



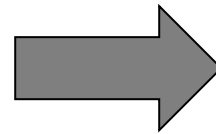
Artificial Intelligence and its Potential Effect on Rural LECs

AI is “as fundamental as the creation of the microprocessor, the personal computer, the internet and the mobile phone.”

- Bill Gates

Agenda

- Introduction
 - What is artificial intelligence?
- Common AI applications
- Potential effect of AI on RLECs
- AI concerns
- Summary



Source: Dall-E
Prompt: Create an image of artificial intelligence in the style or Michelangelo.

What is artificial intelligence?

- **Artificial intelligence** – the ability of a computer or a computer-controlled device to perform tasks commonly associated with intelligent beings
- AI combines **computer science** with **big data**
 - **Data sources include** social media data (including images), web data, geospatial data, time series data, healthcare data, textual data and many more
- AI consumes big data, **applies algorithms** and statistical methods and produces outcomes
 - **AI algorithm** – a set of instructions or rules that enable computers and machines to perform tasks, learn, analyze data and make decisions

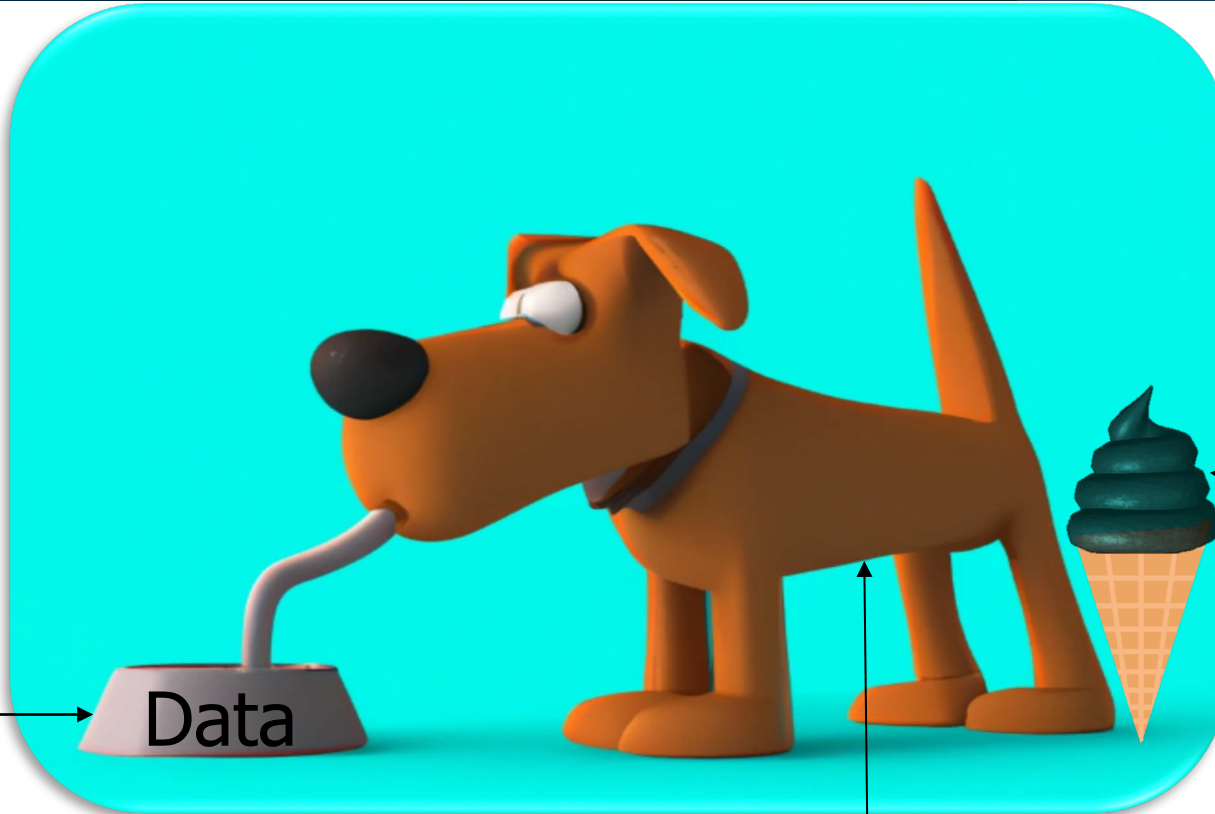


Source: Florida Politics

What is artificial intelligence?

The AI process

Source: Bob Gnapp using DALL-E



Data sources (1)

- Text
- Speech
- Images
- Sensor data
- Large data sets
- Many others

- Specialized computer chips
- Lots and lots of electricity

Data processing (2)

- Algorithms and rules
- Machine and deep learning
- Natural language processing
- Computer vision

Outcome and assessment (3)

- Success or failure
- Analysis
- Discovery
- Feedback

Adjustments (4)

- Data
- Algorithms and rules

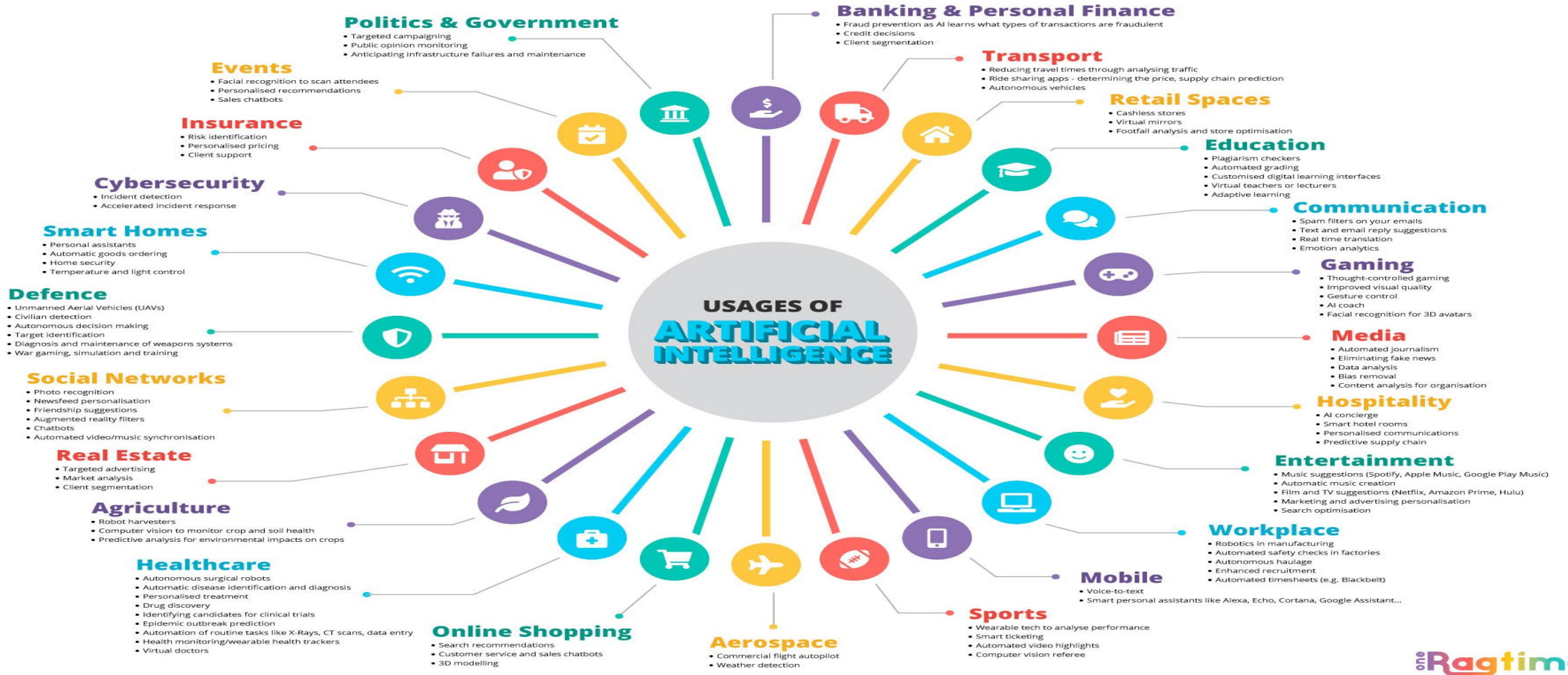
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What is artificial intelligence?

Stages of AI development

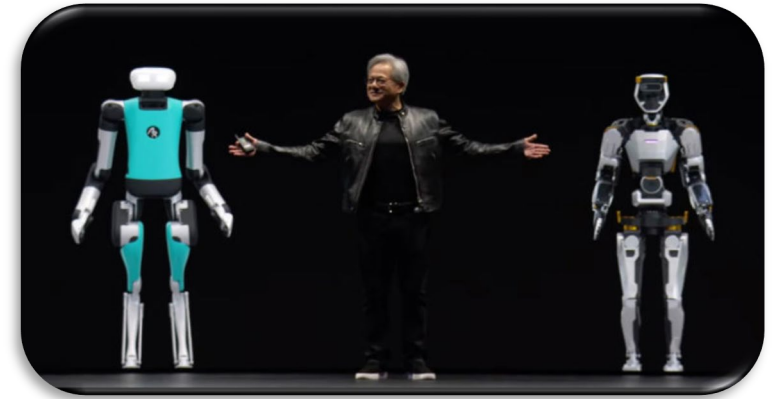
	Weak AI (a.k.a. artificial narrow intelligence)	Strong AI (a.k.a. artificial general intelligence)	Super AI (a.k.a. artificial super intelligence)
AI stages	Executes specific focused tasks without the ability to self-expand functionality	Performs broad tasks, reasons and self improves capabilities	AI that can manifest cognitive skills and develop thinking skills of its own
Timing	Today	2030-2060?	Sometime after strong AI
Implications	Outperforms humans in specific repetitive functions.	Competes with humans across all endeavors. Will understand any intellectual task, think abstractly and learn from its experiences	Outperforms humans across all endeavors. IQs could range anywhere from hundreds of thousands to millions

Common AI applications



Common AI applications

- **Robotics** – the ability of a computer system to control and interact with physical devices
 - Allows AI to function in the physical world
 - Can perceive, move, manipulate or destroy objects
- **Health care** – Enhance ability to diagnose and treat illness and injuries
 - Disease predictions and diagnosis
 - Facilitate the discovery and approval of new drugs
 - Medical image analysis
 - Brain – computer interfaces



Source: Nvidia



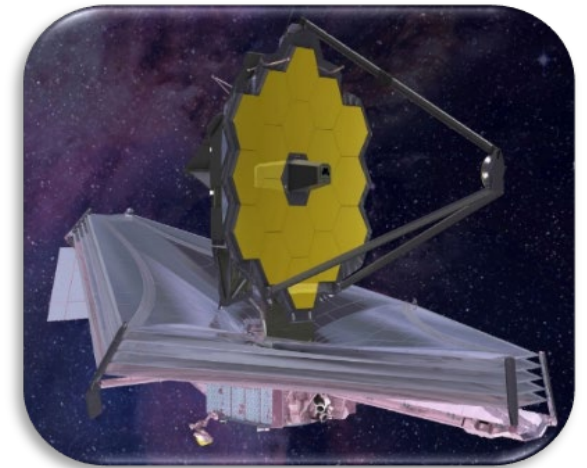
Source: ABC.net

Common AI applications

- **Self driving cars** – Uses deep learning and computer vision to perceive the world and make decisions about where to go
 - Several cities are currently allowing testing of driverless taxis
- **Astronomy** – AI is applied to large data sets to identify patterns, make predictions, identify exoplanets and advance our understanding of the universe
 - Makes more accurate forecasts, like the likelihood of a comet hitting the Earth
 - Can uncover hidden patterns in astronomical data leading to new insights into the structure and evolution of the universe



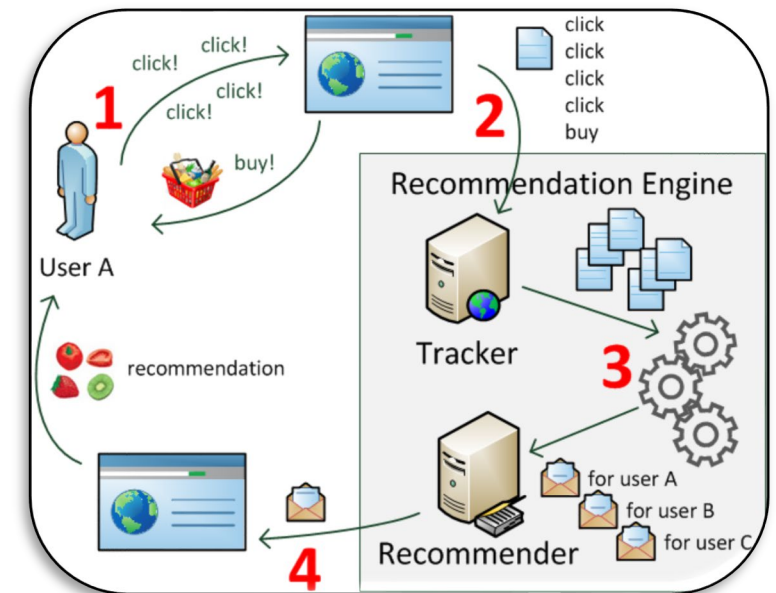
Source: cnet.com



Source: NY Times

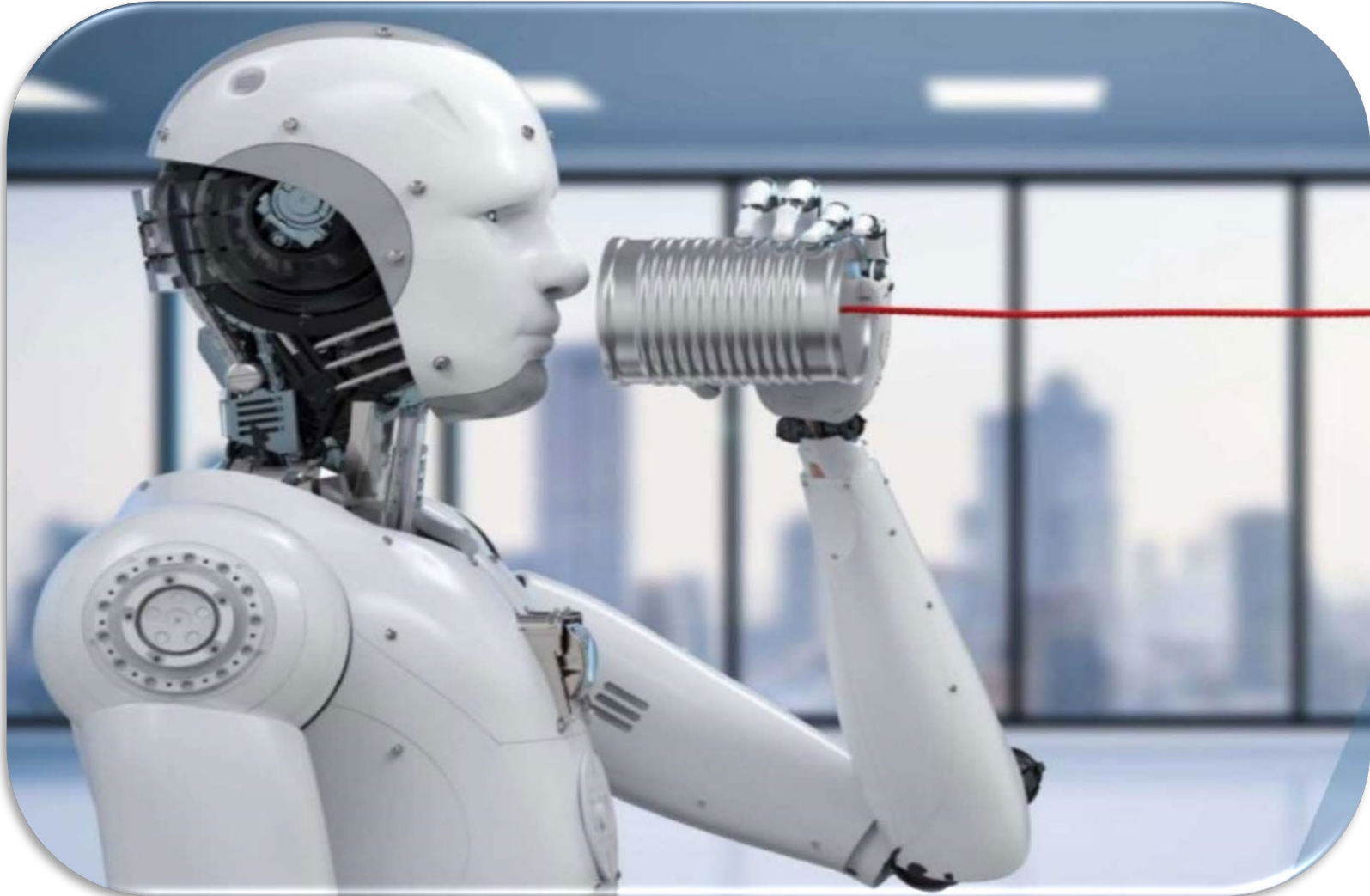
Common AI applications

- **Social media** – artificial intelligence technologies are used to automate or improve various activities related to social media
 - AI can assist with customizing user content and advertising, spotting harmful posts or bots, fact checking and assisting users with image/content development
- **Recommendation systems** – applies AI to user data to provide customized recommendations to users to help them find what they are looking for
 - Used in entertainment websites, social media, e-commerce and video sharing



Source: 911 WeKnow

Potential effect of AI on RLECs



Source: TechSee

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Potential effect of AI on RLECs

According to ChatGPT 3.5

What is the effect of artificial intelligence on telecommunications providers?

Network management and optimization: Telecommunications companies use AI algorithms to monitor and manage their networks. AI can predict and prevent network outages, optimize bandwidth allocation and ensure efficient use of network resources. Over time, these AI-driven processes become integrated into the standard operations of the telecom industry and the AI effect may make them seem routine rather than groundbreaking.

Customer support and chatbots: AI-powered chatbots have transformed customer support in the telecommunications sector. These chatbots can handle a wide range of customer inquiries, troubleshoot common issues and provide assistance 24/7. As customers become accustomed to interacting with chatbots, the AI effect might lead them to see this technology as a normal part of the customer service experience.

Predictive maintenance: Telecommunications infrastructure, such as cell towers and data centers, can benefit from AI-driven predictive maintenance. By analyzing data from sensors and equipment, AI can predict when maintenance is needed, reducing downtime and improving overall network reliability. As predictive maintenance becomes standard practice, the AI effect may diminish the perception of it as a cutting-edge AI application.

Network security: AI is used to detect and respond to security threats in real time. It can identify patterns indicative of cyberattacks or unauthorized access and take immediate actions to safeguard the network. With the widespread adoption of AI for network security, the technology may become a routine component of telecom security measures.

Data analysis and insights: Telecommunications companies gather vast amounts of data, including customer usage patterns, call quality and network performance. AI-driven data analytics helps extract meaningful insights from this data, leading to better decision-making. Over time, as data-driven insights become a standard part of business operations, the AI effect may lead to their normalization.

Personalized services: AI enables telecom providers to offer personalized services to customers. This could include personalized content recommendations, tailored service plans and targeted promotions. As customers become accustomed to receiving personalized experiences, the novelty of AI's role in providing these experiences may diminish.

Potential effect of AI on RLECs

Marketing

- **AI marketing** – data collection and analysis to determine consumer behavior and to learn what drives customers to a service provider and what drives them to leave
- Results can be used to predict consumer behavior
 - Can provide recommendations for making upselling and cross-selling offers to the right users at the right time
- Can be used to create an improved advertising, personalized marketing, provide email automation
- Allows for **dynamic pricing** and limiting customer churn
- AI can provide a means of filtering out fake reviews

Potential effect of AI on RLECs

Customer service

- Solve frequently asked questions 24/7, using chatbots
- Identify needs of the customer and provide personalized recommendations
- Identify customer frustrations and sentiments
- Predict customer behavior and needs using predictive analytics
 - Allows agents to be more proactive and deliver the appropriate response
- Identify poor customer service



Source: kmslh.com

Potential effect of AI on RLECs

Managing networks and predictive maintenance

- **Affect broadband usage**
 - **Increases usage** – content recommendations, internet of things devices and cloud-based services
 - **Decreases usage** – improved video compression, proactive caching and adaptive movie streaming
 - **Prioritization of critical applications**
- **Traffic Management** - AI optimizes traffic flow across the network by dynamically allocating bandwidth based on demand
 - **Prevent system failures and disruptions by predicting the best possible maintenance times**
- **Provide network security by detecting anomalies and potential threats**

Potential effect of AI on RLECs

Supply chain management

- Assist with supplier selection
- Reduce waste in the supply chain by providing more accurate demand forecasting
- Predict problems in advance and proactively prescribe solutions to manage such disruptions
- Provide real-time tracking of goods throughout the supply chain
- AI algorithms can optimize transportation routes considering factors like traffic conditions, fuel costs, weather and delivery schedules



Source: Logisticsbureau.com

Potential effect of AI on RLECs

Cybersecurity

- AI systems can recognize cyberattacks and cyberthreats by monitoring patterns from a variety of data sources
 - Threat and anomaly detection – can detect suspicious activity and unusual traffic patterns
 - Endpoint security – endpoints, such as laptops and smartphones, are often targeted by cybercriminals
 - While traditional antivirus software relies on detecting known malware variants, AI can detect unknown malware variants by analyzing user behaviors and biometrics
 - Automated incident response – responds to threats by isolating affected systems, blocking malicious traffic and initiating remediation procedures



Source: authx.com

Potential effect of AI on RLECs

Human resources

- AI can be used in HR departments
 - Hiring
 - Resume screening
 - Candidate sourcing
 - Chatbots for initial screening
 - Social media screening
 - Employee engagement and retention
 - Monitoring employee productivity



Source: It's Your Skills

AI concerns

Job displacement

- **Job displacement** – industry experts are concerned that AI, robotics and related technology could displace many existing jobs while creating others
 - A 2023 Goldman Sachs study found AI tools could impact 300 million full-time jobs worldwide, which could lead to a significant disruption in the job market
 - In a TEC survey, 47% of respondents said they think AI technologies will create more jobs than they destroy. But another 27% said it will destroy more jobs than it creates, while 26% said it is too soon to know
 - **Susceptible occupations** include manufacturing, computer programming, media jobs, legal industry jobs, finance jobs, accountants, customer service agents, taxi/ride share jobs, journalists, medical jobs (e.g., radiologists) and teachers
 - In many cases, AI will improve productivity of employees before or instead of replacing them

AI concerns

Misinformation

- AI-generated content can contribute to the spread of false information and the manipulation of public opinion
 - Online bots may represent the most powerful tools for spreading misinformation
 - Deepfakes – falsified videos, images and voices
 - While there are benefits of this AI advancement, it can be used to encourage misinformation
 - AI has already caused disruption in the political arena
 - AI can create fake reviews
 - Existing technologies to fight against misinformation also rely on artificial intelligence



Source: Trymaverick.com

AI concerns

- **Autonomous weapons** – any weapon that selects and applies force to targets without human intervention
 - Once a person activates an autonomous weapon, they do know specifically what it will strike
- The prospect of **AI-developed bioweapons** raises significant concerns
- **Cybersecurity threats** – while AI can improve a company's cybersecurity abilities, it can also help cybercriminals enhance their attacks
- **AI bias** - AI systems can reflect or amplify prejudices present in their training data or design



Source: Sputnik

- Some believe AI could fail in unpredictable ways
 - Self-driving cars can cause deadly accidents
 - Medical diagnoses can have serious and sometimes deadly consequences if the AI or the underlying data is faulty

“If AI has a goal and humanity just happens to be in the way, it will destroy humanity as a matter of course without even thinking about it...It’s just like, if we’re building a road and an anthill just happens to be in the way, we don’t hate ants; we’re just building a road.”

- Elon Musk

AI Concerns

New rules and lawsuits

- October 25, 2023 – FCC issues **NOI** then **NPRM** to help protect consumers from AI driven robocalls
 - FCC will pursue new rules for AI in political ads, but changes may not take effect before the election
- October 31, 2023 – President Biden issues executive order on AI
- December 10, 2023 – European Artificial Intelligence Act
- December 27, 2023 - The New York Times sues OpenAI and Microsoft over A.I. use of copyrighted work
- Many new rules, regulations and lawsuits to come

Summary

- Artificial intelligence provides the ability of a computer or computer-controlled device to perform tasks associated with intelligent beings
- Components of AI include big data, algorithms, machine learning, language processing and computer vision
- Common uses of AI include robotics, agriculture, health care, self-driving cars, social media and recommendation systems
- Uses by RLECs include marketing, customer service, supply chain management and cybersecurity
- Concerns related to the use of AI are real and will need to be addressed

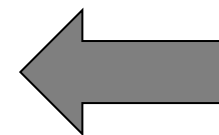
Questions?



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