WEBVTT

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00:00:04.540 --> 00:00:08.739

Jisun An: Hi! Welcome back to the class. Hope you have a great spring break.

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00:00:09.190 --> 00:00:19.380

Jisun An: I was preparing the lectures, so no break for me. So so today's passcode is agent. Please mark your attendance.

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00:00:19.770 --> 00:00:43.909

Jisun An: So a few announcements. So thanks a lot for submitting the theoretical assignment, too. I think. Now everyone's have submitted, so I will post the grade soon, but I think you know your grade, so I think should be fine. A few things coming up so the towards the end of the semester. This course will get a bit busier, so we have a practical assignment.

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Jisun An: which is to do is by the end of this week. This Sunday is coming up, so please make sure that that you get this done, I mean. So I mean, we don't require any fancy methods. It's just. I think it's a good experience for you to get everything done from start like data creation to the evaluation by yourself on your own. So it's a small size, sizable projects that I think it'd be quite interesting for you to try things out.

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00:01:14.060 --> 00:01:30.669

Jisun An: So the details of the practical assignment is in the canvas. And also I updated the rubrics for the assignment. So you can also check them. I mean, it's basically each of the components that I mentioned, but then you can see how many points you will get for each of them, so you can see it from the canvas.

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00:01:31.326 --> 00:01:44.450

Jisun An: The one thing that I need to make sure again is so each. So 2 of you are working together. But each of you individually need to submit a report, so it will be individual assignment and individually graded.

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00:01:44.823 --> 00:02:10.250

Jisun An: But then the data set. So basically, your aim is to develop a method to impersonating your teammates research. So that should be your main research. But then you can also use your own data set for general liability validation. So and also, when you are discussing about the research, make sure. I mean, just consider that aspects. So while your method may be optimized for your teammates, data, or

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00:02:10.440 --> 00:02:31.309

Jisun An: whatever information you have about your teammates, and then you can test the exact same method on your own data, and then and then see how the results are different, or what improvement can be made for better generalizability and etc. So these are some of the discussions that you may add, as a part of generalization and the discussion. Yes, please

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00:02:31.830 --> 00:02:34.270

Jisun An: go on back to sanitation.

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00:02:38.490 --> 00:02:54.950

Jisun An: No, it's an individual report. So you can share the data. And also you can discuss like the method and the steps, but the in the reports should be individually submitted.

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00:02:55.050 --> 00:03:17.024

Jisun An: No, i i oh, is it still in the group? Oh, okay, no, no thanks for letting me know. I may initially set it up as a group. Now I will change it. Yeah, thanks for letting me know. Okay, I will change back to the individual assignment. Okay? Yeah, yeah, thanks for letting me know.

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00:03:18.000 --> 00:03:32.756

Jisun An: yeah, initially, I thought you could submit it together. But then I changed my mind. So sorry about that, anyhow. So this is coming this by the end of this Sunday, so make sure that you work on it and then submit it. And if you have any questions, ping me emails,

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00:03:33.910 --> 00:03:34.930

Jisun An: that'll be okay.

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00:03:35.060 --> 00:03:39.049

Jisun An: Any questions like at you know here about this

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00:03:40.930 --> 00:03:42.800

Jisun An: and try to be concise. Yes.

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00:03:51.620 --> 00:03:57.650

Jisun An: Oh, yeah. The the data set, the entire data set means question, and the answer set

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00:04:04.760 --> 00:04:19.269

Jisun An: alright. And the next thing is so. The exam. Resources are coming up, which is the next Thursday. It will cover everything from the start to the AI agent, which is, we will cover this week.

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00:04:19.667 --> 00:04:43.259

Jisun An: It will be in person, in class exam. Using the canvas keys. It will be 1 h, probably less than one. It will take less than 1 h about 30 or less multiple choice questions. So it'll be very similar to the t. 1 and T. 2, that you've seen, maybe slightly more challenging than those ones. It will be closed the book exam. And

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00:04:43.290 --> 00:04:52.970

Jisun An: even though I see some other colleagues are using like lockdown browser for the keys, but I don't want to make that hassle, so I will just do it without the Lockdown browser, so I will leave it to you

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00:04:53.120 --> 00:05:23.109

Jisun An: that, believing in you that you were not going to change it to any other tests, you would just look at the keys itself, so we would do a good visualization. So hopefully, that will be okay. So that's something also coming up. But once again, I will not going to ask you like details of the equations that we've been discussing, or like deviations, it will be at the levels of why this method exists and why this method, important. So those high level understanding of the method should be enough

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00:05:23.170 --> 00:05:24.369

Jisun An: for the exam.

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00:05:27.330 --> 00:05:28.400

Jisun An: Yeah, yeah.

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00:05:28.570 --> 00:05:36.900

Jisun An: so yeah, I mean, except the lab content. So we don't include any lab content as a part of the key. So it's only the lecture part yeah. So

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00:05:37.720 --> 00:05:51.127

Jisun An: it's so it'd be a lot but yeah, it's it's a lot of content. But focus on those things that I've been highlighting and like mentioned several times, I I think that will be

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00:05:51.760 --> 00:05:53.339

Jisun An: the focus of the exam.

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00:05:55.440 --> 00:05:56.200

Jisun An: Yep.

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00:05:56.980 --> 00:06:10.630

Jisun An: And yeah, make sure that you have the laptop. Bring them in class, and also make sure that you have a charge fully. I think there are a few few powers here and there. But yeah, hopefully, I mean, you, can. You can handle that

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00:06:10.880 --> 00:06:12.510

Jisun An: any questions about the event.

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00:06:12.930 --> 00:06:21.479

Jisun An: Yes, this is like meat slash final, because it's not, neither meat or neither fighter. So I just call it as an example. Yeah.

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00:06:23.770 --> 00:06:26.590

Jisun An: okay, yes. Oh, go ahead.

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00:06:28.780 --> 00:06:29.570

Jisun An: Okay.

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00:06:30.011 --> 00:06:51.430

Jisun An: and then minor changes in the schedule. Once again I found that the edit M agent is actually a lot to talk about. So we will talk about Edith agents this week, and then we will do the lab for the Edm next week, and then the exam. And then the final week. We will have AI safety and the multimodal. So we had, like lab for the multimodal Edm. But

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00:06:52.230 --> 00:07:05.300

Jisun An: eventually I think that lab is quite easy. So I think it'll be okay to skip. And instead of actually talking more about the Edith agent would be more interesting. So I changed that little bit so minor updates on the schedule.

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00:07:06.350 --> 00:07:12.619

Jisun An: Okay? So yeah. So pass code for today's agent. Please mark your attendance if you haven't done so

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00:07:13.230 --> 00:07:16.719

Jisun An: and let me start with the Lm agent.

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00:07:16.860 --> 00:07:27.510

Jisun An: So are you guys familiar with the Internet who who are not so? Are you familiar with the Edm agents who have have heard of AI agents or Edm agents.

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00:07:28.980 --> 00:07:30.760

Jisun An: some of you. Okay.

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00:07:31.310 --> 00:07:34.960

Jisun An: So before we are actually going into the

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00:07:35.070 --> 00:07:40.710

Jisun An: the lecture part, I will start with a small group activity today. So

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00:07:41.680 --> 00:07:49.327

Jisun An: so can you just email like 3 to 5 people, I only have 18 pages. So I think you probably need to see

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00:07:55.280 --> 00:07:57.220

Jisun An: you know, came up like.

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00:08:00.680 --> 00:08:25.120

Jisun An: So I thought it would be interesting to have a small activity to think about. Ai agent. So here, so just share. And then, yeah, so I mean, we have like movable chairs. So I think it is possible to move around. So can you just group like 3 to 5 people to talk with each other. Yeah.

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00:08:29.470 --> 00:08:39.999

Jisun An: So maybe for some of the team, I think you guys are already like talking about the AI agent to support you. Maybe it'd be already familiar. But for those who haven't, maybe this would be a good practice.

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00:08:40.150 --> 00:08:43.890

Jisun An: So here the activity that

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00:08:44.840 --> 00:09:05.299

Jisun An: we are trying to do is so imagine that we are designing a system for emergency response system and think about, yeah, who are the people in charge involved, and what? What responsibility? They have!

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00:09:06.022 --> 00:09:30.877

Jisun An: How they communicate and collaborate, and what would be the biggest challenge in collaboration, but thinking so without any AI agents. Just think about building this system with a human or like ecosystem in this environment. So who would be involved into the system? And what would be in responsible for, and how they communicate and etc, and try to make a diagram. And

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00:09:31.490 --> 00:09:35.419

Jisun An: yeah. So I will give you about 10 min to think about this.

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00:09:50.330 --> 00:09:55.049

Jisun An: Don't I think anywhere? I think, typically, okay, yeah. So

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00:10:54.362 --> 00:10:56.729

Jisun An: just haven't done that.

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00:11:00.670 --> 00:11:01.370

Jisun An: Okay.

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00:11:35.930 --> 00:11:38.120

Jisun An: you know.

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00:14:49.825 --> 00:14:50.680

Jisun An: So

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00:14:59.560 --> 00:15:01.113

Jisun An: thank you.

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00:15:04.160 --> 00:15:05.440

Jisun An: See the numbers?

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00:15:48.010 --> 00:15:49.040

Jisun An: Yeah.

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00:16:10.686 --> 00:16:21.739

Jisun An: it's just

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00:17:28.244 --> 00:17:28.920

Jisun An: okay.

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00:17:36.600 --> 00:17:37.780

Jisun An: 1, 31,

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00:18:47.650 --> 00:18:50.400

Jisun An: get that.

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00:21:02.425 --> 00:21:10.380

Jisun An: And I think it's brought up

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00:22:06.520 --> 00:22:08.089

Jisun An: is that your question.

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00:22:56.360 --> 00:22:57.030

Jisun An: let's see.

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00:23:03.010 --> 00:23:03.680

Jisun An: thank you

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00:25:18.085 --> 00:25:19.040

Jisun An: yeah

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00:25:56.660 --> 00:26:07.899

Jisun An: alright yeah, thanks a lot for the all the interesting discussion. Anyone volunteering to present, I mean, even though we cannot share what you're actually drawing. But

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00:26:08.040 --> 00:26:10.330

Jisun An: just wondering anyone want to share.

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00:26:14.910 --> 00:26:16.399

Jisun An: Yeah. Yep, yep.

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00:26:20.001 --> 00:26:28.590

Jisun An: the end user, which is the.

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00:26:28.750 --> 00:26:35.800

Jisun An: And they will ask, this happened. They will call 9 1 1. We're just going. It's like phone in

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00:26:36.706 --> 00:27:01.920

Jisun An: to understand what's happening and what kind of resources they need. So the rest of the team well, contact each kind of resource team, the resources team, including like the medical help, or it, or any kind of equipment.

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00:27:02.600 --> 00:27:05.979

Jisun An: I see. Oh, so so these are the 3 layers.

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00:27:06.970 --> 00:27:13.600

Jisun An: 4, 4 layers. Yeah, that's good. I think the structure you had was slightly different from.

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00:27:15.030 --> 00:27:21.929

Jisun An: By the way, interesting. I think that covers, I think, many, many of the the aspects that that we want to talk. So

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00:27:24.180 --> 00:27:42.210

Jisun An: task force team 1st so that you can construct a future teams together and also managing all those on process under the task force team. We try to make a 4 different kind of team. One is rescue team, and second is Michael Team, and 3, rd one is broadcasting team, and also the 4th one is resource management team

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00:27:42.320 --> 00:28:03.229

Jisun An: for the rescue team. By the Pf. Team's allocation. They will actively seek. That's actually trying to find people in each spot as well as calling 9 1 1 people, those managing also by Pf team. And after they trying to rescue any kind of people from any spot, they will call to the broadcast team.

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00:28:04.132 --> 00:28:24.139

Jisun An: actually broadcast. I mean, it's constructed with 2 different parts, internal communication part, and also external communication with journalists. So whenever rescue team is trying to save people, they call it internal communication, broadcasting and with using the dashboard, which shows the location of hospitals and all those resources together.

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00:28:24.210 --> 00:28:49.479

Jisun An: Broadcasting team calls to the medical team so that they can know where to send those patients to, or if that person is located, and where to send those people to. And whenever a medical team is getting those patients by call with broadcasting, they'll hear those as needed, and also on top of that, using the list of people that they have to say. Broadcasting also can send to the external panelists

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00:28:49.560 --> 00:28:52.400

Jisun An: so they can find some people

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00:28:52.760 --> 00:29:07.519

Jisun An: send some people back to their family and resource management team. The last thing was about managing all those resources, including medical supplies, and also anything that we need for.

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00:29:08.000 --> 00:29:37.319

Jisun An: Yeah, thank you. I think having like a task force, and where all the information are centralized is also something would be quite useful, even though I'm not sure how easy it would be to build such a system. And if and also if the system fails, so then that would be also a big problem. But I think, having this kind of different types of structure of the teams is quite interesting. Any other ideas, like any other entities that we are missing, or any other types of communications or the roles that you are observing.

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00:29:41.350 --> 00:29:57.829

Jisun An: Okay, so I mean everyone. I mean I I talked to you like most of you, and I think you also had all good ideas. I think everyone has a slightly different ideas, but essentially, I think it converts it into a few entities, and these are also not the exact, the correct answer. I

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00:29:58.210 --> 00:30:07.596

Jisun An: I help. I got a help from the chat gpt to help me to to answer to these questions, and they suggested so this would be the like most

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00:30:08.362 --> 00:30:36.439

Jisun An: the entities that would be needed for the system. So it, the interesting part was like, Gpt was really strong about citizens. The citizens should be there. When when we are designing this part of the system. So I think that's also something. I think many of you are missed it, but I think some of you had a volunteers. I think that was also interesting idea. So when you think about system, you always should have a like people in it who are the

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00:30:36.980 --> 00:30:52.549

Jisun An: that are like dealing with the actual situations. So yeah, I mean the flow. And the way to communicate is something simpler than I think some of you had. So I think it's also interesting way to think whether

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00:30:52.550 --> 00:31:20.509

Jisun An: making everyone to talk with each other or making a limited communication between certain entities which will be more effective in this kind of situation. Understanding that would be, I think, quite important. So in here. So citizens who are actually in the field. They can report to the rescue teams or the police to update the situations and then the rescue team and the police, and they are talk with the medical teams so that they can fetch the people survivors and then to get treated.

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00:31:20.800 --> 00:31:48.879

Jisun An: And then the rescue team and the police are also talking with the center or local government, so that they can optimize for the resource allocations. And they also talk with the Ngos for the supplies or the volunteers for the adding more supplies and the help, and also talking with the video or the journalists to spread the news to help people. So these are some, I mean very basic system. And I know that whatever you've got you come up with actually far more rich than this one.

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00:31:49.110 --> 00:32:16.530

Jisun An: I'm assuming that we have this kind of system. Now, the next question is so. So then, now let's think about. We introduced AI agent into this system. So what part of this system can be replaced with the AI or AI agent. So the 1st question which human roles in this system could be replaced or supported by AI agent, and what specific task would each AI agent be responsible for?

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00:32:16.995 --> 00:32:26.580

Jisun An: So any any idea? So within. So not this diagram, but within your diagram, can you think of who can be replaced? To the AI agent.

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00:32:30.500 --> 00:32:47.409

Jisun An: And here, because it's before we are discussing about the AI agent. So you could be a little Fuzzy. So, AI agent you can think of as an AI entity which can perceive and think, and then act on something. So consider that you can create like a

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00:32:47.610 --> 00:32:57.599

Jisun An: assistant AI assistance, who can help some part of the system? So in that, given that kind of simple definition, what part of your system can be replaced into an AI agent.

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00:34:46.760 --> 00:34:55.859

Jisun An: Alright. Sorry let me just copy here. Sorry, for this was a very quick oh, do you need more time.

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00:34:58.760 --> 00:35:07.439

Jisun An: Yeah, I mean, given the time, I think we we probably move on. But so any any quick ideas about what can be changes to the AI agent.

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00:35:08.630 --> 00:35:11.069

Jisun An: if any idea is welcome.

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00:35:20.003 --> 00:35:28.909

Jisun An: oh, so like the reporting from like citizens

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00:35:29.440 --> 00:35:46.709

Jisun An: to the rescue teams they can be. I mean that a a there can be an AI agents that dedicated for answering to the calls and then reporting back to the actual summarize. Okay, that's actually a good idea. Yeah, I like that. Yeah, yeah. Any any other AI agents that you can think of?

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00:35:55.750 --> 00:36:01.449

Jisun An: Oh, so it's really, really need to use that, because it's really critical. And

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00:36:02.960 --> 00:36:05.950

Jisun An: in terms of like, if we really have. Yet.

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00:36:06.260 --> 00:36:17.510

Jisun An: that's really the good point. So the the next question was actually about the benefits and the risk.

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00:36:17.510 --> 00:36:40.340

Jisun An: So it's obvious, right? If we are implementing or any applying the actual AI models here, there are obviously a risk. So maybe for that something that very severe or very important. I think it should be relied on like a human. But I think there are also pros and cons so pros AI can handle multiple things that

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00:36:40.340 --> 00:37:03.362

Jisun An: in larger scale in much faster way. So those things, I think, is better for the AI agent. So like calls, I mean, basically during this this digester, there will be many, many calls, and the human may not be able to answer to all of them. So I think this is actually a good way to applying this AI agent. And even though there are a little bit of Miss or Force positives, still, it is possible. Right?

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00:37:03.700 --> 00:37:06.650

Jisun An: so I think maybe it's actually, though, that's the

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00:37:06.940 --> 00:37:15.470

Jisun An: part where you think about what can be really replaced with the AI versus what cannot be. Yeah, thanks for that. Comments. Any any other

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00:37:16.470 --> 00:37:21.489

Jisun An: thinking of what can be replaced as an AI agent?

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00:37:23.420 --> 00:37:27.959

Jisun An: So let's think about medical team. So medical team, if someone need to be treated.

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Jisun An: except that there will be a robot who will operate in the future. I mean they they will not be likely to be replaced by the AI. But but there could be something that AI can can do like maybe initial examination, even though that would be a crucial. So I don't know how we will

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00:37:45.980 --> 00:38:04.313

Jisun An: be like I mean, reliably, they can do it, but maybe they can do a quick like initial examination of each of the patients how severe they are, so, if they are not severe that they can wait. If they are very severe, then they can send it to the doctor. So I mean that kind of, I think help as an AI agents.

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00:38:04.740 --> 00:38:06.086

Jisun An: What about

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00:38:07.940 --> 00:38:14.160

Jisun An: in the in the government? Would there be anything that can be replaced with the AI power.

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00:38:24.490 --> 00:38:43.949

Jisun An: Right? So one of the like government need to do is they they need to allocate the resources in the right places. And this kind of optimization problem, I think it is the best. By the AI models better than the humans, I mean, sometimes, maybe humans based on their experience, they would be better. But if they are just having large informations and

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00:38:44.210 --> 00:38:58.319

Jisun An: different places, they need to make sure to have a good resources. Then I think the AI basically, the algorithmic way of thinking would be actually far better than the human decision. So that would be actually the part where we can get some help from the AI

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00:38:58.877 --> 00:39:15.842

Jisun An: and one other thing is it's something that I was also quite interested in. So many people were saying that the reports from the city agents may not be really replaced by the AI, I mean but then, if we are using like a drone to just go around the area of these

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00:39:16.549 --> 00:39:39.479

Jisun An: digesters and then collect all those information. So what happening in each of the part, and where there are survivors or not, how severe the risk is. So this kind of risk, detection, or survival locations this. There could be dedicated AI agents that just doing that so that they can communicate with the rescue team to tell where are the survivors? Where to send the teams and etc, etc.

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00:39:39.490 --> 00:40:09.099

Jisun An: So and lastly, in terms of like the media and the journalists. Obviously there will be a lot of misinformation going around during this kind of disaster responses so could be an AI agents dedicated for looking at all the information around, and then see which one is forced and true, what should be believed, what should not be believed, etc. So these are some of the things that I and even though many of the. There are a few more things that we can we can think about.

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00:40:09.668 --> 00:40:22.919

Jisun An: Essentially, I can see that this kind of system, especially that deals with our lives cannot be solely based on the AI agents, but it should be collaboration between human and the AI agent. So I think this is a good way to think about so.

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00:40:23.254 --> 00:40:31.369

Jisun An: Think about where the AI agent can be in part of this system. So the reason that I started with this group activity is because

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00:40:31.370 --> 00:40:54.659

Jisun An: I think the agent and agent system is some some terms that you will hear a lot in the future. It's becoming really popular in the industry as well as in the research area as well. But then I think the term is easily defined, and then everyone calls everything agents now, and to certain extent I agree with it. But also there should be some way to define it concretely and think about

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00:40:54.660 --> 00:41:04.240

Jisun An: where where AI agent is really needed for a particular thing. So hopefully, this was a good exercise to. To think in that aspect.

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00:41:04.880 --> 00:41:12.199

Jisun An: And yeah, yeah, I hope we had a more time about it, but I will move on. But before any any questions about

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00:41:13.170 --> 00:41:15.010

Jisun An: this particular

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00:41:20.470 --> 00:41:34.700

Jisun An: oh, from Temple to the tangible robot, all our AI agent, apparently. But I will go in right after this. We will talk about definition of AI agent. Yeah.

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00:41:35.610 --> 00:42:03.669

Jisun An: everyone calls everything AI agent these days. And yeah, so I mean in particular, Edith Agent, I think AI agent is broader term, and then Edith agents are slightly within the AI agent that it's particular, a smaller scope of it. So I will explain this. So I mean, even start from the first, st like agent. What is agent so agent in philosophy is so, an agent is an entity with the capacity to act.

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00:42:03.750 --> 00:42:09.670

Jisun An: and the term agency denotes the exercise or manifestation of this capacity.

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00:42:10.339 --> 00:42:25.010

Jisun An: And those a agency is used to refer to the performance of intentional action, and correspondingly the term agency notes entities that possess desires, beliefs, intention, and ability to act.

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Jisun An: So this is the definition of the agents in the philosophy. So from this perspective, the philosophy does artificial entities capable of agency.

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Jisun An: Do you think that the AI agent

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00:42:41.090 --> 00:42:45.800

Jisun An: is capable of agency in in this respect.

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00:42:48.050 --> 00:42:48.940

Jisun An: Maybe

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00:42:50.060 --> 00:43:02.239

Jisun An: so, if you think about if we define it as entity with a capacity to act. Then maybe it's possible, because we know that AI agents can do many things right. They can generate the text, and they can call different things.

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00:43:02.240 --> 00:43:29.239

Jisun An: They can do some actions, and also they can control, like the robots, to to do actually the actions. But then, if we consider the agent as an agent as a possessed desire, beliefs, intentions, then, and so acting based on the attention. So if we are defining that way, there are some debates, so do some people. I mean, obviously, it's just the we learned that the evidence are just the model that predicts the next tokens, right?

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00:43:29.400 --> 00:43:44.290

Jisun An: Given the context. So given that I mean, does it have their own desire beliefs or the intention? I mean? Many people say no. And then there are also other groups who are saying that, given that they actually predict the next token. Given the context.

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00:43:44.370 --> 00:44:13.400

Jisun An: they actually have the intention. So I think it's debatable. And many research has different kind of opinions on that. So. But in our class in this lecture we will use this particular definition to define the AI agent, so the artificial entities that are capable of perceiving their surroundings, using sensors, making decisions and then taking actions in response, using the actuators. So these are the our definition of the AI agents.

132

00:44:14.630 --> 00:44:42.549

Jisun An: then some of the key properties to be a successful AI agents are so autonomy. So basically they should be able to operate without any human intervention. So this is the 1st property of the AI agents and relate to that they should be able to react, have react to the changes of the environment or any stimuli in the environment, and also not just react to the environment. But also they need to be proactive to a.

133

00:44:42.780 --> 00:44:59.800

Jisun An: to a situation. So rather than just react to the environment that they need to be able to set up a goal plan on something and do something step by steps. And finally, they also may need to have a social ability where they can interact with the other agents, including also humans.

134

00:45:00.210 --> 00:45:10.319

Jisun An: So they should have way to communicate with like in in text. Picture inputs or any other kind of sensors, sensory informations.

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00:45:12.250 --> 00:45:13.230

Jisun An: So

136

00:45:14.590 --> 00:45:32.719

Jisun An: once again, the AI agent, you see something that has been there for a while, and then it also changing their meanings. And the way that how we use these terms. But all of these things that you've seen are part of the AI agents. So the autonomous cars the and then the Arfago, which basically built

137

00:45:32.720 --> 00:45:55.859

Jisun An: for doing this playing goal and chatgpt, obviously, and also the agents that are playing games, Alexis or this like robot, that controlling the robot arms. These are all parts of the AI agents, so in a way that they are. Each of them are. They know they know how to perceive their environment, and they decide within their

138

00:45:56.174 --> 00:46:03.415

Jisun An: some kind of reasoning, and then they are act on it. So these are the 3 components that each of these AI agents

139

00:46:03.910 --> 00:46:06.295

Jisun An: may have. So

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00:46:08.580 --> 00:46:33.239

Jisun An: then what is the Edm agent. So I mean, we know that we have this edit M, which is the language model that predicts the next tokens. And the AI agent is something that interact with the external environment. So given some observation from the environment, the agents act on it. But then, Edm is basically, it's the same similar AI agents, but then, as a backbone to

141

00:46:33.810 --> 00:46:41.650

Jisun An: think, to determine, like what action to do in the next, they are just using it at them to to replace that particular module.

142

00:46:41.840 --> 00:47:02.859

Jisun An: So so these are kind of just a different terms. But so while the AI agent is far more broader, and it may contain more things. We will focus on the Edm agents and we'll talk about what are the components of the agents? And what is the system? Types of the system that we could build based on these agents.

143

00:47:04.890 --> 00:47:29.000

Jisun An: So here is the conceptual framework of the Edm based agents. So once again, given our definition of the Rrm agents, the Rm. Agents have 3 different components. One is the brain. So brain is the the way the module that enables the agents to think, and it's responsible for memories or reasonings and also making the decisions.

144

00:47:29.650 --> 00:47:44.159

Jisun An: The second module is a perception, so it should be able to process like multimodal information from external environment. So we don't know what environment it would be, but it should be able to perceive that in different ways.

145

00:47:44.310 --> 00:48:03.199

Jisun An: and then the 3rd will be the action. So they will execute task using tools or interacts with their surroundings, depending on environment once again. So the action will be related to the environment. So depending on what environment this agents in it, the action may also change a little bit.

146

00:48:03.310 --> 00:48:17.430

Jisun An: So here the example shows that the user asked, look at the sky. Do you think it will rain tomorrow? If so, give the umbrella to me? So this was the request from the user. And the agents now think about

147

00:48:18.675 --> 00:48:31.090

Jisun An: like so perversely, they probably need to know what is the current weather right? And then this is something that the editor would not ever know, because, edit them is something trained, based on the historical data

148

00:48:31.090 --> 00:48:53.619

Jisun An: that itself may not be able to predict or know today's weather, right? So they need to be able to perceive what is the weather today? So which we will, we will talk about this later. But they will probably call, I mean, search Google, basically like, what is the weather today? Then the Google knows, Google knows right, like, what is the weather today, so they will know, perceive the environment or the weather first, st

149

00:48:54.080 --> 00:49:22.640

Jisun An: and then using their brain. They will now reason behind like if it is like rain, then would it be needed? Umbrella or not? And then they will get back to the agents as an action here. In this case it would be just in detector input, because these are basically Chatbot example. So user asked about this question. So agents perceive the environments and then think about reason about whether the umbrella is needed or not, and then finally decide to take the action to give the umbrella.

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00:49:22.980 --> 00:49:30.089

Jisun An: So this would be like the some like the frame, the basic framework of these edit and based on agents.

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00:49:31.660 --> 00:49:39.930

Jisun An: So I will go through each of these modules of the editor and based agents. But until here any questions.

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00:49:42.730 --> 00:49:45.840

Jisun An: Okay, so perceptions.

153

00:49:47.870 --> 00:49:51.185

Jisun An: So I mean, there could be like different

154

00:49:52.816 --> 00:50:14.270

Jisun An: how the model actually can understand the surroundings would be. There could be different ways. But then, people also say that many tasks actually can be turning into the texture information. So, for example, this is one of the popular example of the art word, so these are kind of the game. And then

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00:50:14.630 --> 00:50:16.409

Jisun An: basically, what they do is

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00:50:16.680 --> 00:50:45.320

Jisun An: they have this simulation environment where they have some image of this rooms, and then they literally just translate into the texture information, so that now, even though the edit may not have any ability to understand. This visual information by simply changing this visual information to the text the texture information now can be, come into the or the agents as a as an input.

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00:50:46.380 --> 00:50:51.459

Jisun An: so yeah, so like so these are, I mean, these are

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00:50:51.570 --> 00:51:14.030

Jisun An: simply not just about detector input, but they also kind of combining between the inputs and the actions as well. So they also give a like mentioned actions like go to shelf 6. Then they can actually go to shelf 6 as well. So they these are the example of the combining these 2. But here, what I want to highlight. Is that so things actually can be just

159

00:51:14.030 --> 00:51:25.949

Jisun An: change it to the texture, manner. And then now, every as as long as the input is in text form as you edit them can understand about it. So this would be the one particular way to perceive the environment.

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00:51:25.950 --> 00:51:30.630

Jisun An: So if we are explaining it.

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00:51:31.000 --> 00:51:39.110

Jisun An: and then and then there are also something as a still, it's a still texture. But there may be the wrap. Input, so

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00:51:40.120 --> 00:52:00.203

Jisun An: so when, as the AI agent started to studied, people have been developed, a try to develop a web environment where people can develop different AI agents and test it. So this web arena is one of such a platform and the data set where they can. They

163

00:52:01.140 --> 00:52:14.990

Jisun An: they built a different website, and then the the on on this web arena, you can create an agents where where they are, connect also connect to a different set of actions.

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00:52:14.990 --> 00:52:25.910

Jisun An: so that you can see where which page you are at. And then by clicking this like, it's also redirecting to another page, so that there could be a sequence of the web actions

165

00:52:25.910 --> 00:52:48.990

Jisun An: to achieve or complete a particular task. So they started from something very simple, like a shopping more using the Amazon data. So they had a big Amazon data set. And they created this market website where they have lists of the products. And then they can click. They can buy, they can track when the order is coming and etc. So all these tasks.

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00:52:49.040 --> 00:52:55.949

Jisun An: So these are kind of simulation environment where you can test your own AI agents whether they can complete each of the tasks.

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00:52:55.990 --> 00:53:24.482

Jisun An: and then in doing so. So the left one is the what we are seeing as a like web page. And then but it's actually in the Atmr format. And also it has this accessibility tree, where, you can see where are actually objects that you, the clickable or the actionable images, so that you can use this textured information to train the edit them to do a course of the actions to do a particular job, like buying of stops or or checking for the

168

00:53:24.850 --> 00:53:32.490

Jisun An: orders, and etc. So once again, these are example of detector web. Input but here also some demo, I don't know how.

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00:53:32.680 --> 00:53:37.639

Jisun An: So the on top there's a small prompt. And then the here is like.

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00:53:38.180 --> 00:53:48.119

Jisun An: I think the task was finding the When is mine, the order will arrive. Was the task. And then now it's kind of running.

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00:53:48.850 --> 00:54:13.950

Jisun An: You can see that the the page is automatically changing. And it's it's basically there are prompts that are thinking about what to click. And then they are actually clicking. So actually making an action, and then think again, etc. So these are some of the demo that using this web arena. So if you are interested in this particular platform is actually so they started. Oh, they started from this

172

00:54:13.970 --> 00:54:31.960

Jisun An: web shopping mall. And then they extended it to many other things like the online community, like the Reddit github, and some other Cms kind of. So they have a different kind of platforms where you can see different simulation environments where you can test the different AI agents.

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00:54:35.719 --> 00:54:40.550

Jisun An: Yeah, the 3rd one would be like visual inputs. And so

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00:54:41.930 --> 00:54:56.649

Jisun An: so so we will actually talk about this visual language models in the in the last class. And then one of the example, if I think the most current open source is this, lava, large language and vision assistance model.

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00:54:56.960 --> 00:55:20.739

Jisun An: And these are so in a way that these are it started from like an image captioning. So people were interested in given an image, whether we can create a caption explaining about what's happening in the image. And then. Now these models are now encode both text and the image together, and they are trying to make sense of what's actually happening in this image?

176

00:55:22.690 --> 00:55:38.079

Jisun An: I mean, Gpt 4 is obviously a good choice. But then, obviously it's costly. So lava is the something that introduced in 2023. And then there's a lava 1.5, which is using more simpler architecture to

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00:55:40.006 --> 00:55:50.160

Jisun An: train, and now they show the great performance at at per at the Gpt. 4. So

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00:55:50.840 --> 00:56:13.407

Jisun An: what it means is that now, even just with the visual, like images or I don't think it can do videos yet, but there could be some other model that are handling the videos as well. So given the image, it can basically understand the visual images as it is. But at the same time you can also reason about different parts of these images.

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00:56:13.730 --> 00:56:21.909

Jisun An: so visual input is also one possible perception which, and also could be very useful, especially in the real world scenarios.

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00:56:21.910 --> 00:56:36.200

Jisun An: and there are not just the lava, and there are other open models as well. So that would be also an interesting model to explore. And I know that some of the teams are actually considering to using this visual models. So it'll be fun to see what the visuals that you'd have

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00:56:37.550 --> 00:56:49.699

Jisun An: and some other visual input as well. So there are some different data set. This one is like touchdown is the corpus for executing the navigation instruction. So

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00:56:50.290 --> 00:57:14.480

Jisun An: so these are the data set where it has a strip from the Google Strip view. And then it basically has all this natural language instruction to go to particular direction, and then so, like turn left, go straight. There will be a certain building with the dinosaurs, and then on the on the top of the the back of the dinosaur is the touchdown. So the goal

183

00:57:14.480 --> 00:57:25.929

Jisun An: of the task is to find that direction. Follow that direction, using the the following, the instruction and then find the exact position of this touchdown is is their goal.

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00:57:26.220 --> 00:57:43.680

Jisun An: So they created this touchdown data set with a bunch of Google Street View. And so this data set has been used to train different models to understand this visual information, especially at the spatial info descriptions into the

185

00:57:43.960 --> 00:58:06.330

Jisun An: into the model, so there could be. So I don't know whether this one in particular has been integrated with the evidence or not, but obviously, I mean, just wanted to let you know that these there are some efforts that's going around that are trying to do I mean, obviously, you can, you can see that this would be. There are also many other data set that are relating to the autonomous car drivings, and

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00:58:06.730 --> 00:58:14.250

Jisun An: which I'm this is something that I'm not very familiar with. So these are some of the examples that that I can share.

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00:58:15.830 --> 00:58:33.598

Jisun An: and and also in terms of the procession. There could be some other input like auditory inputs. So like text to speech or style transfer. Here, the start transfer means that, like changing my voice to like Obama, or something that kind of like style transfer, or the speech recognition.

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00:58:34.250 --> 00:58:51.020

Jisun An: so an example, I think there's audio Gpt is the some open source model that does a lot of these processing for the auditory input. So if you are interested in them, I think this would be also a good model to check.

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00:58:51.520 --> 00:59:10.559

Jisun An: And then, essentially, the perception is about learning the environment. So there could be different inputs. Some other sensors like maybe like. So how can we make sure, like the the models? The agents knows that, like the feelings of these materials or smells or tastes, would it be possible to

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00:59:10.560 --> 00:59:22.379

Jisun An: have those sensories. So, even though these are not our domain of the expertise. But I think that the Hci area are very, very active in trying to

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00:59:22.770 --> 00:59:36.489

Jisun An: getting the sense census of like these things that are. I think there were recently. There are the from the Japanese Company. There are these chopsticks where where you they can make you saltiness. Fill the saltiness

192

00:59:37.570 --> 00:59:44.890

Jisun An: from the like electrical signals. If you are eating a food with that chopsticks, then you can actually feel the salt.

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00:59:45.180 --> 00:59:49.599

Jisun An: So you can reduce the net neutrium intake.

194

00:59:50.090 --> 01:00:13.420

Jisun An: So I think that's some interesting kind of senses. And there could be some other environmental context, like measuring temperature, humidity, brightness. So any kind of sensors that you can think of to understand the humans that can be connected back to the AI agents and then considered to be as understanding the environment parts. So these are possible kind of input that can be injected to the AI agents.

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01:00:14.410 --> 01:00:20.059

Jisun An: Can you think of any any other inputs? That other than this? I think this more.

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01:00:20.240 --> 01:00:23.559

Jisun An: most of the things that I can think of?

197

01:00:27.420 --> 01:00:43.430

Jisun An: Yeah. But I mean there should be tons of you. I mean, especially like the drones that we just talked about in the tester situation. So I think if we have a clear scenario, it'll be becoming more clear what kind of environment we are in and what kind of census that we need to

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01:00:43.780 --> 01:00:53.029

Jisun An: learn from the environment. But these are just the common types of the inputs, I think, would be required for the AI agents.

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01:00:56.590 --> 01:00:59.979

Jisun An: Right? So the next one would be the actions.

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01:01:00.140 --> 01:01:28.099

Jisun An: So in the actions there are 3 different types of the actions, so the texture output. So if, for example, like the Chatbots, these are, if we consider them as AI agents, then like talking with them, their action is basically generating another sentences. So the texture output is their action, and we already know that are really good at generating this text. So I will not talk about the text output that much. So we will more or less more talk about tools and the embodied actions.

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01:01:28.850 --> 01:01:31.600

Jisun An: But then also embodied action is something that

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01:01:31.730 --> 01:01:45.999

Jisun An: connecting to the actual embodiments of the actions, which is like the robots or doing games. So it's just the I want to know that conceptually they could just. But we were mostly talked about. The tools.

203

01:01:47.160 --> 01:02:05.950

Jisun An: So what is a tool? Especially for the agents? So language model use. The tool is a function interface to a computer program that runs externally to the item where the item generates the function calls and input arguments in order to use the tools. So

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01:02:06.570 --> 01:02:11.670

Jisun An: I think to 3, rd to an extent we.

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01:02:11.860 --> 01:02:24.159

Jisun An: I mean, we we didn't mention about the tool. But we like talked about like the rag. So using rag is essentially using a tool, right? So basically, you can imagine a situation where Gpt, now, does that? So

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01:02:24.160 --> 01:02:49.120

Jisun An: we ask something. And then the model finds that the whatever question it was, if it is not confident enough to answer to that particular question. Then they may need to use, like the rack system, to get retrieve some better information right? So in using this rack is the time that the model knows to use the tool. Basically, it cannot solve this problem within

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01:02:49.120 --> 01:02:57.119

Jisun An: mechanism of the other end. But instead, they need to use external tool to do something. So these are. This is the action.

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01:02:57.370 --> 01:03:03.650

Jisun An: and this action is done via this tool. And the Reg is also kind part of this tool use

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01:03:05.108 --> 01:03:33.060

Jisun An: but then in in general, there are different 2 functionalities 3 types of different functionalities. So even though I leave this tool as a category of the action, but edit them actually can use 2 for like getting the perception getting some, collecting the information from the environment, as I told you, like getting the weather information. So this is also using the tool. But it's actually about the perception. So there are a bit of mixture of the concepts here, but

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01:03:33.060 --> 01:03:36.709

Jisun An: I thought it'd be nice to be here, so I just leave it here.

211

01:03:37.233 --> 01:03:48.919

Jisun An: So like like getting the time of now or getting the weather information. So these are essentially, conceptually, it is for the perception. But it's it's done via the tool use of the item.

212

01:03:49.390 --> 01:04:12.689

Jisun An: and then the actual action. So so like doing some kind of actions like generating like. If it were in the like the games, then maybe turn left or turn right, or if you are an agents like controlling for the social media accounts, and like, make a post to be an action. So these are the actual action that are given that are responsible for the different AI agents.

213

01:04:13.590 --> 01:04:41.586

Jisun An: And lastly, there could be some computation related tools like like calculator or translators. But I think these are the. So there's this survey paper about lot of tools, anyway. And these are the definitions categorization coming from this survey paper. But I think once again, the AI agents in this entire area is very new, so there's no consensus on this, but I think these are the reasonable enough

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01:04:42.320 --> 01:05:05.239

Jisun An: to categories. So and more specifically, there could be, there's different types of categories of the tools, so there could be knowledge access like accessing to the Dbs or using like our reg system. So SQL. Executors or search engines, or the retriever so whenever

215

01:05:05.240 --> 01:05:17.009

Jisun An: you find that whatever information that you have is not enough to answer back to this question that you may need on external information. So for that purpose, you may need these tools to require the knowledge

216

01:05:17.180 --> 01:05:31.684

Jisun An: and the computation activity, including like calculator or python interpreter. So here Python interpreters are. Basically, you've seen in the Chat Gpt, that running the actual python code, right? So they see that this is that, and also like worksheet insert row.

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01:05:33.517 --> 01:05:35.659

Jisun An: I don't know whether this is

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01:05:35.960 --> 01:05:42.950

Jisun An: to me whether this is part of the computation activities or not. But I think now, there are.

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01:05:44.670 --> 01:05:45.540

Jisun An: Yeah.

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01:05:45.960 --> 01:05:50.130

Jisun An: The entire application can be connected to the Edm. And then,

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01:05:50.660 --> 01:05:57.060

Jisun An: that the implication can be controlled by the I think there are some ongoing work. The Fec.

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01:05:57.310 --> 01:05:58.310

Jisun An: Figma

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01:05:58.510 --> 01:06:12.990

Jisun An: is that the application for the drawings? The figma was connected to the chatgpt, so you can virtually control the figma with the Gpt. So that was the Msp. Which is the kind of middleware introduced by the anthropy.

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01:06:13.596 --> 01:06:23.399

Jisun An: So there could be. You can. You can think of, or possible actions can be done in one software, and that can be also connected to the edit them. And then these

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01:06:23.410 --> 01:06:44.279

Jisun An: are considered to be actions, because, like, you are clicking each of these buttons in the applications you can use editing to ask, click that button, and then they will click the button. So just so, action would be also the course of the set of all possible actions can be done in one software. And I think that could be this part of this computation activities

226

01:06:45.440 --> 01:06:55.579

Jisun An: and and some other types of categories like interaction with the word getting the weather getting the location the current events or the email verifications

227

01:06:56.300 --> 01:07:07.089

Jisun An: and and also like checking with the non-texture modality. That like playing musics or creating or deleting the images.

228

01:07:07.280 --> 01:07:15.699

Jisun An: And also there could be some other special skilled items like Qa in particular, or the translations. So these are some

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01:07:17.000 --> 01:07:32.529

Jisun An: one possible types of the categories of these tools. And so I think eventually there will be more and more possible actions that can be connected to the addms, and these are just the initial set of and categorizations of the tools.

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01:07:34.790 --> 01:07:53.053

Jisun An: So how actually, these tools can be used? And especially if you think about the Llm model that we learned, it just generates the the language. I mean token by token, right? So how they they do is

231

01:07:54.129 --> 01:08:19.150

Jisun An: basically, they just switch between text generation mode and the tool execution mode. So while so, the the way that this works tool use works is that the edit M start to generate tokens, and then, instead of the actual tokens. They generate a particular token that trigger to execute the tool execution. So, for example, if the user ask, how is the weather today?

232

01:08:19.550 --> 01:08:27.189

Jisun An: Then obviously edit them doesn't know the weather today. So instead of saying something, they generate, it is check weather

233

01:08:27.300 --> 01:08:49.870

Jisun An: functions, and this will be a token that triggers to execute a particular tool that calls the Api like doing the Google search or checking the weather and then get the return from this function call, and then replace this particular token with the actual results. Which is, it is sunny, and then and then keep generating.

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01:08:50.529 --> 01:08:53.860

Jisun An: So that's the like normal paradigm that, like

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01:08:54.000 --> 01:09:10.819

Jisun An: common paradigm, that you would see how the tool use actually happen in this generation. And then this can be done during the inference time prompting, or you can also train to to to know the how. Let the model know how to use these tools.

236

01:09:11.220 --> 01:09:20.180

Jisun An: So I will talk about that a little bit. So this 2 token is this something that was like

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01:09:21.069 --> 01:09:28.510

Jisun An: popularly used lighting. And I believe that the Gpt also use this tool token when they are doing. And

238

01:09:28.800 --> 01:09:39.170

Jisun An: the way it works is quite interesting. So what they do is basically, they added this additional 2 tokens. So they code it as a

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01:09:39.319 --> 01:09:47.580

Jisun An: tokens, 2 tokens and show called tokens, so they so, instead of all the tokens that they we have in the language, they also added this tokens

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01:09:48.073 --> 01:09:52.896

Jisun An: in in part of the language, and then they just train the models a little bit.

241

01:09:53.529 --> 01:10:12.158

Jisun An: So instead of when so they just train the model. I mean, they create a data set with with the replacing some of the parts in the the actual data. And then they just replace it with these tokens and then just train the model, and then

242

01:10:12.880 --> 01:10:32.389

Jisun An: they basically whenever so, and then and then let the model just to generate these link the tokens. So when they actually got the tokens, then they instead of I mean, when, whenever they are facing the tokens. They just execute that tool and then replace the reachers. And then they just do that. So

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01:10:33.750 --> 01:10:36.169

Jisun An: yeah, I mean, it's a. It's a kind of.

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01:10:37.150 --> 01:10:59.510

Jisun An: So I think it's an interesting idea, because they use that. I mean once again, the language models are just next token generation model. So they just consider this to use as a part of the language. So this token became a part of their tokens, and then and then, just whenever they are facing this tokens, they just execute that.

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01:10:59.660 --> 01:11:05.339

Jisun An: So let's see how most popularly, the tool use has been done in the Internet.

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01:11:08.260 --> 01:11:34.199

Jisun An: And then, the quote act is also something similar to the tools. But then, you need so this, this tool use, they basically they have bunch of different Api calls or different tools that they can use, and then they replace the results into their their language. But then, their idea, this quote act, their idea was, rather than getting like multiple Api course, why don't we just do

247

01:11:34.310 --> 01:11:37.565

Jisun An: just like program it? So instead of

248

01:11:38.130 --> 01:11:42.600

Jisun An: So assuming, if we wanted to know the

249

01:11:42.710 --> 01:11:55.290

Jisun An: calculate the phone price in the Usd for okay. So I I guess the question was, what is the most cost effective country for the phone

250

01:11:55.632 --> 01:12:14.057

Jisun An: buying the phone, I think, and then so if you have this question, if you are just using the like tool, no more tool to call the Apis, and you probably need to call N. Times for different countries to figure out how much the price of the phone in each of the country, right? So so instead of doing that,

251

01:12:14.620 --> 01:12:32.229

Jisun An: they just create a python code and then they just execute this code to run it so rather than exchanging through the Api multiple times. Just let it do it with the code. And then so this is one example. And I think

252

01:12:32.380 --> 01:12:49.000

Jisun An: now that I'm saying it, this may not be very different from just calling Api end times. But then there are actual cases where using the Python code is better than just calling the Apis multiple times. And they found that using the this code itself improves some of the reasoning tests.

253

01:12:49.324 --> 01:13:09.780

Jisun An: So so these are, I think, the 2 examples that you are also seeing from when you're using, like the Chat Gpt or any other, add items. So sometimes they are suddenly like start to write a like some programs. And so there are some cases where these programs are working better. And there are cases when just simply calling these Apis are working better.

254

01:13:11.240 --> 01:13:16.254

Jisun An: And and lastly, this is the tool former. So here,

255

01:13:17.140 --> 01:13:42.211

Jisun An: here, basically, we are creating a data set that we let the model know when to use which tools. And then but basically, these guys have an idea that it may not be possible to let model to know which tools to use, at which exact time, so rather than they let them to learn which tool to use for what, when, so what they did was so and the idea is

256

01:13:42.880 --> 01:13:56.009

Jisun An: basically, they, they created this data set, using the Rrm to see which to provide the best output which part should be replaced to the tool use.

257

01:13:56.090 --> 01:14:21.829

Jisun An: And and they just created this data set using the edit them. So, for example, if they had this. Like particular sentence, Pittsburgh is also known for the Steel city, then, except the answer, they using the prompt before the answer, they had a few candidate Api calls and then they actually execute the Api calls and see which one actually lead to the correct answer

258

01:14:22.243 --> 01:14:30.249

Jisun An: and then they use that information to create this data set so to complete that sentence which Api call would be the best

259

01:14:30.747 --> 01:14:38.619

Jisun An: and then and then, using this kind of steps. They just created a big data set solely by the Nm.

260

01:14:38.930 --> 01:14:54.969

Jisun An: And then they kind of even though here there were like limited number of the tools, but at least this one, rather than we let model to know the tools they let model to learn when to use which tools. So that was the kind of different approaches.

261

01:14:55.920 --> 01:15:03.389

Jisun An: So I think I will. I'm sorry that I was. I feel that I was like talking a lot, but any any questions.

262

01:15:06.230 --> 01:15:17.330

Jisun An: This may not be very fun. But I think it's it's some basic information to understand what is the edit images and what is the compulsive. And

263

01:15:18.606 --> 01:15:35.800

Jisun An: yeah, so I will continue. I I think I have a few more slide about this tool use, which is part of the action, and then I will move on to the memory, which is more interesting, and then I will talk about single agent, multi agents, and the evaluation. I think that will be all for the AI agent.

264

01:15:37.200 --> 01:15:45.039

Jisun An: Okay, if you have any other questions, I will be here. Otherwise. Have a great rest of the day, and I will see you

265

01:15:45.150 --> 01:15:46.309

Jisun An: on Thursday.

266

01:15:46.840 --> 01:15:48.110

Jisun An: Thank you.