Title: What Is Beyond Smartphones?

Author: Kazuma Takahashi

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What is beyond smartphones? We use smartphones and know how powerful they are. With smartphones, we can make calls, video-chat, and text. We also take pictures and share them with friends all over the world. It's surprising how such a small device enables us to use it in a variety of ways. Then what do we want next? Do we want smaller devices, better designs, higher speeds of communication, or more applications? We need both new ideas and technologies to realize what we want. For new ideas, our challenge to create new things never ends, and even teenagers can come up with great ideas. On the other hand, smartphone technology has grown dramatically but seems to be saturated now. Therefore, we need new technology to realize such great ideas. The open scientific question here is how to achieve such technology.

Physics gives us a new way to see the world. For example, there is a famous story of

Laplace’s demon. If you were a great expert at knowing everything happening now, you would predict anything in the future. Do you think it is true? The demon can probably predict the weather of tomorrow. But what about 100 years later? Some will say that the demon knows the weather 100 years later because it is the same puzzle as one day. Some will answer no because its complexity is totally different. It is important to know there are many ways of looking at the world and to think about our own way of seeing the world. In the context of physics, we can predict the movement of particles following Newton’s laws of motion. Isaac Newton made three laws describing the movement of particles, and mechanics is applied to many fields like launching rockets. The laws seem to tell us future like the weather 100 years later. However modern physics tell us that we cannot predict motion of particles even just a moment ahead in some situation. The physics is called quantum mechanics. We know that particles in the small world like atoms and electrons follow quantum mechanics, not Newton’s laws of motion. The movement of such small particles can only be understood in a probabilistic manner. Those particles are so probabilistic that not even Laplace’s demon can predict their movements. I introduced you two ways of seeing the world. One is that we can predict future, and the mechanics is applied to our lives as it is stated before. The other is that we cannot predict future. The mechanics is called quantum mechanics. Is there some way to apply the mechanics to our lives even if it follows probabilistic manner. Yes, we can use it develop new technology to be beyond smartphone!

I’m working on new technologies to enhance the ability of smartphones using quantum mechanics. I was inspired to do research in this field because I found it interesting to learn a new way of looking at the world. When I was a high school student, my friend

told me a story of Schrödinger's cat. Schrödinger wondered if a cat in a box can exist as a quantum thing so that it is alive with a probability of 50% and dead with a probability of 50%. The answer is yes because quantum mechanics is proven by many demonstrations. One of the demonstrators won the Nobel Prize in Physics in 2022. As I mentioned before, even Laplace's demon knowing everything now cannot tell the future. However, I completely made a mistake on Schrödinger's cat when I heard the story for the first time when I was 18 years old. The story mistakenly told me that an observer in the box and out of the box see different worlds. The observer in the box knows everything like Laplace's demon, though I didn't know the demon yet. On the other hand, the observer out of the box only knows the probability of dead or alive, not the truth. I correctly understood the story of the cat when I learned quantum mechanics at university. I learned a lot of ways of seeing the world from Schrödinger's cat. Physics tells us one of the ways that truly describe the world, but it is interesting to think about other ways. My friend also told me that quantum mechanics can be applied to smartphones, and it can enhance the ability to calculate. He and I talked about the realization of Doraemon, a Japanese character who came from the 22nd century and helps children with special tools in the future. We believed that we could realize Doraemon using the technology of quantum mechanics. I promised to be a scientist and realize Doraemon because he loved physics but decided to be a doctor. Many people, especially young people, create works of creativity with smartphones now because they help us to do a variety of activities. The technology of quantum mechanics provides more choices. For example, quantum mechanics give us more powerful AI (artificial intelligence) tools. AI needs huge amount of data, but probabilistic nature of quantum mechanics allows us to treat that data as a small

amount of data that is probabilistically mixed. It is also known that quantum mechanics makes it possible to communicate larger amounts of data to datacenters. With smartphone and quantum mechanics, more and more children come up with ideas and realize them. To go beyond smartphones, we need both powerful technologies of quantum mechanics and brand-new ideas from young ages. Learning technology help you come up with better ideas. I hope this essay has sparked your interest in new smartphones and inspired you to contribute to science.

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