Ep 11 - Future or Fantasy, Agri-Chatbots

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Rachael Halder: Catchment Convos with Thriving Southland, your link to Southland Catchment groups and their impactful projects. Each episode will dive into grassroots effort by local farmers and communities that are driving change and sustainability in our regions. Listen in for inspiring stories and insight. Real people, real change, the Southland Way.

Welcome back to Catchment Convos, the podcast that dives into the heart of Southland's, land, water, and people, and the ideas shaping our rural future. I'm your host, Rachel Halder, and today we're talking tech, but not the kind that leaves you scratching your head. We're joined by Mahgol Yousefi, a product designer and PhD researcher who's working right at the crossroads of human-centered AI and farming.

She's leading a collaborative project with AgResearch and the University of Canterbury looking at how we can turn all of the [00:01:00] farm data, into simple smart tools that can actually help with day-to-day decisions. Mahgol's been exploring the idea of agri chatbots, AI powered helpers that could one day sit in your pocket, ready to answer questions and make sense of your farm data on the spot.

Future or fantasy? That's the question, and we're going to get into that today on this episode. So whether you are AI curious, a tech skeptical, or just looking for better ways to get through the workload, this episode's for you.

Hi Mahgol. Welcome to Catchment Convos. It's awesome to have you.

Mahgol Yousefi: Hi Rachel. Thanks for having me.

Rachael Halder: No problem. So, hey I thought what we might do is start this episode off with can you tell us a little bit about yourself and, your background?

Mahgol Yousefi: So I was raised and born in a farm, small farm, but my grandfather, my uncle and every family members are [00:02:00] farmers, dairy farmers and, crop farmers.

So when I grow up, I really understood the farming and I was in the farm and, I could see their challenges and the rewards at the end of the season. So that led me to do my Bachelor in agricultural engineering in Iran. Then I did my agricultural mechanisation degree in Malaysia. And then , I moved to New Zealand in 2022. 2023, sorry to do my PhD in , human centered , AI and specifically for agriculture. That was a journey.

Rachael Halder: Wow. So what led you to human-centered AI, and how have you ended up working with Ag Research and the University of Canterbury?

Mahgol Yousefi: So when I was in Malaysia, I studied for my master, innovation and design engineering. And then I was introduced to, into ai artificial intelligence. And I thought, how can [00:03:00] I , merge this AI and agriculture in as a design concept and build. Automate some of the process in agriculture sector.

So that was the idea. And then I came across, this human computer interaction, which was new for me. I've already had some knowledge of AI and do some machine learning, techniques in, for example, pollination, prediction in all palm crops in Malaysia. And then I decided that's really interesting.

The human part of the design process, like, augmenting their human values and their needs, and, building that trust between this techno, okay, we designed these technologies. How do the users, when it goes into their work environment, how do they actually use them? So that was fascinating for me.

And then I had the privilege of working with, AgResearch as well. So that was the opportunity that came [00:04:00] across and I jumped into it.

Rachael Halder: Oh, wow. So AgResearch got you over from Malaysia.

Mahgol Yousefi: There was a position, for this project and specifically for a conversational agent or chat bots which uses AI, in the system. And, their goal was how can we improve AI technology or digital technologies adoption in New Zealand primary sector agriculture. And so I applied and then, I got the position and I was here.

Rachael Halder: And the rest is history.

So can you maybe briefly explain this project or the project that you are leading and what is the main goal for the project?

Mahgol Yousefi: So the project was started in 2022. It was just before ChatGPT and really new evolution of AI technologies that came out. So the project goal was how can we use chat bots to get [00:05:00] farmers information while they are on the farm, and how can we provide information easily for them on the spot. And that was the idea. But then before ChatGPT era, the chat bots were completely different. It was very static. I mean it was rule-based. But then after ChatGPT came out. So, we had advantage of how can we leverage these really powerful AI models. How can we embed them or, bring them into agriculture for the farmers to use? So, that was the beginning. But the ultimate goal is building or designing AI technologies here, the chat bot for farmers to really adopt these technologies into their day-to-day life, and how can we build that trust between the farmers, [00:06:00] and the AI technology.

Rachael Halder: So I guess building on, the farmer side of things is, how are farmers actually involved in shaping these tools?

Mahgol Yousefi: So when we are designing products for the users, and here I'm specifically working with the farmers , chatbots is not something they've already used before. What is a specific area or niche area or the challenge or the problem that we can fulfill to design this AI chatbot for the farmers? When I first started, I just wanted to have a talk chat with the farmers, very casual, understand how do you get the information at the moment? For example, what are the tasks that you , on a daily basis that you need to refer to external sources or , applications to get information? And how do you use them? How do this information help you to make decisions , for those specific tasks? [00:07:00] So we just wanted to understand their challenges, their needs, and how can we bring this chat bots into the process.

Rachael Halder: So why is digital technology adoption in agriculture really tricky and, have you seen or heard from farmers any roadblocks so far with this that you can predict or think might happen?

Mahgol Yousefi: So one is it's not available. I mean, the chatbot is not available for farmers, so they haven't used it . But overall, in terms of other technologies that they have, like in different application in their phones or other, automated technologies like the collar and the sensors, mostly, it's the cost.

The value proposition, like if we invest on these technologies, how this system will add value into their existing business process. So it should be integrated very seamlessly into their existing workflow. So that was [00:08:00] what I've heard from the farmers.

Rachael Halder: I guess you just touched on it then. They are actually collecting and inputting a lot of data already. So the concept of the agri focus chat bot is around trying to make that data, the complexity of their data more accessible, isn't it?

Mahgol Yousefi: Exactly.

Rachael Halder: Can you give us a practical example on a day to day, , how would a farmer or a farming system use this chatbot?

Mahgol Yousefi: So we have different chat bots when we talk. Like the simplest, ChatGPT came out, it was like generative AI where you could give text and you ask a question. For example, summarize this text for me and it will summarize and give it to you in a second, split second. Another chatbot that we can say is agent, AI agent where, for example, the farmer ask, what's the temperature like outside? So the chatbot has its own [00:09:00] internal knowledge based on the retained knowledge. It goes from across a worldwide web, but also needs to call , weather forecasting API to get the weather, forecast the temperature, for example of that region and then give it back to the farmer. So that is AI agent. But then , a bit more complex is, agentic AI where two or three or four different agents or chat bots collaborate with each other. For example, in advanced scenario in the farm, we can say the farmers ask the chatbot to , adjust the irrigation if they have a automated irrigation system already in place in their pasture, for example. Then that agent needs to, connect with soil moisture agent and also with the weather forecasting agent and the ventilation system in [00:10:00] the irrigation system. So all different information agents are connecting with each other, and then it will say, okay, the chatbot will adjust the irrigation system according to all the information. It goes from the soil moisture, from the weather forecast, from the, I don't know, other sources of information, and do that autonomously.

Rachael Halder: So do you see these Agri Chat bots being able to accept data from the farmer?

Mahgol Yousefi: Yes, absolutely it can, but, it would be a very complex workflow. Uh, it's not a single agent. But in those scenarios, uh, it is kind of agentic AI where different API calls need to be made , their workflow needs to be connected to each other and different frameworks so it can call back from, it can connect to different, applications, to respond back to the user. It's possible. Yeah.

Rachael Halder: When we talked at Agritech, you, mentioned a couple [00:11:00] examples about even asking it questions around, milk forecasting or land price forecasting. So, it is using credible sources, isn't it?

Mahgol Yousefi: Yes. So when we are using this, they are trained. What it means, is trained on very large amount of data from , anywhere in the web, in, in the internet, but then when it needs to for specific information, it can connect to your specific information or credible information from Fonterra, for example, the milk production app they have Farm Source for example. Those are credible information or data. And the , website, those are credible information for the farmers, so it can connect with those different APIs and, get the information , merge it with this existing reasoning knowledge, update it and , give the farmers with credible information sighting to those website.

Rachael Halder: Oh, it's gonna be [00:12:00] fascinating to see, 'cause it's such a growing industry. What's some of the most surprising feedback or insight that you've heard from farmers involved in your research so far?

Mahgol Yousefi: From the farmers themselves. Uh, for example, one of the ladies she asked me, I have so much data from my, like fathers and grandfather, and I would really like to know like can refer back to those data, how they did farming like 10 years ago, or five years ago and how that can help me now or in the future. And that is kind of nice things for preserving knowledge and transferring those knowledge into next generation of farmers.

Rachael Halder: Yeah, that's it. Have you sort of come across any sort of resistance or mistrust around the AI and farming tools?

Mahgol Yousefi: Of course, yeah. I mean there, there has to be, some people, I mean it's a kind of awareness as well. Those, very few people, who had their [00:13:00] skepticism towards this AI technology because they say like, oh, I've been doing farming like for, uh, 10 years or 20 years I know my land, I know my weather. And, the weather forecasts are it says it's gonna rain, but it doesn't rain, and so they lose their trust in weather forecasting models. So that's kind of things similar to other, AI technologies that they are using.

So technology like chat bots, they are, like we mentioned, is as good as the data is input. If your data is not good, of course the outcome, wouldn't be accurate as well.

Rachael Halder: And so how do we overcome some of that distrust and that resistance?

Mahgol Yousefi: I would say kind of training, uh, sharing information. , I had a call recently that they are working on AI chatbot for farmers and they are doing so much research and [00:14:00] how can we take like technical steps to make this chatbot really reliable and with as low as possible errors in, the outcome. So I mean, getting them on board to get used because they haven't used chatbot in the farm yet.

Rachael Halder: So what do you see the biggest opportunities then for AI in the New Zealand primary sector for say five to 10 years time?

Mahgol Yousefi: For chat bots, I would say automating some of the tasks for example, we can integrate the different sources of information they have and put it, in one place instead. So we can kind of integrate those, information in one platform and get the agents, the chat bots, provide those information, on the spot with the proper reasoning. Another thing would be getting those images and [00:15:00] sensors, for example, the farmers using and so the chatbot would be connected into those, information. It can see. It can read those, sensor data and it says, for example, oh, you should look, the machine didn't fertilize this part of the land. Maybe you should consider those kind of, uh, you know, being so proactive and giving you heads up and being like assistant, a companion for you in the farm.

Rachael Halder: So if you know farmers listing out there, they're curious, but maybe a little bit hesitant, what would you'd say to them about the future of AI on farm?

Mahgol Yousefi: Um. I mean we could learn from other sectors , because they are really taking this AI chat bots into next levels very high stake environment like in finance, in healthcare. So there are so many advancement in those [00:16:00] areas. How can we adopt those approaches into farming and be receptive towards these technologies because it makes so much of the lives easier in terms of getting information , connecting different sources of information together, providing insight. Real time. So you can act on those , on the spot rather than you have to go search for hours and come up or relying on what you have done over the 10 years. So why not leverage those technology that can really make you do business more productively with lesser cost and also sustainably.

Rachael Halder: So back to your research a little bit, Mahgol , so have you got any prototypes in the pipeline or , what should we be watching out for?

Mahgol Yousefi: So we have, a for prototype is like a ChatGPT, but [00:17:00] you can upload your PDF files that you have. It can do some simple visualization like line, graph , bar or those kind of stuff given the information that you provide. We are planning to do simple copilot study with the small number of farmers and get their feedback, their experience using this chat bots for this simple task. And then what would they prefer? What would like to see this chat bots in other tasks that they do on the farm. So that is a plan we have, and from there we can decide. Okay. Is it voice proper or the text? I mean, we don't know yet. Or, what are the features, other features that they would like to see on this chat bot interfaces?

Rachael Halder: So where can people follow your work or like how can they get involved in this co-design process or your piloting process? [00:18:00]

Mahgol Yousefi: So they can, I have my LinkedIn page.

Rachael Halder: Awesome. And I guess finally, to finish off, if there was one piece of technology, or AI, that you wish every Kiwi farmer had access to tomorrow , what would that be?

Mahgol Yousefi: Of course chat bots, but uh, yeah, obviously we don't have any chatbot yet for the farmers to use. But it's coming. It's gonna be there. I mean, even trying out ChatGPT as well, just play. with ChatGPT or other chatbot that they can use on their phone.

Rachael Halder: Oh, amazing. Mahgol, thank you very much for joining us on Catchment Convos and we are really excited to follow your work and see where it goes. And looking forward to the announcement that you've released a chat bot one day soon.

Mahgol Yousefi: Thank you so much. It's been a great journey for me as well and learning from the farmers and other researchers in the field. Hopefully we will have the [00:19:00] chatbot there for them to use in the future, near future.

Rachael Halder: And that's a wrap for another episode of Catchment Convos, brought to you by Thriving Southland. A big thanks to our guests for being a part of the conversation on today's episode, and for you guys for tuning in. We appreciate your support. Don't forget to like, subscribe, and follow us wherever you get your podcast from so you can stay up to date with all the latest episodes as they're released.

For more information on this episode, check out the show notes or head to the Thriving Southland website where you can also learn more about the awesome work happening across the catchment groups here in Southland. And if you've got a project or an idea you wanna share, don't be shy. Reach out. So until next time, keep up the good work out there on the land and as always, stay connected and keep driving those changes for a thriving Southland.