Telenor research on tech
TRENDS
2017

ON THE VERGE OF SOCIAL MEDIA **FATIGUE?**

PAGE 4

TELENOR RESEARCH ON TECH TRENDS 2017

Last year we highlighted several important developing trends and predicted that these would gain speed and attention during the year. 365 days later the verdict is in and we could almost 'copy-paste and carry forward'.

Softwarization of networks, Low Power Wireless Access for IoT and Deep Learning as the driver for Artificial Intelligence applications have received lots of attention. Big Data for social good, service co-creation and the net neutrality debate are as hot today as a year ago, and will definitely impact 2017.

Re-stating our previous predictions may be convenient, but not very interesting. Instead we have tried to bring you both new insights and adjust what we do carry forward – IoT is on the list this year as well.

For 2017 we claim that Social Media fatigue is starting to appear, that IoT is speeding up – again, that chatbots are hot, that 5G will show itself in demos and pilot installations long before the standard is ready and that the Ethics of AI will be a hot topic.

I hope you will enjoy the report and wish you all the best for 2017.

Bjørn Taale Sandberg
Head of Telenor Research
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5 TRENDS FOR 2017

2016 was in many ways a precursor for what we in Telenor Research believe will continue to materialize and solidify in 2017. The search to digitize more of activities in our daily lives and in businesses will only accelerate now that technological platforms are maturing and moving into trials.

However, we also believe that the pendulum will start moving back and we will be seeing the first signs of "fatigue" within an increasingly digital world. Here are the five trends that we think will shape 2017.

KEEPING **AI** ETHICAL

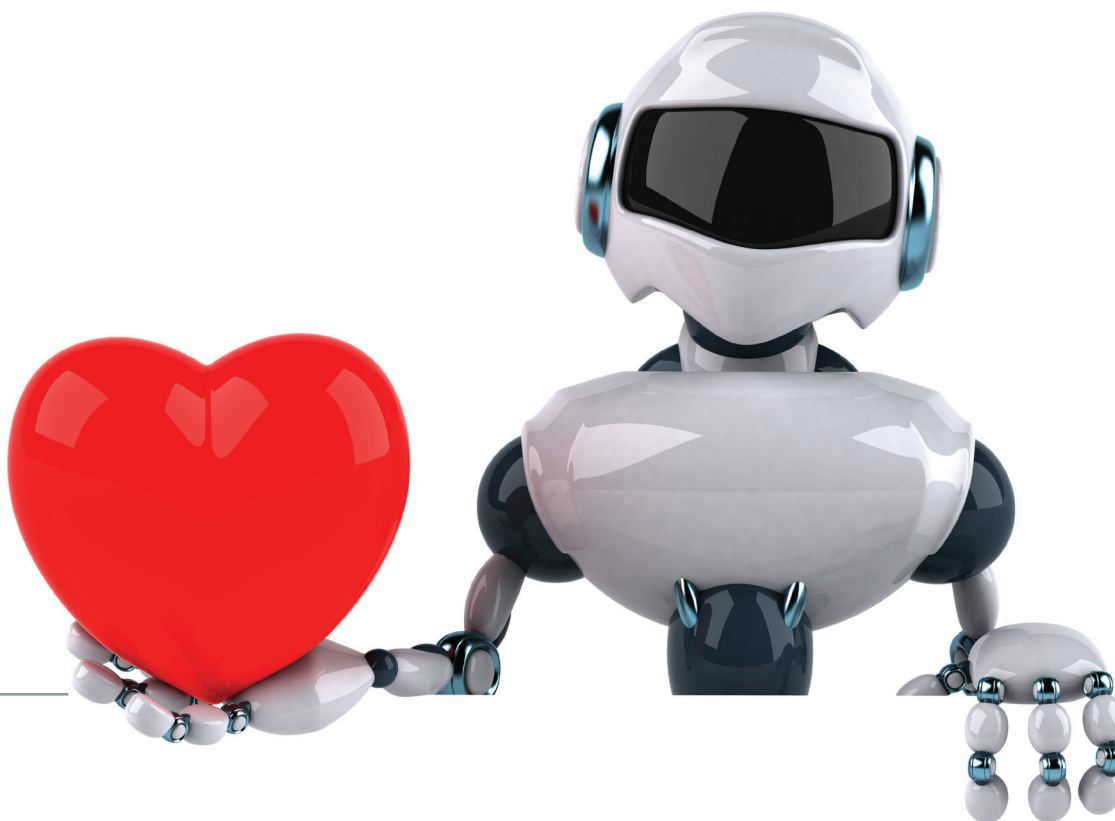ON THE VERGE OF SOCIAL MEDIA **FATIGUE?**

ALL RISE FOR **IOT**

CHATBOTS SOON TO BE EVERY CUSTOMER'S BEST FRIEND

FIVE STEPS CLOSER TO **5G**

KEEPING **AI** ETHICAL

Applications using Artificial Intelligence technology are increasingly common. It will soon be difficult to imagine a 'dumb' digital service, one that does not tailor itself to your needs and preferences or takes into consideration the specific context in which the service is used.

Today, the main driver of AI is data and the selection of data for the training of models can introduce biases. It is also hard or even impossible to explain exactly why an AI built using today's cutting edge technology – deep neural networks – makes the recommendations it does. We thus have a challenge with transparency should these systems be deployed in areas where justification is important – e.g. criminal justice or selecting students for college.

The combination of biases in data and difficulty in explaining why an AI proposes what it does, will become a more and more important problem to tackle. Add to that the understood need to protect user data to maintain customer's privacy, and the 'Ethics of AI' will soar as a trend for 2017.

Bjørn Taale Sandberg
Head of Telenor Research

ON THE VERGE OF SOCIAL MEDIA FATIGUE?

Millennials spend an increasing proportion of their time on apps, and in particular social media. During 2017 we expect to see a counter-reaction. Young people long for breaks from the never ending social interaction and updates.

Flight mode will be used more frequently and it may become trendy to leave certain social media platforms all together. Moreover, during 2016 we have observed how social media is being used as a vehicle for spreading "post-truth" entries. Indeed, Oxford Dictionaries announced "post truth" as the word of the year in both the US and UK.

The dictionary defines the term as: "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief". We predict that users over time will be increasingly frustrated. This will accentuate the trend of social media fatigue.

Wenche Nag
Senior Research Scientist and expert in Social media

Bjørn Hansen
VP and Head of Customers, Competition and Products in Telenor Research

ALL RISE FOR IOT

The Internet of Things (IoT) will be one of the hottest industry trends in 2017. It will shape the way how businesses, consumers and governments interact in the physical world across various sectors, such as manufacturing, the connected home, transportation, utilities and agriculture.

We believe that 2017 will be a landmark of innovations within IoT ecosystem, starting from sensor technologies, IoT service delivery platforms and services themselves, and leading up to radically new business models. 'IoT as a service' will form a basis for many new and exciting IoT applications and drive open innovation through APIs to pull the developers. Online marketplaces, app stores and user forums will be the 'places' to show off new IoT solutions. IoT innovations will be enabled by Low Power Wide Area (LPWA) network technology standards, high cost pressure on device manufacturers, increased analytics capabilities and booming corporate investments into IoT.

Beyond large and small businesses, government agencies will be particularly interested in IoT investment opportunities, particularly in smart cities, once first commercial applications will show efficiency gains and value added from public services enabled by IoT ecosystems.

With the projected IoT device growth up to 21 billion by 2020[1], security concerns around the devices, networks and users will get even bigger and will become of paramount importance to private and public market players.

[1] Gartner Symposium/ITxpo 2015, November 8-12, Barcelona. Press Release, November 10, 2015 (http://www.gartner.com/newsroom/id/3165317).

Ieva Martinkenaite
Head of Digital Innovation Network
in Telenor Research

CHATBOTS SOON TO BE EVERY CUSTOMER'S BEST FRIEND

In 2017, we believe we will see increased experimentation with chatbots. Chatbots can briefly be described as computer programs able to carry out a meaningful conversation—artificial intelligence interacting with humans.

Initially, the chatbots will be text-only, but augmenting with speech to text capabilities will disrupt the customer support process in many Asian countries. The ultimate chat bot can carry out an intelligent and meaningful conversation with a human, without disclosing that the chat bot is artificial.

This technology can be useful to any company that provides customer support. Today more and more of this support is given through digital channels such as email, SMS, chats and Facebook. This is an opportunity tailor-made for chatbots, and using chatbots is potentially of great value.

This is a viable and tangible application of artificial intelligence algorithms, and in 2017 we expect to see important, preliminary steps on this journey. Specifically, chatbots will have impact on the modern telco in the way customer support is carried out.

Kenth Engø-Monsen, PhD
Acting VP of Analytics and AI in Telenor Research

FIVE STEPS CLOSER TO **5G**

Quite a few network operators have already claimed to have demonstrated 5G capabilities such as network slicing or data rates in the Gbit/s range well above rates available with current 4G. But 2017 will be the year where lots of trials will take place, all claiming to test 5G technology as a step towards commercial launch of 5G services.

Some will focus on technology capabilities, others will focus on system aspects for vertical eco-systems. At the European political level there is a significant push towards development of 5G and making use of the new network infrastructure for boosting industry and benefits for the society.

Tests and trials will focus on new market opportunities offered by 5G verticals within sectors such as health, automotive, and energy. There will be technology elements tested with gigabit link capacity, new millimetre wave radio technology, machine type communication servicing Internet of Things (IoT) with large number of sensors and ultra-reliable applications.

New antenna types will also be tested, such as massive multiple output (MIMO) solutions. For end-to-end networking, the softwarization will continue being tested further on practical network slicing connected to 5G verticals. Network slicing is the logical allocation of network resources to enable flexible service operation supporting 5G verticals.

The first parts of the 5G standard worked at by 3GPP will appear in 2018. The full 5G standard will appear in 2020, after the International Telecommunications Union (ITU) has evaluated and adopted it, and after the World Radio Communication Conference has agreed on spectrum bands for it.

Terje Tjelta
Senior Research Scientist and expert in Network Technologies

CONCLUSION

2017 has the making of a year brimming with AI, robots, chatbots and other technological innovations. In all this the ethical and regulatory currents will be evermore crucial in how we can apply and experiment for a digital life.

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