Artificial Intelligence and Machine Learning in Mobile Networks

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- Artificial Intelligence & Machine Learning
  90 min, virtually-delivered
  May 30th

- Artificial Intelligence & Machine Learning
  Tech Primer
  4 hour, virtually-delivered
  May 31st
About Me

Chris Reece  
*Award Solutions Technologist*

**Background:**
- 26 years in wireless telecommunications
- 17 years at Award Solutions
- Instructional Focus: Artificial Intelligence, Network Transformation, 5G Wireless Technologies, consulting and custom training.

Overview

- AI and Service Providers
- Big Data and AI
- Automation and AI
Objectives

After completing this session, you will be able to:

• List key AI applications in telecommunications
• Explain the difference between AI, Machine Learning, and Deep Learning
• Summarize how a Machine Learning/Deep Learning model learns
• Describe a use case of AI in telecommunications

AI and Service Providers
Priority Areas for CSP AI and ML Activities

Source: Gartner, “How CSPs Can Exploit Artificial Intelligence and Machine Learning,” April 13, 2017

AI and Automation Lifecycle

Data → Model Creation → Model Deployment → Automation

Modify the Model based on Additional Data

Human Intervention

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In the News

https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/10014.htm#_idTextAnchor158
https://gizmodo.com/uk-government-proposes-five-basic-principles-to-keep-hu-1825290212
https://www.scientificamerican.com/article/can-ai-really-solve-facebooks-problems1/
http://doyoutrustthiscomputer.org/watch
https://www.youtube.com/watch?v=VgMGXKLekQ

Big Data and AI
Artificial Intelligence (AI)

AI (Artificial Intelligence)
ML (Machine Learning)
Deep Learning

Artificial Intelligence
Enabling machines to reason like humans

General AI
Narrow AI
Machine Learning

Machines creating algorithms from data to improve their behavior

Neural Networks

Simulating brain function to help computers learn

Input #1 → Input #2 → Input #3

“Layers”
Deep Learning

Applying large-scale neural networks, with many ‘neurons’ and layers

ML Example

Problem: How can the value of the hand-drawn numbers be determined?

70000 Hand Drawn Numbers

28 x 28 Greyscale Image

Source: https://www.tensorflow.org/versions/r1.1/get_started/mnist/beginners
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What are we solving for?

Source: https://www.tensorflow.org/versions/r1.1/get_started/mnist/beginners
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Tools for AI

• Caffe
• Microsoft Cognitive Toolkit
• MXNet
• Keras
• TensorFlow
• Torch
• PyTorch
Deep Learning Example

Automation and AI
Conclusions and Key Takeaways

- Key AI applications in telecommunications include billing, network planning and engineering, fraud management, security, and field services.
- Artificial Intelligence enables machines to reason like humans.
- Machine Learning is a subset of AI that focuses on creating algorithms from data to improve their behavior. Deep Learning is a subset of Machine Learning that focuses on applying large-scale neural networks, with many neurons and layers.
- Machine Learning and Deep Learning use statistical models and large amounts of data to learn how to interpret the data.
New Meetup

AI in Telecom Meetup

Join us:

AI Use Cases in Telecom
May 21st @ 11:30

See meetup.com/Artificial-Intelligence-AI-in-Telecom/ for more details

Acronyms

AAA  AI, Analytics and Automation
AI  Artificial Intelligence
API  Application Programming Interface
ML  Machine Learning
MNIST  Modified National Institute of Standards and Technology
NLP  Natural Language Processing
RPA  Robot Process Automation
SDN  Software Defined Network