



# Location Powers: Data Science

## Session 3 Summary Ripe Trends

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## Session 3: Ripe Trends



- Moderator: Jay Theodore, CTO, Enterprise Technologies, Esri
- Rapporteur: K. Kim, AIST and GeoAI DWG chair
  
- Philippe Cases presentation: The AI Tsunami => The AI at the Edge
  
- Panel on Ripe Trends :
  - Anand Kannan, Pitney Bowes - Perspective: Data science, an interdisciplinary approach
  - Milind Naphade, CTO, Metropolis – NVIDIA
  - Devaki Raj, CrowdAI
  - Jim Stokes, MAXAR

# Session 3 – 1. What Works



- AI at the Edge
  - Mapping the information and customer's necessary to profit from emerging trends.
  - AI will be "Game Changer"
  - We are still in the early stage of IoT deployment, but we can expect it would increase around 2021 and 2022.
  - Key use cases: Transportation
  - New requirements: data security(cybersecurity), bandwidth, latency
  - Comparison of data flow between Cloud and Edge
- Panel discussion
  - Skillset diversity
    - Large data sets, Deep learning, Visualization, GPU and elastic cloud
    - Need a combination of these to improve the range of problems we can solve
  - Spatio-temporal intelligence / Situation awareness: NVIDIA Metropolis with Edge and Cloud
    - Static or semi-static(Environment models) + Dynamic(Sensor data)
  - CloudAI: Operation challenges
    - Many use cases of analysis with imagery and video: Detection of changes of infrastructures after natural disasters (e.g., hurricanes)
  - IoT data, Pedigree, Privacy
  - Ai can help us manage the data volume, determine value in data at the Edge

# Session 3 – 2. Open Questions



- What is the future of AI as we head into 2020? What key problems will be addressed in 2020 and which ones will linger and prevent adoption by the data science community and organizations at large, accepting it as mainstream? Will it be ethics, governance, explainability or the ‘fear of unknowns’ factor that’ll slow the pace of AI infusion?
  - Lack of data
- How far will hardware play a role in propagating data science and AI to be an integral part of everyday life? What are some limitations and challenges today, which you feel need to be addressed or are being addressed? Is the next generation of applications poised to benefit from these advancements?
  - Heterogenous computing architectures (GPU, FPGA, TPU, etc.)
- What’s the most meaningful and satisfying project you have been involved in, applying data science principles and practices, and why was it so exciting and fulfilling?
  - Disaster response
- What in your opinion is the biggest challenge the world is facing today, which will be answered by Data Science + AI + {name your trend, like Quantum Computing, Blockchain, Edge Computing, 5G, ...}
  - May be all?

# Session 3 – 2. Open Questions



- Today we have Geospatial Analysts and Data Scientists. What suggestions do you have for introducing a field of Geospatial Data Scientists? Is it necessary? Is it different as a practice or is it just a recognition of the trend?
- Does society need to change social and ethical values to accept answers of prediction by data science, whether infused with AI or not? Or is it the other way around, where data science – the practice, the governance, the transparency, the accountability... need to change?
- Fueling fake advancements in Data Science, powered by biased data and its impact on decision making at various levels. Is this a problem that is prevalent? On a related note, does privacy and current public policies play a role in addressing this or does it aggravate the rush to find answers quickly, whether they are comprehensive or not? Can you comment if techniques like Reinforcement Learning, Adversarial Learning have any impact, in addressing this? How is it being addressed at the fundamental level, across all domains? Or do you see this as deferred to each domain to address at its own pace and motivation?
- What do you see as the biggest hurdles to overcome, before AI models are deployed in production? When will we see production deployments becoming common place?
- When you don't have good quality, unbiased training data, what techniques do you see emerging, to help overcome this deficiency... is it creation of synthetic training data or something else that needs to be considered?

# Session 3 – 3. Next Steps



- How to create a value chain
  - Eco-system
  - Sustainable development
- Geospatial Data Science Education
  - Cross-disciplinary
  - Convergence of each domain
  - Communication skills for teamwork
  - New York Univ.
- When we need to retrain models
  - Quality of models: performance (accuracy?), fairness, robustness, any other?
- What is GeoAI? Do we need the definition of GeoAI?

# What is GeoAI?



- ISO/IEC 2382-28:1995 Information technology — Vocabulary — Part 28: Artificial intelligence — Basic concepts and expert systems
  - 28.01.01: artificial intelligence (1)/ AI (abbreviation)
    - An interdisciplinary field, usually regarded as a branch of computer science, dealing with models and systems for the performance of functions generally associated with human intelligence, such as reasoning and learning.
    - Note 1 to entry: This is an improved version of the definition in ISO/IEC 2382-1:1993.
  - 28.01.02: artificial intelligence (2)/ AI (abbreviation)
    - The capability of a functional unit to perform functions that are generally associated with human intelligence such as reasoning and learning.
- ISO/IEC 22989:2019 (CD) Information Technology — Artificial Intelligence — Artificial Intelligence Concepts and Terminology
  - 3.2.2 artificial intelligence
    - <system>capability of an engineered system to acquire, process and apply knowledge and skills
    - Note 1 to entry: knowledge are facts, information, and skills acquired through experience or education.
  - 3.2.3 artificial intelligence
    - <engineering discipline>discipline which studies the engineering of systems with the capability to acquire, process and apply knowledge and skills
    - Note 1 to entry: knowledge are facts, information, and skills acquired through experience or education.