### (Approx. 1346 words)

### AI – What Next?

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I recently came across an article from TechRepublic reviewing Intel's new Core Ultra and Xeon CPU chips with onboard support for AI. Here's the link to that article:

<https://www.techrepublic.com/article/intel-ai-everywhere-event-2023>.

I shared the article with our Tuesday Kaffee Klatch group. A friend replied, "Really interesting! What's Next?" In this article, we'll explore that question.

My first thought was, "What is AMD doing?" I ran a quick web search and immediately found that AMD has a family of Ryzen AI CPUs offering AMD's XDNA architecture. Here's a link to AMD's web page:

<https://www.amd.com/en/products/processors/consumer/ryzen-ai.html>

My next thought was, "What is ARM doing?" Sure enough, ARM also has CPU chips with onboard support for AI. ARM CPUs are the dominant chips on cell phones, tablets, and recent Apple devices. Here's a link to ARM's web page:

<https://www.arm.com/markets/artificial-intelligence>

So, all the major CPU chip families used in servers, PCs, laptops, and mobile devices incorporate onboard AI support. AI apps like ChatGPT, Bard, and Claude can run on your PC, laptop, or mobile device rather than on a cloud-based server farm. As this technology rolls out over the next few years, it will augment the available worldwide AI processing power by several billion devices.

## Futurism

Usually, I avoid trying to predict the future, especially with technology. Reality tends to outstrip even "far-out-there" predictions. However, I'll have to make a few SWAGs in a "What's Next?" article, especially since I'm writing this at the beginning of the new year. However, I'll probably look at this a few years from now and laugh wryly at my naiveté. Let's look at areas where this new onboard CPU support for AI may significantly impact.

## Speech Recognition and Generation

Speech recognition has come a long way since my software engineering days at Citibank's Transaction Technology Institute in the mid-1980s. Today, we are at the point where humans can talk to machines using natural, colloquial language and be understood. Even accented speech can be understood. Further, machines can now speak in natural voices and be easily understood by humans.

Machines can also translate textual content from one language to another. Combining translation with voice recognition and synthesis brings us to the realization of the science fiction concept of a universal translator.

A quick search on Google turned up two Android apps and an iOS app that offer this functionality today:

<https://play.google.com/store/apps/details?id=com.speakandtranslate.voicetranslator.alllanguages&hl=en_US&gl=US>

<https://play.google.com/store/apps/details?id=com.erudite.translator&hl=en_US&gl=US>

<https://apps.apple.com/us/app/itranslate-voice/id522626820>

For desktop computer users, Google Translate can recognize speech and translate it.

Currently, these apps, while very capable and well-rated, seem to depend on cloud-based servers for the actual translation intelligence. This means their ability to function depends on having an Internet connection. As the new CPU chips mentioned above become commonplace in mobile devices, look for more of this functionality to operate on the mobile device itself with better performance.

If you're a regular Zoom user, you've likely come across its live captioning and transcription features. Zoom can do real-time voice recognition of all the voices on a Zoom session and display the speech as text in a running window at the bottom of the screen. This is a huge aid to hearing-impaired participants. Similar technology is now providing captioning for online videos and other audio streams. For Android and iOS smartphones, there are Live Transcription apps:

<https://play.google.com/store/apps/details?id=com.google.audio.hearing.visualization.accessibility.scribe>

<https://apps.apple.com/us/app/live-transcribe/id1471473738>

Looking ahead, with advanced CPU chips in smart TVs, it becomes feasible for the TV to automatically generate live captions of any incoming audio stream and do on-the-fly translation of the source audio stream language to another language.

## Customer Service

Customer service is a fertile area for applying voice recognition and synthesis. Consider a service application that can run on your smartphone, tablet, laptop, or desktop or a service kiosk, displaying a photo-realistic human face and torso, that can converse colloquially with you in any language and has a vast knowledge of the business's products, services and policies, federal, state and local regulations and has the reasoning and operational skills needed to resolve virtually all classes of customer support problems.

Customer Service is a huge cost for all businesses, a large part of which is recruiting and training service representatives. The service activity often has a high turnover rate, meaning the training expense is recurring. Also, policies and products may change frequently, requiring training updates for existing staff. An essential virtue of a "smart" customer service application is that only one master copy of the application needs to be updated, and those updates can be replicated automatically and nearly instantly in all instances of the application. Another virtue is that a "smart" service application is tireless – it will work 24 hours/day, 365 days/year, and doesn't get sick, take vacations, or lose patience with demanding customers.

Every business is somewhat different; consequently, its customer service applications must be customized. Having on-chip AI support in the CPUs of the business's in-house servers will make it easier to keep this customization and give better performance than depending on cloud-based servers. It also gives the business greater control over what data stays "in-house."

## AI Companions

AI companions are an evolution of "smart" assistants like Siri, Alexa, and Cortana. Here are two articles that discuss the state of AI companion services:

<https://cybernews.com/tech/ai-companions-explained/>

<https://theweek.com/tech/the-pros-and-cons-of-ai-companions>

These systems today run on cloud servers, but with advanced AI CPUs, they should evolve to run directly on users' devices. This will provide better performance and prevent some concerns about personal information learned by these companions from being in the cloud.

## Merging of AI and Robotics

In the past few years, there have been significant advances in robotics. Robots can now "see" via cameras, radar, and lidar and "hear" via microphones. This has helped in factory automation and many other repetitive actions. Self-driving vehicles are a reality, though they still need refinement.

There's also a lot of work on humanoid robots – robots with a head, torso, arms, hands, and feet that can perform tasks traditionally done by humans. These robots have been research projects but are beginning to be deployed in manual labor settings. Here are two links that survey what's current in the field. The YouTube video is quite remarkable.

[https://builtin.com/robotics/humanoid-robots](https://builtin.com/robotics/humanoid-robots%20)

<https://www.youtube.com/watch?v=gFp18nW7p34>

The humanoid robotic form has some challenges: The mechanical and software algorithms to keep the robot upright, especially on stairs and uneven terrain, are complex. The many small actuators needed to animate the robot's limbs draw a lot of power, which requires a large battery pack and regular recharging every few hours.

With advanced AI support in the CPU chips powering robots of all types, the robots should have more autonomy; they won't need to access the Internet cloud as much to provide their "intelligence." We can foresee a time not very far in the future when humanoid robots may serve as effective caregivers, nannies, servants, and companions in home and institutional settings. This could significantly improve the quality of life for aging seniors who are often alone and frail.

## Final Thoughts

As is often the case, I've barely scratched the surface of the vastness of artificial intelligence. I kept thinking of more things to discuss as I wrote this article. I'll return to this topic now and then in 2024, both in articles and in a few of my monthly seminars.

Robotics and AI are not without concerns. Human workers, especially those in lower-skilled manual and clerical jobs, will likely be displaced. Even in creative professions, AI may be able to replace many workers by automatically synthesizing new works of art. Society must have a plan for repurposing these displaced workers.

AI will affect business, generally making it more efficient and productive. However, it can also make it easier for companies to manipulate consumers.

AI can amplify the power of government for good and evil. In the hands of despots, AI could become the ultimate tool for imposing tyranny. Used for good, AI may vastly elevate happiness and prosperity worldwide.

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