



Artificial Intelligence and its Potential Effect on Rural LECs

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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
 - Source include social media data (including images), web data, geospatial data, time series data, healthcare data, textual data
- 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

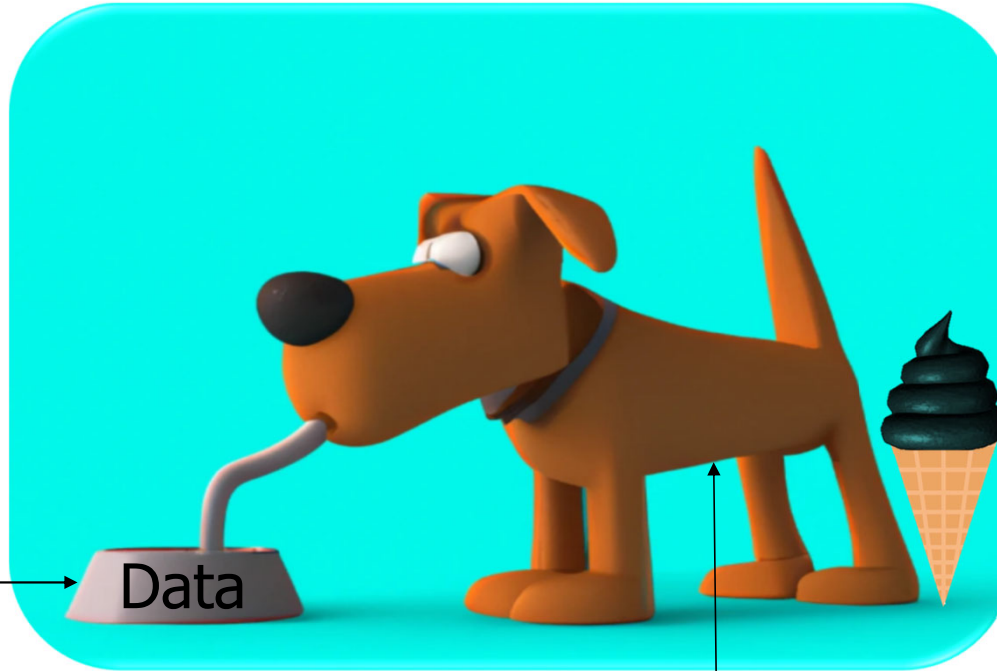


Source: Florida Politics

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

- 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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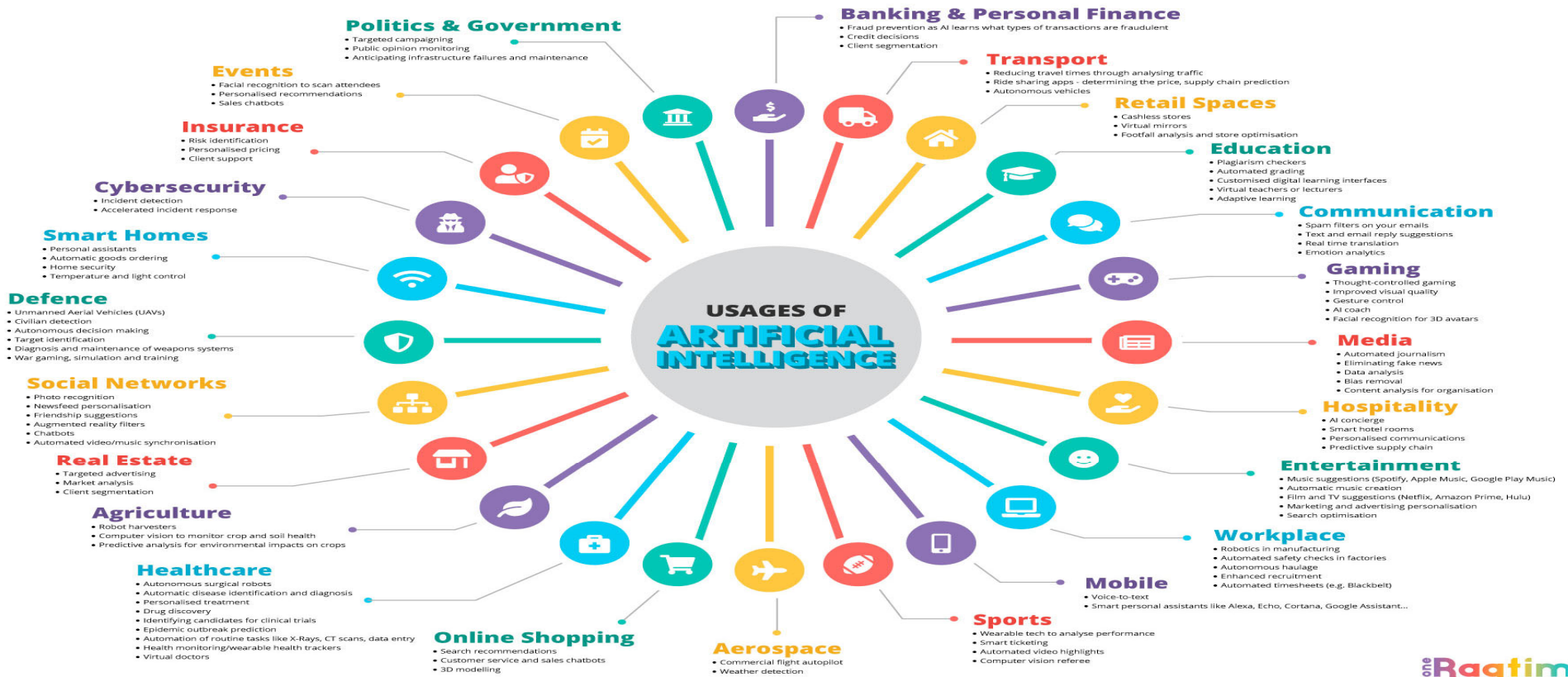
What is artificial intelligence?

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

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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 – the ability of a computer system to diagnose illness, provide disease predictions, utilize health tracker data, facilitate treatment planning and discover new drugs
 - Medical image analysis
 - Analyzes genomic data
 - Help address spinal cord injuries



Source: Nvidia



Source: ABC.net

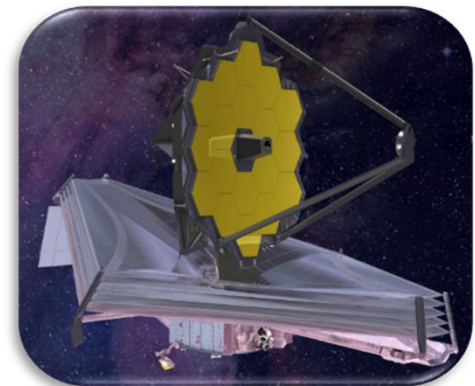
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Common AI applications

- 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
 - Classified in levels – levels 0-2 are considered driver support and levels 3-5 are considered autonomous
- 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



Source: cnet.com

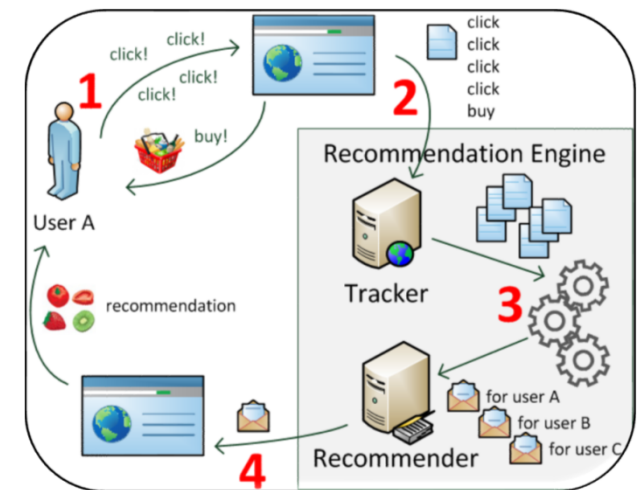


Source: NY Times

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Common AI applications

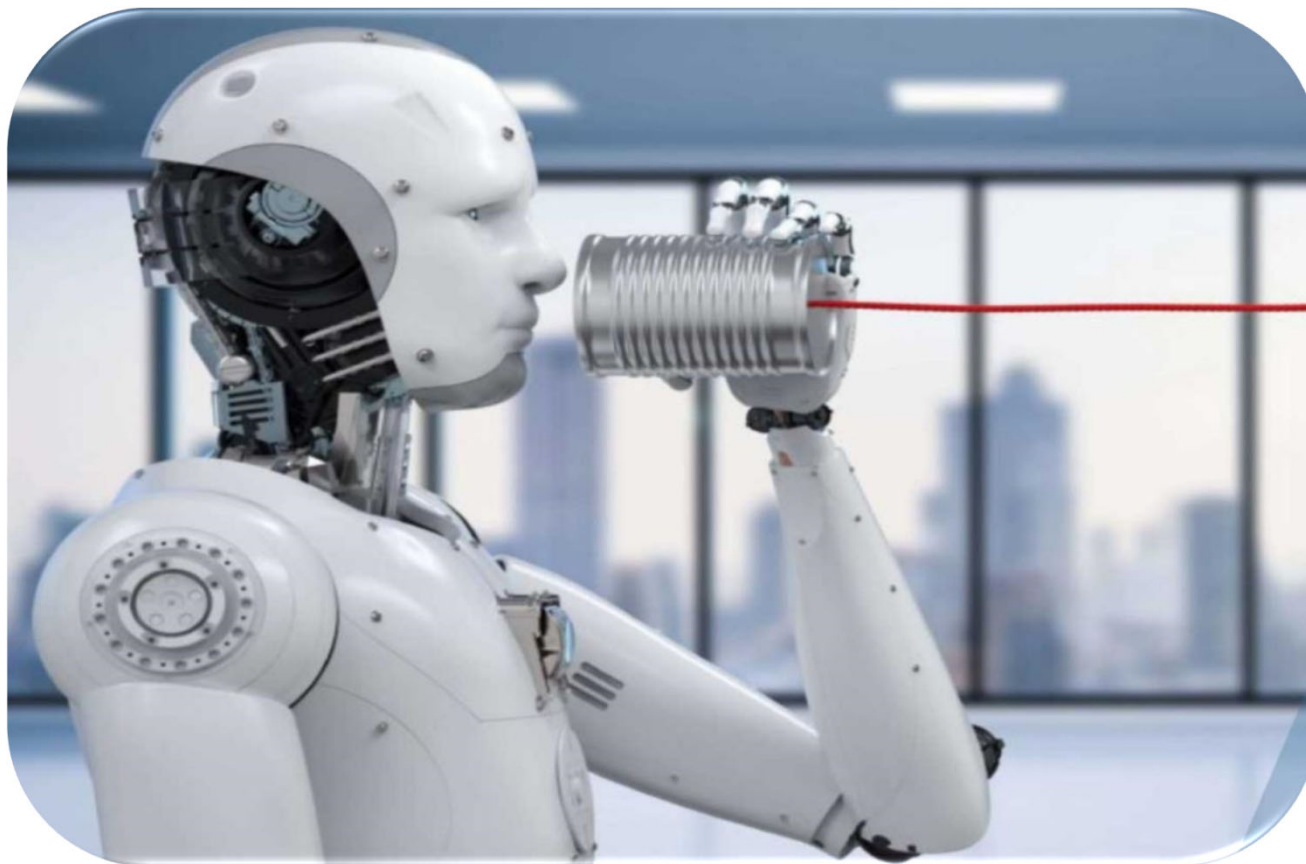
- Social media – artificial intelligence technologies are used to automate or improve various activities related to social media
 - AI can assist with customizing user content and advertising, spotting harmful posts or bots, fact checking and assisting users with image/content development
- Recommendation 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

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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
 - AI analyzes consumer data to gain insights into their preferences
- Results can be used to segment customers and predict consumer behavior
 - Can provide recommendations for making upselling and cross-selling offers to the right users at the right time
- Insights that will create personalized marketing, enhanced digital advertising, email automation and social media marketing
- AI can provide a means of filtering out fake reviews

Potential effect of AI on RLECs

Customer service

- Solve frequently asked questions, up to 50%, 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 and/or cross-selling recommendations
- Provide automated email responses
- Identify poor customer service



Source: kmslh.com

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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
- Predict network congestion and can provide network optimization solutions when congestion occurs
- Prevent system failures and disruptions by predicting the best possible maintenance times
- Provide network security

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Potential effect of AI on RLECs

Supply chain management

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



Source: Logisticsbureau.com

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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
 - Regulatory compliance



Source: It's Your Skills

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 ethical, safety and security concerns
- Cybersecurity threats – while AI can improve a company’s cybersecurity abilities, it can also help cybercriminals enhance the sophistication of their attacks
 - Includes highly personalized spear phishing, deepfake voices that impersonate high ranking executives and tampering with system data



Source: Sputnick

- 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
- AI may get out of its creator's control as it surpasses human intelligence
 - The prospect of strong and super strong AI could lead to unintended and potentially catastrophic consequences
 - Steps will likely need to be taken to avoid this



Source: TurboSquid

AI Concerns

New rules and lawsuits

- October 25, 2023 – FCC issues NOI to help protect consumers from AI driven robocalls
- 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 more 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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