Outrageous Opinion Panel: Do We Really Have to Consider the Human Factor in Networking?

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ABSTRACT
The "*Outrageous Opinions Panel"* discusses the main question of FhMN, namely if and how much human factors should be considered in the actual and future communication infrastructures or in management functions at the user side or inside the network. In this panel we want to discuss these issues stimulated by the papers presented in this workshop. The pro and contra opponents will prompt the discussion.

Categories and Subject Descriptors
C.2.1 [**Network Architectures and Design**]: new network architectures; human factors in delivery and network management

Keywords
Outrageous Opinion, human factors, network management, network architectures, network operations, network protocols

1. INTRODUCTION
FhNM has the underlying premise that computer networks, network management and computer communications can provide better and more efficient services for the users when considering "*the human factor*". The idea is that on the one hand services can be improved if specific adaptations can be made in the way content is delivered. These adaptations explicitly take the human perception and other user related properties into account. For instance, they exploit knowledge about the human senses but also user populations, profiles and interests in traffic management. On the other hand, this all increases complexity in the network and puts additional burden on network management. Hence, the question is *if and to what extent human factors should be considered in next generation networks*.

2. PRO
Over the years it has become apparent that the simple but efficient principles the Internet has been built on will not be able to sustain the growth in usage and massively increased variety of services we are witnessing today. While for a number of years this could be covered by an increase in capacity and bandwidth it is anticipated that in future this will be outstripped by the bandwidth and Quality of Service (QoS) demands from services such as Internet Television, content exchange and content on demand. Further, more and more users create their own content (sometimes already in HD formats), which they want to share over the Internet. At the same time we have been seeing research in the areas of Content and Information Centric Networking (CCN/ICN) using knowledge about content in order to provide a better service and resource utilization at the same time. Quality of Experience (QoE) as a way to improve network management while also ensuring a better user experience has also become a popular research topic. Hence the hypothesis is that considering *human factors* (such as human perception, user profiles, social behaviors, content and communication patters, etc.) in the delivery and network management can be used to improve not only the service but also will help managing network resources better and hence will form the basis for growth and improved services in the Future Internet.

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3. CONTRA
The evolution of the Internet over the past three decades showed that complexity inside the network and complex control mechanisms, such as QoS, are not needed to support and enable the development of high quality multimedia services to the users. When used, these mechanisms have normally a negative effect on the scalability and performance of multimedia services. Even for real-time HD or 3D services, the basic multimedia communication mechanisms (compression, interpolation, rate adaptation, and buffering) integrated in highly efficient intelligent codecs, and associated with high bandwidth links, seem to be enough to achieve high level user experience, while keeping the network simple. QoE issues are important to monitor and calibrate codecs and control mechanisms on the user side and will have little or no direct impact in network management functions. The human factors in the next generation Internet are important for the design of new terminals, new multimedia services, and for the development of new codecs and advanced Human Machine Interface mechanisms. Inside the network infrastructures, simplicity and service neutrality will be the only way to achieve the need performance and scalability.

4. CONCLUSION
The arguments from both pro and contra sides are balanced and no *a priori* conclusions can be drawn. The proposers of this *Outrageous Opinions Panel* hope that the discussion among the panelists and the attendants of the FhMN workshop will shed some light on this important issue for the Future human Networked Multimedia.