

# The Future of Computing & AI



Joe Callison  
Senior Computer Users Group of Greater Kansas City  
May 2022

What is the future of computing and why should we care?

Computers are involved in an ever growing part of our daily lives. We can't avoid it.

We shouldn't ignore it.



# Our Personal Computer Devices

Desktop    Laptop    Tablet  
Smartphone    Smartwatch  
Smart Speakers    Navigation System  
E-Reader    Others?

Can you name others?  
How many do you have?



## **Embedded Computers, IoT**

**Appliances      Thermostat      Smart TV**

**Irrigation System      Weather Station**

**Home Monitoring and Control**

**Automobile Control and Infotainment      Toys**

Recent car models have 20 to 30 embedded and networked computers in them. There are about 40 billion embedded devices in our homes today, many of them networked for internet access (IoT)!



# Computer Technology Challenges

Supply Chain (Temporary?)

Transistors

Processor Speed

Watts

Cores

Billions of transistors! Now being stacked (3D)

Processor speed increases have stalled due to thermal considerations

Watts limited by thermal limits in mobile devices, and by green energy policies

Moving from multi-core chips to chiplets (multiple processor chips in the same package)



# Future Chip Technologies

**Photonic (light)**

**Neuromorphic (biological brain simulation)**

**Quantum (spooky)**

Photons (light packets) are faster than electrons, and produce less heat  
Computers may have a few million neurons while our brains have billions that are connected in a very complex way.

Einstein considered the theory of entanglement too spooky to imagine. Still is, even though it has already been verified at short distances. A Qubit can be 0, 1 or both. Fragile and needs error correction as implemented presently.

IBM demonstrated a 5 qubit computer in 2016, 17 qubit in 2017, 50 qubit in 2018, 65 qubit in 2021, goal of 1000 for 2023. Building a cryogenic chamber to house a 1,000,000 qubits. Worldwide race because of concerns about the impact on encryption. China demonstrated a 66 qubit computer that can do a simple sorting task in 1.2 hours that would take a conventional computer 8 years. China and Australia have transmitted a quantum computer encrypted video call from China to a satellite and from the satellite to Australia.



# Computing Methodology

**Cluster Computing (Supercomputers,  
Cryptomining)**

**Cloud Computing (Edge computing, virtual  
computers)**

Clusters of computers connected by a network or internet

Cloud computing on internet servers, or Edge hybrid local and internet, or virtual computers and operating systems on the servers



# Artificial Intelligence (AI)

**The ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.**

(Britannica)

An algorithm is simply a “set of instructions,” a formula for processing data. AI takes this to another level, and can be made up of a set of algorithms that have the capacity to change and rewrite themselves in response to the data inputted, hence displaying “intelligence.” Kaya Ismail



## **Examples of AI in our Daily Lives**

**Maps & Navigation**

**Facial Detection & Recognition**

**Text Editors or Autocorrect**

**Search and Recommendation Algorithms**

**Chatbots**

**Digital Assistants**

**Social Media**

**E-Payments**





## Other Industry AI Examples

Transportation (autonomous vehicles)

Manufacturing (robots and sensors)

Healthcare (diagnostics and monitoring)

Education (digital media, student monitoring)

Media (financial reports)

Customer Service (AI assistant)

AI already plays a major role in the hiring process, so much so that up to [75% of resumes](#) are rejected by an automated applicant tracking system, or ATS, before they even reach a human being.



# AI Concerns

Job Displacement

Privacy

Bias

Discrimination

Ethics

The bottom 50 percent of the world in terms of income or education will be badly hurt with job displacement,

Massive amounts of centralized data causes privacy concerns- there is an increasing appetite for data regulation worldwide

Algorithm bias or discrimination- There has been a bill introduced into Congress entitled the [Algorithmic Accountability Act](#) with the goal of forcing the Federal Trade Commission to investigate the use of any new AI technology for the potential to perpetuate bias.

Ethical decision making- if an autonomous or self-driving car has to choose between hitting another vehicle or hitting a pedestrian, how should it be programmed to respond?

**QUESTIONS or COMMENTS?**

