Theme Guidance
- Network Traffic

Proposed NMLRG
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Motivation of the Proposed NMLRG

• Networks and network problems become more and more complicated, many varieties and dynamically changing
  ÷ Looking for new mechanism that can adapt to various and dynamic environment
  ÷ Looking for autonomic mechanism to replace human operations, even human programming
• Machine learning was also motivated by tasks that are extremely difficult to program by hand
  ÷ Advantages: robustly solve complicated tasks, reliance on real-world data instead of pure intuition, be able to adapt to new situations
• The Network Machine Learning Research Group (NMLRG) provides a forum for researchers to explore the potential of machine learning technologies for networks.
Potential Usage in Network Area

• The machine learning mechanism can be used to intelligently learn the various environments of networks and react to dynamic situations

• Many network aspect can benefit: network establishing, controlling, managing, network applications and customer services, etc.
  ▶ acquire knowledge from the existing networks so that new networks can be established with minimum efforts;
  ▶ use machine learning mechanisms for routing control and optimization;
  ▶ predict future network status in network management;
  ▶ autonomic and dynamically manage the network;
  ▶ analyze network faults and support recovery;
  ▶ learn network attacks and their behaviors, so that protection mechanisms could be self-developed;
  ▶ unify the data structure and the communication interface between network/network devices and customers, so that the upper-layer applications could easily obtain relevant network information, etc.
Precondition of Applying Machine Learning Approach

• Although it is different from big data or data mining, machine learning does also need **data**. However, machine learning can be applied with small set of data or dynamic feedback from environment. The quality of data decides the efficient and accuracy of machine learning result.

• There is **no generic machine learning mechanism** that could suitable for all or most of use cases. For each use case, the developers need to design a specific learning path, which may combine multiple approaches or algorithms together. The feature design and learning path design are the key factors in the machine learning applications.
Network Traffic & ML

• Network traffic is one of the most important objectives that needs to be managed
• Traffic meet preconditions of applying ML
  • Data, measurable
  • Complicated & dynamic changing
  • Sudden vs. regularity
• There are many different types of network traffic
  • Various use cases in different scenarios
• Potential a dedicated document for this theme
Let’s have good discussion today and in the future!

Thank You!

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