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Using the information control networks (ICN) as a test area for searching for effective methods of machine learning in the networks of the future generation

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ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ УНИТАРНОЕ ПРЕДПРИЯТИЕ
НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ РАДИО



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1. Introduction

- **Already today fixed and mobile (convergent) networks generate a huge amount of data at the level of the network infrastructure and at the user level. The rate of increase is such that there is an opinion that with them even 5G networks can not cope.**
- **Therefore, the creation of a focus group aimed at the solution of these problems (ITU-T Focus Group on "Machine Learning for Future Networks including 5G" (FG-ML5G)) is very relevant and timely.**
- **The purpose of this presentation is to talk about the potential of existing information control networks (ICN), which solve similar problems, although for a more limited number of tasks, and suggest using them as a test area for ML.**

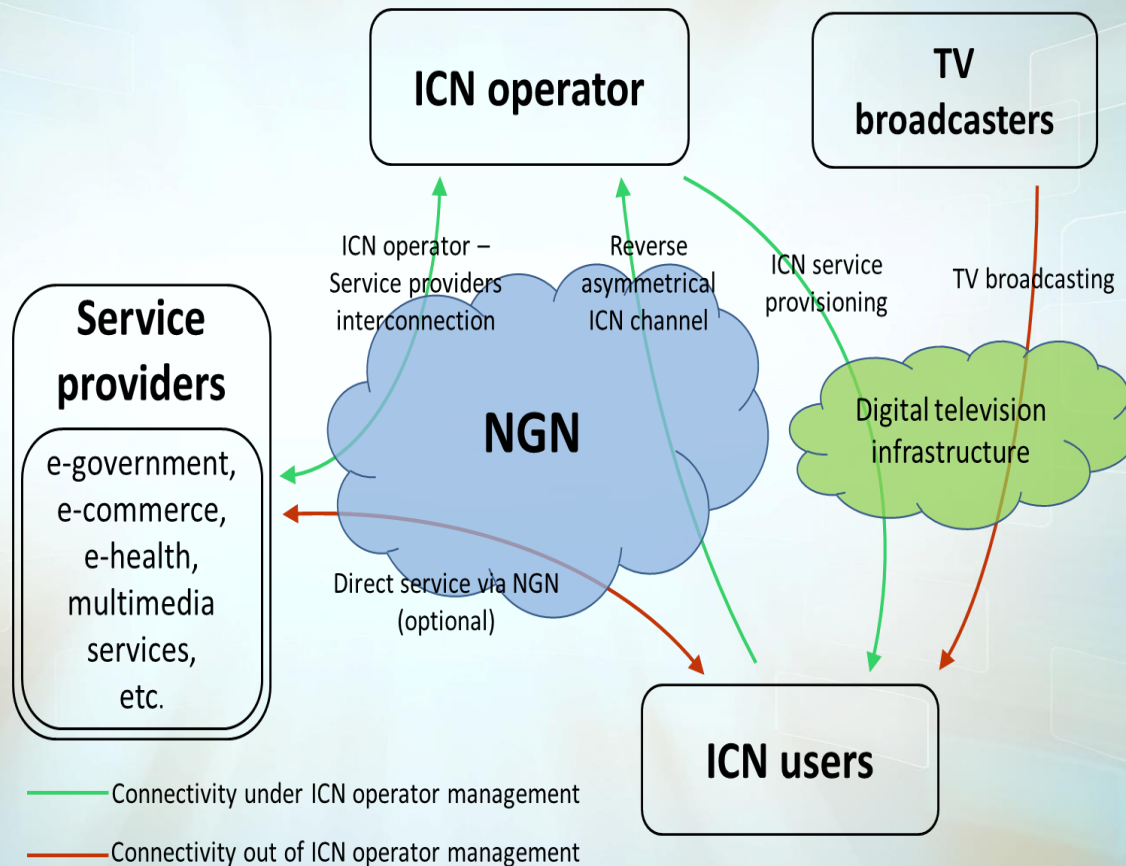


2.Short description of Recommendation ITU-T Y.2239

- **Information Control Network (ICN):** A logical network providing services over, for example, infrastructure NGN or digital television infrastructure characterized by high-reliable data transfer, service management and traffic control.
- ICN allows the organization of a trusted environment for the provisioning of mission-critical services, such as emergency management, e-government, e-commerce, e-health, by introducing the ICN operator as a single point of service management.
- We note that one ICN operator simultaneously provides only a limited amount of services for limited number of users.
- ICN users obtain services from the ICN operator (using the infrastructure over which ICN is deployed). All ICN users have enhanced support by the ICN operator that is responsible for service provisioning and service management.



2.Short description of Recommendation ITU-T Y.2239



The process of service provisioning in ICN in typical deployment with NGN



3. The main functions of the ICN operator.

- To create for specific ICN typical processes (TPs) that will be regularly reproduced in this ICN.
- The number of these TPs must be limited, these processes must be interrelated, semantically homogeneous.
- Under these TPs it is necessary to find ICN users who need these typical processes and select one or more ICN service providers of providers that can ensure their implementation.



3. The main functions of the ICN operator.

- It is necessary to provide training for ICN users of the correct implementation of TPs,
- There should be a procedure for changing the rules for the formation and operation of this TPs in this ICN, for example, with the aim of improving them,
- To form and run in real time the TPs' administration system for all ICN service providers and ICN users,
- A procedure should be developed for excluding the malicious ICN service providers and those unable to train and / or non-complying with ICN users' and providers policies.



4. The possibility of using ICN as a test area for ML.

- Thus, we note the similarity of the tasks of the ICN and ML systems. The ML application points in the ICN are the ICN operator and ICN users,
- Studying the rules of ICN, ML system developers could determine:
 - the time frame and necessary and sufficient degree of learning ML,
 - how to choose hyperparameters that essentially define the knowledge base,
 - how to ensure the processes of KT, DL and other important characteristics of ML, including how to build an administration system.



5. Perspectives.

- In turn, the use of ML methods in the operation of ICN operators, the ICN service providers and users of ICN can improve the efficiency of the ICN.
- **Of course, all these assumptions require detailed research, which we would like to do within the framework of our focus group**



5. Perspectives (2)

- ***Caution.***

It should not be possible for ML and AI systems to interact directly with IoT and other sources of data for BD, since the result of such direct interaction may be the birth of the new knowledge, inaccessible and incomprehensible to man.

8. Acknowledgments

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