AI Network Applications

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Participating Companies

Group Leaders (*)

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Carroll Gray-Preston, VP Innovation, ATIS

- Analog Devices
- Apple
- AT&T
- Bandwidth
- Bell Canada
- C Spire Wireless
- Charter
- ComTech
- Ericsson
- Fujitsu
- Futurewei*
- HPE
- IMEC
- Juniper
- Lumen
- Microsoft
- Motorola Mobility
- Nokia
- Nvidia*
- Peraton Labs
- Qualcomm
- TDS
- Telnyx
- TELUS
- T-Mobile USA

Background

- Can Generative AI be used by Service Providers?
  - This was examined by the TOPS AI Small Group last year
  - While 3GPP, ETSI, and others are using GenAI for specific functions, no comprehensive use case surveys have been conducted
- This led to the formation of ANA, which has four goals:
  - Assess and prioritize key use cases from participants
  - Conduct a gap analysis across SDOs
  - Identify proposals for key functions that are missing in current SDOs
  - Produce a white paper that benefits all stakehold
- The above work will be conducted non-incre
  - Support the SDOs, but refrain from performing within their remit

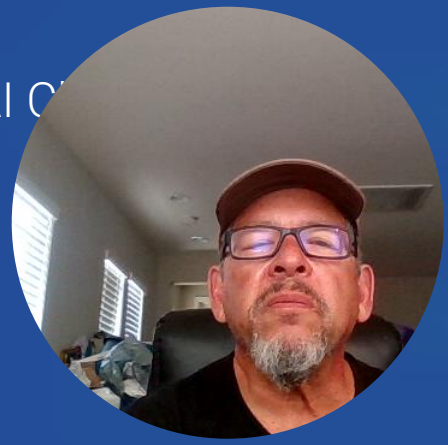
Why This Will Benefit The Industry

Generative AI in Telecom

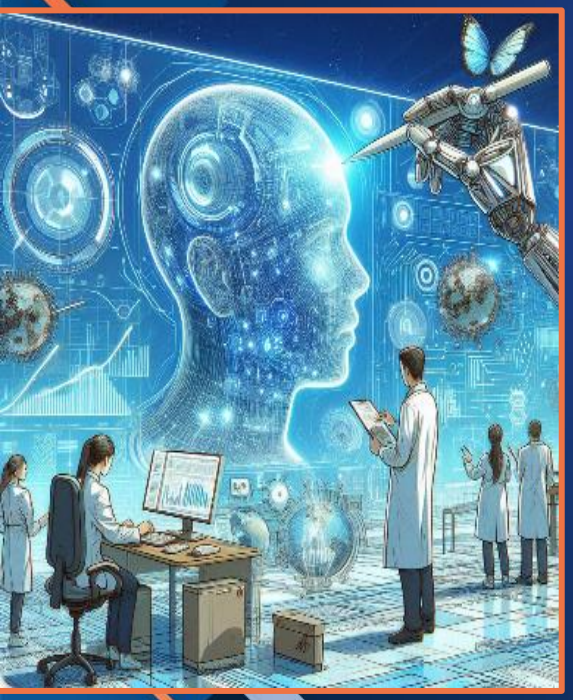
- Generative AI is the ability of algorithms to create new content (e.g., text, images, sounds, animations, and even computer code)
- Generative AI is moving at warp speed, and transforming the way people work and play:
  - Generative AI models learn the patterns and structure of their input training data and then generate new data that has similar characteristics
  - Today, generative AI most commonly creates content in response to natural language requests
- There have been many AI/ML related activities in different telecom standards bodies such as 3GPP, ETSI, NGA, and O-RAN
  - This provides *individual functions* but ***misses the larger opportunity***
- The Generative AI use cases for telecom survey addresses a critical gap
  - Provides unique insights that will help advance future AI implementation ac networks

Use Case Progress

> Ericsson	LLMs for Customer Support Troubleshooting
> Ericsson	LLM Question-Answer Assistant
> TII	Telecom Foundation Model
> IMEC/Ghent University	Wireless Physical Layer Foundation Model
> Microsoft	Azure AI-Based Voice Service Protection
> Futurewei	Cognitive Digital Twins
> Futurewei	Semantic Knowledge Graph Enabled Transformer for Reasoning and Decision Making
> NVIDIA	Survey on GenAI in the RAN
> NVIDIA	ORAN Knowledge Assistant AI C
> C Spire	AI Onboard Mobile Devices



Gap Analysis



- Hard to automate network management and optimization:
  - AI and ML can automate network management tasks, leading to significant cost savings, faster response to network issues, improved customer experience, and reduced energy consumption
  - AI improves Service Assurance, providing ultra-reliability, low latency, and high security, while supporting a wide variety of use cases
  - AI improves Customer Experience, reducing churn and enhancing brand equity
  - AI helps prevent Network Overload by quickly responding to infrastructure overload, preventing network failures and ensuring consistent service quality
  - AI enables Personalized Services for upselling and better customer targeting
  - AI can support new business models, attracting new clients and fostering innovation
  - AI tools can help in keeping malicious activities at bay, enhancing th the network and protecting customer data
- Current solutions lack semantics:
  - Understanding the reasons behind events is crucial for prevention enhancement of our current methods

Actionable Insights

- Semantics:
  - Novel combination of Transformer and Knowledge Graph enable:
    - Improved contextual understanding of the environment
    - Business needs to be translated into offered network services
    - Improved prediction accuracy for remediation decisions
- This is key to many use cases:
  - Semantic object detection and image classification
  - Enhanced root cause analysis
  - Semantics enable enhanced network design, operations, and management
  - Multimodal semantic data fusion for data and image c
  - GenAI-as-a-Service

Next Steps

Laid the groundwork for potential ANA v2 follow on activities:

- V2 would be useful if we just cover remaining use cases, but we could do more!
- Drive an industry initiative to create a Wireless Physical Layer Foundational Model
- Drive an industry initiative to create a Cognitive Reasoning Assistant (combination of Transformer and Knowledge Graph)

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