Critical Thinking Conversations:
Pairing Professors and Professionals
Building Thinking Machines

Q. Is it even worth competing to create domain-specific LLMs when big players have more resources and can provide a similar product at scale? The smaller models may not be as good, but 80% is there compared to the general big-brain models.
A. Even outside AI, little companies often innovate out of necessity and drive unique solutions that big companies won't be as motivated to solve. Things like having access to data, avoiding proprietary data or model fees, and access to hardware will drive innovation for smaller model developers. We can also parallel people's specialization of understanding. Not all humans, even in the same profession, can be consulted for any inquiry. A general practitioner of medicine will defer to a specialist when required. I foresee ensembles of models, the way GPs will consult specialists, as an AI architectural pattern in the future.

Q. There was talk about a deeper interface between the human brain and an AI model & how that might affect day-to-day life. That brought me to some recent thinking I've been doing on this. There was some exciting recent development out of the realm of thought-to-speech technology. We have already achieved some level of computer chip integration with the human brain, with companies like Neuralink. Does that mean integrating each of those technologies to interface the human brain with an AI is that far off? Would doing such a thing connect the human brain to the internet (at least indirectly through the use of the AI interface)? Would people with similar implants be able to think and contact each other?
A. My quick gut opinion is that AI is just software. If the hardware becomes available to interface, we shouldn't have a limit to what we do with that data. That said, I just watched Black Mirror S7E1. We need to make sure the ethics and rigor are ahead of commercialization.

Q. You say that the "goal" isn't to replace humans. But, of necessity, isn't that inevitable? Even making humans more efficient means you need fewer people to do the same activity. That isn't to be feared, but we need to consider strategies for workforce migration.
A. Completely agree with workforce migration. For instance, the proliferation of electronic computers after World War 2 yielded the retraining of the human computers to become many of the first computer programmers. We've seen that the first rounds of this migration are moving people from data grooming roles to data analytics/business insight roles. It has also driven more demand for data collection, input/ingestion, and quality assurance. Another aspect of this workforce migration is that these tools lower the barrier to entry for analytics and business insight roles.

Q. If we bring AI so close into our lives, does that make specific industries and occupations requiring advanced or niche knowledge more accessible?

A. Absolutely. As a parallel, computer programming of the 1950s was an advanced and niche skill. 75 years later, I routinely program command blocks in Minecraft with my 5-year-old son and 3D print routines and models with my 10-year-old daughter. How we use these tools still requires skills, training, rigor, and ethics to apply to our everyday lives. I'm not ready to let the 5-year-old out with the self-driving car.

Q. Aren't biases the mirror of our society, and there may be a bigger problem here than ensuring that AI doesn't inherit our biases?
A. Most definitely. Acknowledging the problem with our data and correcting it is our first step to proactively making our applications more fair and equitable.

Q. Could newer AI models do specific tasks at the speed of thought? Could an AI model write a book just by someone thinking about it?
A. I definitely see an opportunity for future research on how to communicate more effectively with AI. I could write a prompt to write a novel today with ChatGPT or Gemini. ChatGPT thinks it would need upwards of 16 hours to complete a chapter book. I'm sure we'll get to a point soon where responses could be streamed in real-time. I used ChatGPT to help brainstorm topics and find resources for my RIT Certified course. These are not real-time results, especially when tweaking my prompts to get the content and vibe I aimed for.

Q. Which major would best fit the goal of building specialized devices to assist humans that incorporate AI?
A. I'm partial to Computer Engineering :) There are a lot of different aspects to human assistance devices. There are also a lot of fields that will benefit from the incorporation of AI. AI is just a tool we engineers and scientists use to solve problems. We still have to learn how to solve the problem. Device development could range across the spectrum of engineering, from mechanical design to the electrical aspects to software, including any AI and the interfaces between them.

Q. Could AIs reach an advanced enough level to allow someone to write an entire thesis without formally attending college?
A. Writing the thesis is actually not the hard part :) Yes, an AI could do this writing now. The academic community has a rigorous methodology to oversee and peer review the research in the thesis. Today, an AI-written thesis likely wouldn't meet that rigor to show academic novelty. I also find AI is suitable for identifying trends in existing data and even less evident connections between pieces of data, but not for finding new and novel interpretations of the data.

Q. How can the specialization of using multiple AI models balance the convenience of using AI for specific tasks?
A. Soon, I expect we'll see AIs recommend outsourcing specialized queries or maybe pieces of queries to more focused models, whether it's a directed referral or an automated query. Right now, immense effort is being made to groom the data used to train models. I believe we'll find that too much contradictory information leads to specialized training.

Q. If we implement AI to complete a certain task humans couldn't achieve (at least as easily), how do we implement such technology when it comes across a specialized situation? Do we get the AI model to do that critical thinking for us?
A. For now, AI is best used to connect data and make recommendations based on input to provide predictions and recommendations based on human input. Humans will continue to interpret the recommendations AI produces and apply them based on the problem to be solved. Much like the calculator didn't eliminate the need to teach mathematics, the fundamentals and concepts are still required to understand the tools used to solve problems.