhte hue AI ko use karenge toh woh vardaana hai. Otherwise woh ek tarah se abhishaap bhi ban sakti hai. Aise aneko researchers hain. Aise aneko log hain jo ki batate hain ki AI aisa toh nahi ki kisi din duniya ko barbaad kar dega aur hum dekh bhi rahe hain ki AI ke kaafi dher saare misuse bhi ho rahe hain alag-alag tarike se jo ki hum aage slides mein bhi discuss karenge. Toh adaptive learning system ki hum baat karein jaise hum Moodle ki application ki hum baat karte hain toh personalize the learning experience by adjusting content based on the individual needs and performance jaise humne baat ki ki alag-alag jo students hain, upyogkarta hai unki buddhimatta alag hai, unke samajhne ki kshamata alag hai, woh unke bhasha alag hai, unke alag-alag ek tarah se needs hai toh kya hum unki zarooraton ke hisaab se content ko adaptively change kar sakte hain jaise agar unko English achhe se nahi aati toh kya hum corresponding uska sab Hindi mein translation karein? Kya usko hum bol ke batayein? Ya jo complex word hai ya complex sentence hai unko translate karke batayein. Jo bachhe bahut tezi se cheezein seekh rahe hain ya kuch cheezein jo ki unko already aati hai toh hum woh part ko skim through karein aur jo part unko nahi aata us pe hum zyada focus karein. Is tarike se hum adaptive learning AI ke madhyam se kar sakte hain. Personalize kar sakte hain. Rather than jaise class ki teaching hoti hai. Same content, same delivery saare students ke liye hoti hai. Kuch ko bahut slow lagta hai. Kuch ko bahut tez lagta hai. Kuch ko aasan lagta hai. Kuch ko bahut jatil lagta hai. Toh kaise hum adaptive learning system ek tarah se bana sakte hain aur yeh basically jo bhi learner ka data hai, unka interaction ka pattern hai, test score hai, engagement hai, in sab cheezon ko use karte hue aap educational content aur uske speed ko update kar sakte hain. Toh iska jo mukhya uddeshya hai to ensure the appropriate challenge and the support for each learner. Kyunki har jo

learner hai, har seekhne wala jo vidyarthi hai, uski aavashyakta alag hai, uski kshamata alag hai, uske seekhne ki pace alag hai, uski bhashayein alag hai. Toh is wajah se agar hum is tarah ka koi adaptive learning system banate hain, toh yeh ek varda hi hoga jo ki hamare is poore education system ko boost kar sakta hai. Har koi uska fayda utha sakta hai. Apne pace ke hisaab se, apne understanding ke hisaab se. Toh agar hum dekhein toh ismein HCI aur LLM kaise ek doosre ke saath saath mein karya karte hue madad kar sakte hain. Is adaptive learning system mein. HCI jo karega woh focus karega creating intuitive and user friendly interfaces for seamless learner interaction. Toh jaise hum kaise sahay tarike se aur jo upyogkarta ke aavashyakta ke anuroop aur uske friendly interface aur seamless learner interaction bana sakte hain. Jabki LLM ek tarah se provide dynamic and context aware content generation tailored to the learner progress. Ek tarah se jo content itself hai. Jaise ki jo part saral hai, ab paanch slide ki jagah woh ek slide mein sankshipt tarike se bata dega. Aur jo part kathin hai ab ek slide ki jagah usko paanch slide mein detail mein step by step tarike se batayega. Toh isi tarike se HCI mein provide personalized learning path, instant feedback and real time suggestion jo aapko user de raha hai ya indicate kar raha hai unko seekh ke kaise hum apne model mein integrate kar sakte hain. Toh generate personalized quiz, iske jo bhi feedback mila hai ya jo bhi usne test mein perform kiya hai. Toh personalized quiz, explanation, learning material based on the learner performance. Toh hum jab bhi HCI ki baat karte hain, inclusivity ki baat karte hain, toh it ensures accessibility and usability for diverse learner with different needs. Aur usi tarike se it offer real time support such as simplified explanation or alternate source when a learner struggle. Jaise hum Perplexity AI ki baat kar rahe the ki wahan pe alag-alag sources bhi de raha hai. Nahi toh jo cheezein aisa ek toh summary de diya, alag-alag sources de diya. Ab aapko nahi samajh mein aa raha hai toh aap further un resources ko bol sakte hain. Jaise usko bol sakte hain ki yeh jo source hai ismein se isko thoda aur elaborate karke batao. Is concept ko thoda sa aur elaborate karke batao. Toh ek tarah se jo adaptive learning system hai bade achhe tarike se aapki madad kar sakta hai cheezon ko, jatil cheezon ko samajhne ke liye aur ek achha overview dene ke liye jo cheezein aap pehle se padh chuke hain. Toh improve learner experience throughout the real time progress tracking, visual cues and the feedback. And LLM jo hota hai transform learning to conversational jaise learning aap yahan pe woh kisi bhi samay par jaise agar hum traditional class system ki baat karein toh jab teacher class mein available hai tabhi aap pooch sakte hain apne prashn ko aur kabhi yeh hota hai ki jo vidyarthi hota hai introvert hota hai ya samay ke abhav se ya anya kisi kaaranon se class mein prashn nahi pooch paata toh woh prashn uske dimaag mein hamesha rehte hain. Toh LLM ke madhyam se woh ab kisi bhi samay jo video recording hai ya content hai usse woh prashn natural language mein pooch sakta hai aur uske uttar ko pa sakta hai. Toh chaliye usi hisaab se hum aapko ek karya dete hain. Toh reflect on your learning experience. Toh hamara jo objective hai think about a challenge you face while learning in school and explore how LLM could have assisted you in overcoming it. Toh instructions aap jaise yahan pe dekh lein, think of learning problem. Toh us case mein reflect on a specific subject or topic that was difficult for you in school. Toh aap apne school mein dekhiye ya college mein dekhiye jo bhi subject aapko difficult lage ho rahe ho usko dekhiye. Uske baad identify the challenges which

particular what specific difficulties did you face? Kya woh bhasha ki dikkat thi, woh pronunciation ki dikkat thi, woh content ki dikkat thi, material ki dikkat thi, kya thi? Aur uske baad LLM as a assistant ko sochiye aur boliye ki woh ab aapki kaise madad kar sakta hai toh how could LLM have been help uh you solve or elevate these difficulties? Aur last mein consider the benefits how would real time feedback for adaptive content generation have impacted your learning experience? Toh is baare mein aap vichar kariye aur isi tarike se aap koi aur bhi problem utha sakte hain aur in in prashnon ko aap pooch sakte hain aur uske baare mein aur achhe se jaan sakte hain, samajh sakte hain. Toh jaise humne baat ki ki personalize content ki zaroorat hai. Woh padhai ki bhi baat ho sakti hai ya kisi aur bhi cheez ki baat ho sakti hai. Chahe woh alag-alag item ho, alag-alag e-commerce pe, website pe, chahe woh chahe woh grocery app ho, jaise tailor content, recommendation and experiences to individual user based on their preferences, behaviors and interaction. Jis tarike se woh interact kar raha hai, jis cheezon ko dhoondh raha hai, jis cheezon se ko search kar raha hai, uske mutabik kya hum usko recommendation de sakte hain? Personalized recommendation de sakte hain. So, aims to enhance user engagement by showing relevant content that matches the user interest, improving user satisfaction kyunki jo user ka interaction hota hai woh har baar type wala nahi hota hai. Woh kaafi time alag-alag tarike se interaction hota hai. Jaise aap alag-alag item ko scroll kar rahe hain. Kuch item ke aap detail mein jaate hain, dekhte hain toh matlab ek tarah se woh relatively zyada important hai as compared to jo baaki items ko aapne just skip kar diya. Kuch items ko aap basically apne wish list mein daalte hain. Kuch ko aap alag-alag tarike se dekhte hain. Kuch brand ki item ko aapne past mein baar-baar khareeda hai. Kuch item ko aapne baad mein khareeda hai. Ya aapke agar hum iske social media ko bhi dekhein toh aap kaise aapka social media indicate karta hai. Kis tarah ke products, kis tarah ke kapde, kis tarah ka electronic item, kis tarah ke khaane ko aap pasand karte hain. Toh usi tarike se aap dekh sakte hain my favorite getting recommended. Ab usko saamne hi dikh jaata hai. Toh ek tarah se smart UI ka bhi inter ki baat kar sakte hain. Kaise? Smart UI mein aapko jo bhi aap most likely cheezein lena chahte hain, woh aapko saamne dikhengi aur jo cheezein nahi lena chahte most likely woh baad mein dikhengi aur yeh LLM aur AI ke madhyam se woh aapko recommendation karke yahan pe aapko dikhata hai. Toh ek tarah se aap dekh rahe hain kaise HCI aur AI ek saath milke aapko personalize content dete hain. Jisse aapka upyogkarta ka anubhav sugam hota ja raha hai aur achha hota ja raha hai. Usi tarike se yahan pe aap dekh sakte hain based on aapka based on aapka jo activity hai, jo aapke content hai, jo aapke aur bhi cheezein hain, uske hisaab se aapko batayega ki aapko tracking ke liye yeh saari tent ek tarah se suggest kar raha hai. Is pe additional ek tarah se discount dikha raha hai. I enjoy tracking aapko dikha raha hai toh shayad aap khareed lein. Toh usi tarike se agar hum dekhein toh kaise aapke personalize content ko banane mein madad karta hai. Jaise aap yahan par hum dekhein. So humne isko bola write a one line advertisement text of a toothpaste best for smile for parents of India in native language. Toh isne mujhe ek tarah se advertisement de diya best for smile. Toothpaste se apne bachhon ko de swasth aur chamakte daant kyunki unki muskaan muskaan mein hi asli khushi hai. Ab ab main isse agar yeh prashn poochun how many Indians will like this, give answer in percentage, kya yeh uttar de

payega? Toh agar hum dekhein toh yeh uttar kuch had tak dega. The percentage who might like this advertisement depends on various factor blah blah blah. Us tarike se agar hum dekhein if you consider this factor toh estimate kehta hai 60 to 70% log isko pasand karenge and could find this ad appealing but aap toh chahte hain ki bhai 60-70 nahi main toh chahta hoon ki 99-100% log isko pasand karein toh aap isse phir further converse karenge aur aapke requirement ke hisaab se personalization ke hisaab se yeh ek tarah se aapko help karega content generation mein, is one line advertisement text mein. Toh ek tarah se aap dekhenge toh large language model for personalization, content generation mein, recommendation mein bahut achhe tarike se aajkal use ho raha hai aur aapki madad kar raha hai. Toh usi tarike se agar hum ek apne research problem ki baat karein toh kaafi had tak jo is tarah se LLMs hai response dete hain woh generic response hote hain. But kabhi-kabhi aap aise mental trauma aur aise situation mein hote hain ki agar koi aapko achhe tarike se spiritual tarike se batayein toh shayad aap thoda sa achha feel karein. Toh jaise is case mein aapne dekha ki an example of with a given context conversation between a patient with a chatbot and with a chatbot and patient's query on struggling to maintain a relation with your partner. Ab woh apne partner ke saath jo relationship hai usko usse thoda sa pareshan hai. Toh kaise aap usko thoda sa straightforward ki bajaye aap thode se spiritual ya thode se friendly tarike se usko response de sakte hain. Jaise various LLM fine tune on GPT dataset. Yeh ek tarah se aap dekhenge jo responses aa rahe hain alag-alag existing models ke saath jaise yahan pe Llama ke through hai, Mistral ke through hai, Phi ke through hai. Is tarike se aur humne apna jo khud ka model banaya hai, uske madhyam se hum ek tarah se spiritual response yahan pe jo usne prashn poocha hai, wahan pe ek tarah se respond kar rahe hain. Aur yeh ek tarah se Bhagavad Gita ke pe based hai. Uski ki learning ke upar based hai. Toh uh hamare research paper mein jo ki Aman Singh, Janak aur Dr. Janendra Shukla ke saath kiya gaya hai. Aap isko internet pe dekh sakte hain aur iske baare mein aur jaan sakte hain kaise hum spiritual LLM bana rahe hain jo ki ek achha spiritual response aapko de sakta hai aur aapko ek tarah se sukoon de sakta hai apne uttar ke madhyam se jo ki again jaisa ki humne bataya Bhagavad Gita ki learning pe based hai. Toh aap isko dekh sakte hain. So personalization content mein agar hum aage baat karein toh kaise aap jaise alag-alag image generate kar sakte hain toh jaise yahan par user interface generate kar sakte hain. Toh jaise HCI design interfaces that make personalized recommendation prominent and easy to access ensuring smooth. Toh us tarike se aap user interface mein personalize user interface mein aapki madad kar sakta hai. Jaisa ki humne pichle example mein bhi bataya tha. Personalize feedback de sakta hai. Jaise LLM use data to generate feedback and suggest that help user make better choice. Just you might like this product because you recently browsing waghera. Toh agar aap kuch feedback denge toh unko samajhna, relate karna aasan ho jayega. Continuous learning, both HCI and LLMs help refine personalization over the time as they as they collect more data on the use preferences, behavior and creating a self improving system. Jaise ki humne pehle saptah mein bhi bataya tha ki hamara ek work hai jismein hum behavior LLM mein behavior tokens ko behavior user ke jo alag-alag behavior hain jaise ki alag content ko like karna ya us pe jo comment kar rahe hain un cheezon se seekhte hue kaise hum ek behavior optimize LLM bana sakte hain aur woh kaise alag-alag karya ko kar sakta

hai toh isko humne pehle saptah mein discuss kiya tha. Aap hamare researcher paper ko aap prefer kar sakte hain iske baare mein aur bhi zyada jaankari paane ke liye. Toh personalization content mein agar hum iske fayde dekhein toh it enhances engagement. Kyunki hamara ultimate aim kya hota hai ki humein engagement badhana hai. Humein user experience ko badhana hai. Toh better user experience, conversion rate ko badhana, jitne log hamare product ko use kar rahe hain, woh aur bhi use karen. Toh personalize product recommendation in e-commerce, meal suggestion in food apps, post recommendation in social media lead to higher conversion rate waghera. Toh kaise agar aap in sab madhyam se personalize content ke madhyam se alag-alag iske fayde hain jo ki kuch yahan par ingit hain aur bhi cheezein ho sakti hain. Aap iske baare mein soch sakte hain. Jaisa ki humne baat kiya ki kisi bhi maanav kendrit system ke liye agar hum design principle ki baat karen hum HCI core fundamental ki baat karen toh humein accessibility aur inclusivity ki baat karni hai. Toh kaise hum accessible aur social inclusion system bana sakte hain. Toh LLM ismein bhi ek aham role aajkal nibha raha hai. Jaise what is accessibility in digital applications? Jaise yahan pe making application usable by specially abled or differently abled people. Toh ensuring equal access to the digital resources and service, kaise yeh kar pa raha hai. Toh ek tarah se hum dekh rahe hain ki aaj ke time pe hamare paas ASR technique hai. Hamare paas jo ki jo hum bhi bol rahe hain usko text mein convert kar. Hamare paas translation technique hai. Jo bhi humne ek tarah se bola jo text hai usko ek language se doosre language mein kar sakte hain. Usko hum text to speech kar sakte hain. Hum gesture ko recognize karke uske prashn ko samajh sakte hain. Gesture to text kar sakte hain. Gesture to speech, abhi MIT ka ek student tha. Usne ek aisa bataya banaya jismein gesture ke madhyam se woh jo bhi gesture kar raha hai woh corresponding speech mein bolta ja raha hai. Toh unhone banaya toh woh bhi system aap dekh sakte hain. Aise dher saare accessible technology saamne aa rahe hain jo ki badi bhasha model ka upyog karke alag-alag jo unke seva ya utpaad hai unmein unko integrate kar rahe hain. Toh ek tarah se social inclusion in technology, designing technology that accommodate diverse group, ensuring that marginalized or under represented users are not excluded, promoting digital equity. Toh ek tarah se aap dekh sakte hain kaise Microsoft ka sensing app ya app hai woh madad karta hai jo blind aur visually impaired users hain. Toh aap iske baare mein aur is link pe dekh sakte hain, jaan sakte hain. Aur aise dher saare aur bhi examples hain jo AI ke madhyam se, AI ko use karte hue, LLM ko use karte hue apne apne seva ko ya apne utpaad ko aur bhi intelligent bana rahe hain. Toh how LLM contribute to accessibility. Toh ek tarah se LLM jo hai alag-alag application ko enable karta hai samajhne mein aur respond karne mein jo ki voice command hai. Chaha hands free navigation ho for user with physical disabilities. Yeh ek tarah se generate karta hai alternative text description for images, video and other media. Making content accessible for visually impaired user. Humne personalize accessibility feature ki baat ki thi. LLM can adapt to the content offering alternative format. Jaise aap ek format se doosre format mein convert karna chahte hain toh LLM aapke liye kar sakta hai. Based on jaisi aapki zarooratein ho. Multilingual support provide karta hai. Agar aapko ek bhasha nahi aati, doosri aati hai toh LLM enable real time translation and localized content enhancing social inclusion for the user with different linguistic background. Toh how HCI come

in picture yahan pe? Toh LLM help create dynamic caption generate alternative text for image of the videos while HCI design interfaces for easy access to these feature jo bhi aap bana rahe hain. Jaise yahan pe button for screen reader capability aur baaki cheezein uske madhyam se HCI aur LLM dono milke apne upyogkartaon ki zarooraton ko bade achhe tarike se bahut tezi se solve karte hain. Toh LLM provide voice command for navigation. HCI design for easy to read fonts, clear category, labels and straightforward checkout. HCI ensures user interface is easy to navigate visually clear and accessible to everyone including those with capabilities. Ek tarah se dono saath milke aap kaam kar sakte hain. Toh chaliye ek aur use case hum baat karte hain. Jaise ki humne is saptah ke shuruwat mein baat ki thi. Kaise aap aaj ke time pe ek jo aapka mobile phone hai usko ek futuristic tarike se kar sakte hain. Toh chaliye yahan pe hum jaante hain. Jaise yahan pe ek aapke phone mein dheron aise apps hain. Alag-alag karya karte hain. Jaise agar hum Uber ki baat karein toh taxi book karta hai. Rapido ki baat karein toh agar hum Zomato, Swiggy ki baat karein toh aapke liye food order karta hai. Amazon ki baat karein, Flipkart ki baat karein toh kuch item, gift aapke liye order karta hai. Cake order karna hai toh again iske liye dher saare applications hain. Aap kar sakte hain. Toh is tarah se aap alag-alag karya aap alag-alag application ke madhyam se kar sakte hain. Aapko ek tarah se jo aapke saare dost hain unse batchit karni hai. Koi plan event karna hai, plan karna hai toh WhatsApp ke madhyam se aap ek group bana sakte hain. Unse baat kar sakte hain. Ek poll create kar sakte hain. Alag-alag cheezein kar sakte hain. Toh alag-alag karya ke liye bhi alag-alag cheezein karte hain aap. Toh agar aapke paas ek phone as an assistant hota toh kya woh aapke in saare karya ko jo hum alag-alag application ke through kar kar rahe hain combine tarike se kar paata? Jaise agar hum ek example dekhein toh suppose aap apne ek mitra ke liye uske sab liye surprise birthday party plan kar rahe hain using a future AI power device jo ki humne baat ki. Toh pehle kya hota tha? Pehle hota tha ki aap alag-alag application ko use karke apne karya ko karte jaise ki maine bataya ki aap apne jo saare friends hain ek WhatsApp group banayenge ya koi aur group banayenge, unko invite karenge, poll create karenge. Poll se date final ho gayi, time final ho gaya toh aap unko calendar invite bhejenge. Ek poster banayenge birthday party ke liye. Canva ka use kar sakte hain aur bhi Adobe Express ka use kar sakte hain. Uske baad aap venue book kar sakte hain. Toh again book a table mein Zomato, Swiggy aur bhi aur tarike se aap table book kar sakte hain aur cake order kar sakte hain. Uske baad of course bhai usko toh dost hai toh usko gift bhi dena padega. Toh aap Amazon ya Flipkart se aapne gift order kiya. Toh abhi current situation tiring hai. Aap aapko ek tarah se jo us overall birthday party ko plan karne ke liye aapko alag-alag application ke madhyam se alag-alag karya karna pad raha hai. Assume kariye agar yeh saari cheezein aapne keval bas bol di aur yeh jo mobile, advance mobile application tha woh saari cheezein aapke liye apne aap kar diya step by step tarike se jaise aapne bola ki plan a surprise party for Ana on Saturday evening, invite all close friends waghera waghera is tarah se aap yeh kariye toh simple LLM jo ki mobile aapka agent hai woh sure I will do, relax, chill. Toh usne phir ek tarah se saari cheezein karni hai, usne saare doston se coordinate kar liya, book kar diya, order kar diya cake, venue book kar diya, create detail itinerary kar diya, calendar invite bhej diya, sabko bhej diya. Toh kitni aasani se woh saari cheezein aapke liye kar payega bina aapko hassle pareshan kiye

hue. Toh LLM isliye here transform HCI into more fluid, conversational interaction, removing the need for switching between applications, streamlining complex multitask waghera-waghera. Ek aur agar hum example ki baat karein jaise aapke mobile phone mein Uber bhi hai, Ola bhi hai, Rapido bhi hai, Blue Smart hai. Dher saare aise application hai. Aapko ek source destination pe jaana hota hai toh shayad aapne realize kiya hoga ki alag-alag application mein same source aur destination ke liye alag-alag paise lag rahe hain. By default aap kisko choose karna chahenge? Aap chahte hain ki jo sabse kam paise le rahe hain unko lein. Lekin aapki aadat hai ki aap har baar Uber se book karte hain. Toh bhale hi Uber ₹400 le raha hai. Jabki baaki aur application pe aapko ₹200 mein same ride mil rahi hai. Toh aap agar aap LLM agent ka use karte hain ya ek tarah se agent ka use karte hain jo ki sab pe price check karne ke baad us application pe aapki ride book karta hai jo ki sabse sasti thi toh bada achha hota hai. Usi tarike se aap dekhte hain alag-alag khaane jo aap alag-alag restaurant pe book karenge. Same khana, same restaurant se alag-alag application par alag-alag discount ke baad alag-alag paise mein milte hain. Toh aap kahan se order karna chahenge? Aap wahan se order karna chahenge jahan pe aapko sabse sasta pade. Toh yahi cheezein hain. Yeh cheezein aap ek tarah se dekh sakte hain. Kaise aap isko reimagine kar sakte hain aaj ke mobile phone ko. Future is tarah aur woh din door nahi hai. Aise dheron aise example bhi aaye companies ke jaise aapne dekha ki Sundar Pichai phone karta hai woh apne aap uske liye book appointment kar deta hai doctor ka ki book an appointment for this. Toh woh usko bolta hai ki theek hai usko doctor call lagata hai pata chalta hai us din available nahi hai, agle din available hai toh yeh isse follow up karta hai ya calendar check kar leta hai achha is din available hai chaliye is din hum book kar dete hain waghera waghera toh is tarike se hum ab user ko pareshan hone ki zaroorat nahi hai. User ko baar-baar bother karne ki zaroorat nahi hai. Aapne bas apna jo aapki requirement hai aapne bata diya aur uske mutabik AI agent ne saara karya karke aapka karya job done. Toh agar hum summarize karein is chapter ko toh HCI jo adhyayan karta hai hamare jo alag-alag upyogkarta hai kaise woh technology se interact karte hain. Kaise hum sahay design ke upar baat karte hain. Upyogita ke baare mein baat karte hain. Kaise hum usko sugam banane ki baat karte hain. Kaise hum saare logon ko apne services provide karte hain. Chahe woh differently abled log ho ya specially abled log ho and what are the crucial for creating system are engaging and easy to use. Kaise hum usko engaging aur bahut aasani se use karne ke liye bana sakte hain. Toh large language model jaise jo hai woh leverage vast data and deep learning to generate human like text aur other modality jaise aaj ke time pe image aur video banate hain with application in areas like chatbot, content creation, education. Toh humne alag-alag application baat ki jaise wahan pe LLM aur agar hum human centered AI ki baat karein focuses on designing AI system that prioritizes human needs, values and ethical consideration aiming to build transparent, trustworthy and collaborative technology that argument rather than replace human capability. Toh yeh cheezon ka humein bilkul dhyan rakhna hai humein human ko replace nahi karna hai otherwise yeh saari duniya phir AI chalayegi hum thodi chalayenge, robot chalayega, chatbot chalayega kal woh hamare liye kuch bhi kar dega jo ki hum nahi chahte hain. Aisa nahi hona chahiye. Toh human toh involve hona chahiye. Human in the loop hona chahiye. But woh kam se

kam uski involvement honi chahiye aur kam se kam galti honi chahiye AI ke dwara aur bahut hi sugamta ke saath bahut kam samay mein bahut hi sasta economical aap solution de paayein. So they focus on developing AI system that are explainable, ethical and user friendly, integrating advance AI technologies like LLMs into interfaces that enhances human AI collaboration and the trust. Aur aage hum additional material ki baat karein is course mein toh HCI and LLM ke upar Ritika Jha ke dwara ek tutorial diya gaya hai aur hum alag-alag demos ki baat karein toh inmein hum ChatGPT ka demo dekhenge. Adobe Firefly aur in AI, Audino ka demo dekhenge. Hum generative technology using text to template and LLM yeh bhi dekhenge Adobe Express aur iske madhyam se aur ant mein hum aapke liye ek assignment denge jisse aap kar paayein aur is saptah ke further reading ke liye aage ki padhai ke liye aap in alag-alag resources ko apne shraddha ke saath apne samay ke anusaar aap dekh sakte hain aur unse achhi-achhi cheezein seekh sakte hain. Human centered AI ke liye Ben ki yeh resource padh sakte hain. Ethics ke liye AI aap S. Mathew ki yeh resource dekh sakte hain. Alag-alag online articles bhi hain jinko aap dekh sakte hain. Jaise Stanford HAI jo ki Dr. Fei-Fei Li ke dwara hit kiya jaata hai. Wahan pe bhi aapko human centered AI se related dheron aise bahut hi achhe resources mil jayenge aur isi ke saath is saptah mein main aapse alvida leta hoon aur agle saptah mein main punah prastut hounge ek alag topic ke liye. Dhanyavaad. [Sangeet]