

The Role of Russia in Global AI Movement

Maxim Fedorov

*Skolkovo Institute of Science and Technology (Skoltech),
Center for Computational and Data-Intensive Science and Engineering*

**Artificial intelligence and the next generation of competences :
*How Digital – and Artificial Intelligence will impact jobs and competences profiles?***

The World Conference on Intellectual Capital for Communities

UNESCO, 11 & 12 July 2019

AI - Biggest Benefits and Biggest Risks

“Superintelligence will control/destroy us”

technically speaking, it has been proven that development of a “Super-AI” is not possible; however, even the ‘weak AI’ can be used as an **instrument** for control through education

Education does not follow the race;
however, **AI can greatly contribute**
to development of new educational
technologies

Discrimination and bias due to
data analysis (privacy violation)

New drive for the
segregation in a society through access
to advanced educational technologies

Established cultural codes do not
always work in an AI-guided digital world



Machines will take our jobs, or
may be machines will take only
routine jobs

The changes will be too fast to adjust,
but we (humankind) have power to
control
these changes

The information influx increased
thousand-fold since 200 years ago (**‘digital obesity’**),
but this environment can be made comfortable for us

• AI: Real Dangers and Risks

- **Digital obesity:**
- 200 years ago there were only ten every-day things to care about. Now there are more than 1000.



- **Extra segregation.**
- **Culture and education are behind technologies.**

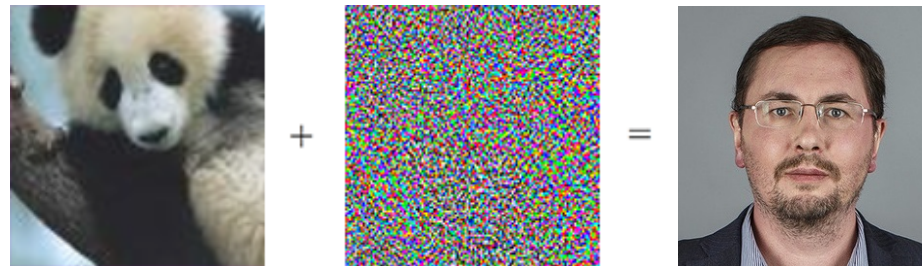
Potential for discrimination through data analysis (privacy violation).



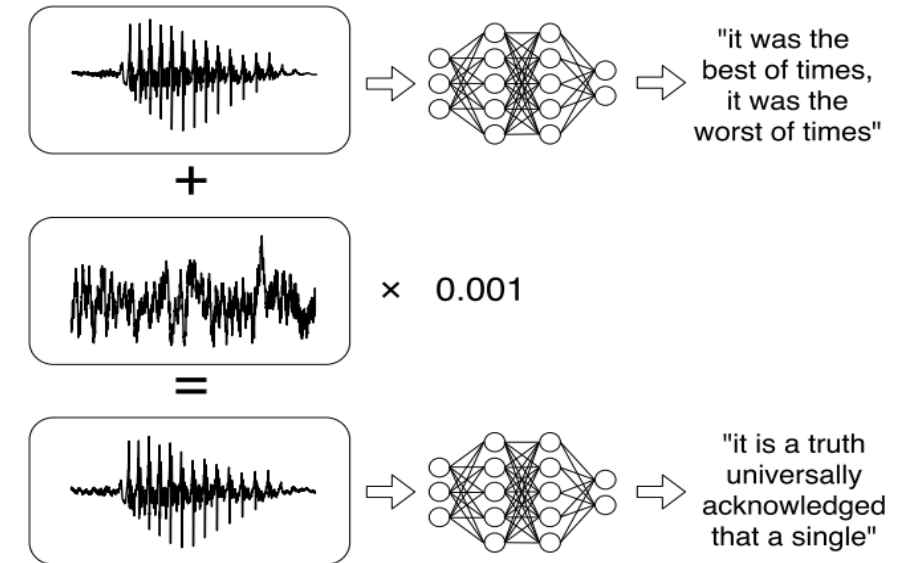
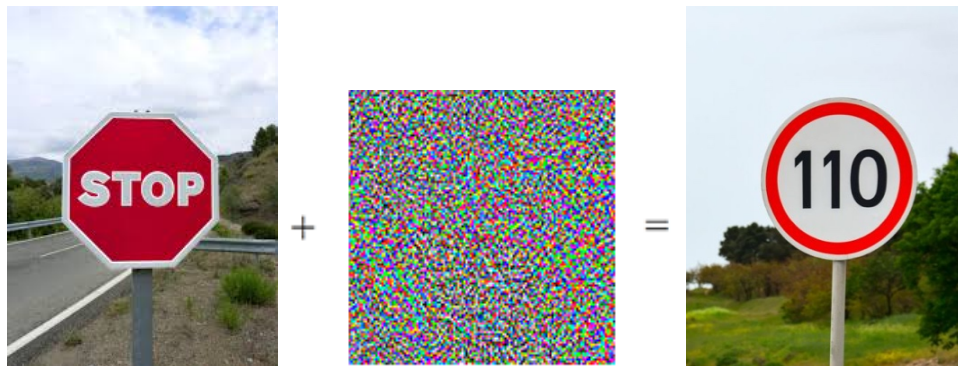
AI technologies based on data are susceptible to manipulations through data

Adding specially designed noise to images can confuse the neural networks and lead to unrespectable results

Face
recognition

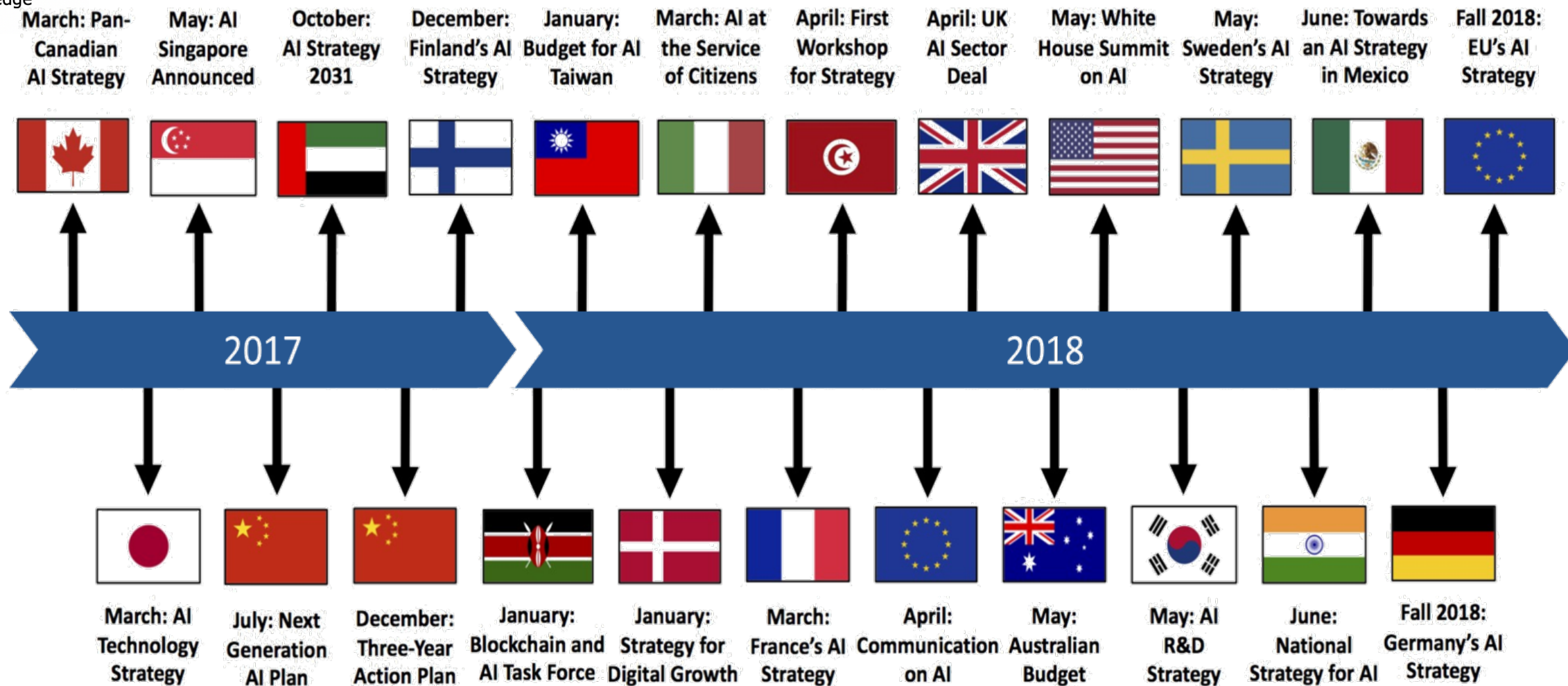


Autonomous
driving



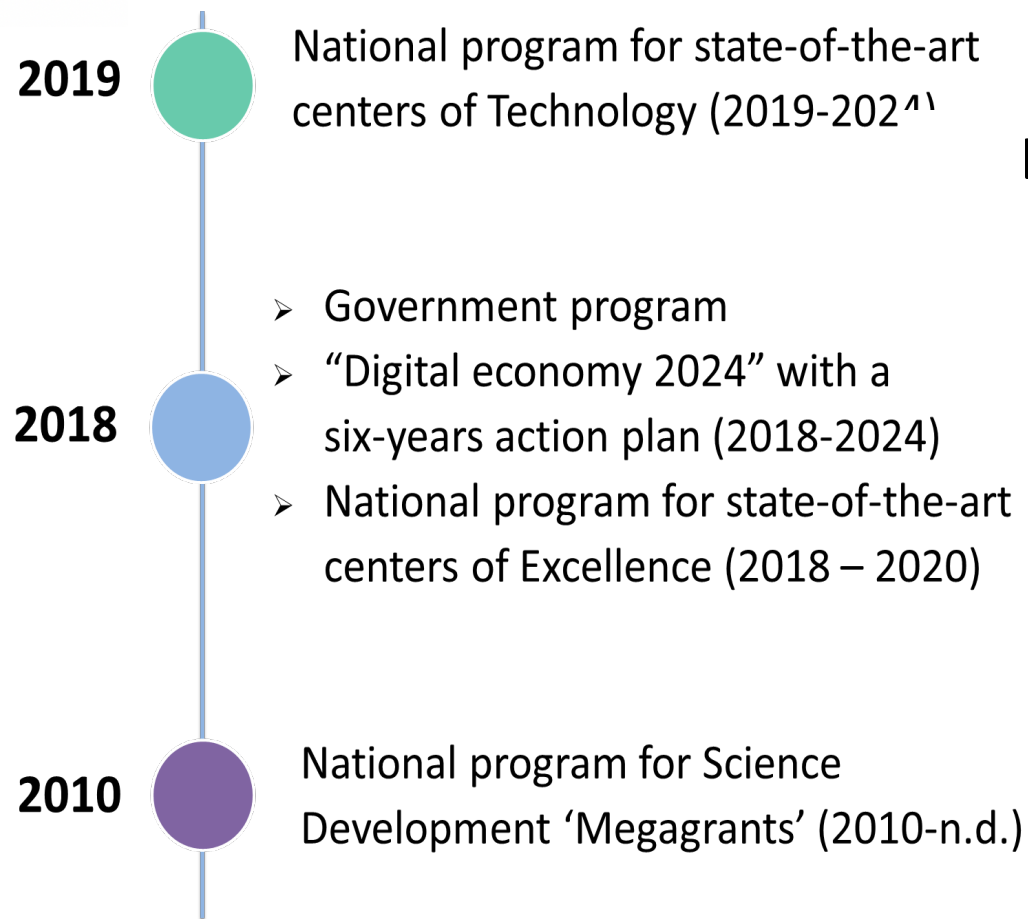
Worldwide movement for AI Strategies and Plans

Intellectual Capital
for Communities
In the Knowledge
Economy



AI in Russia: Government Agenda

Key Factors for AI Industrial Development according to 'Digital Economic' Program



Legislation & policy
development

Technology



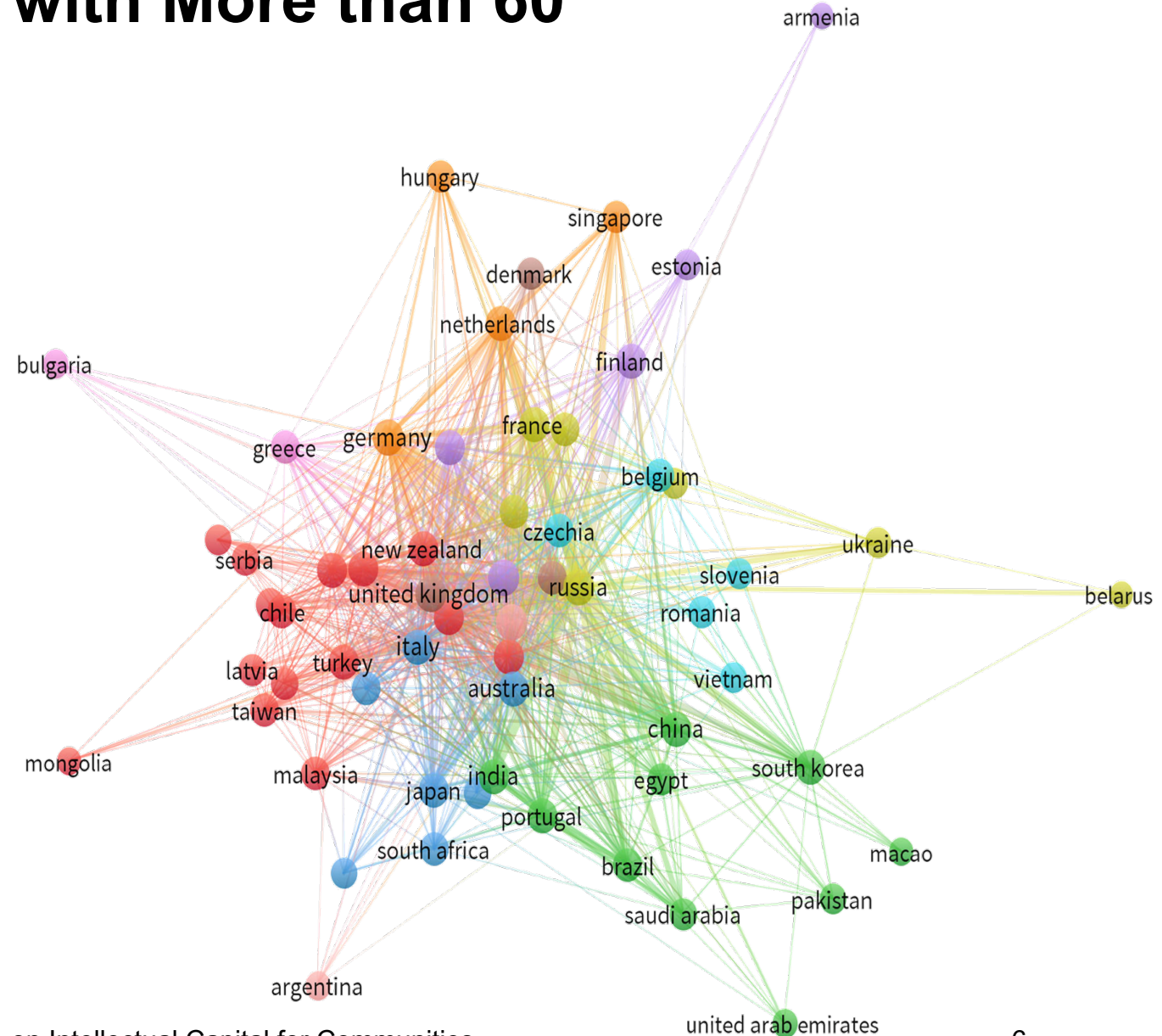
AI Infrastructure

Education and
Talents

Russia Collaborates with More than 60 Countries in AI

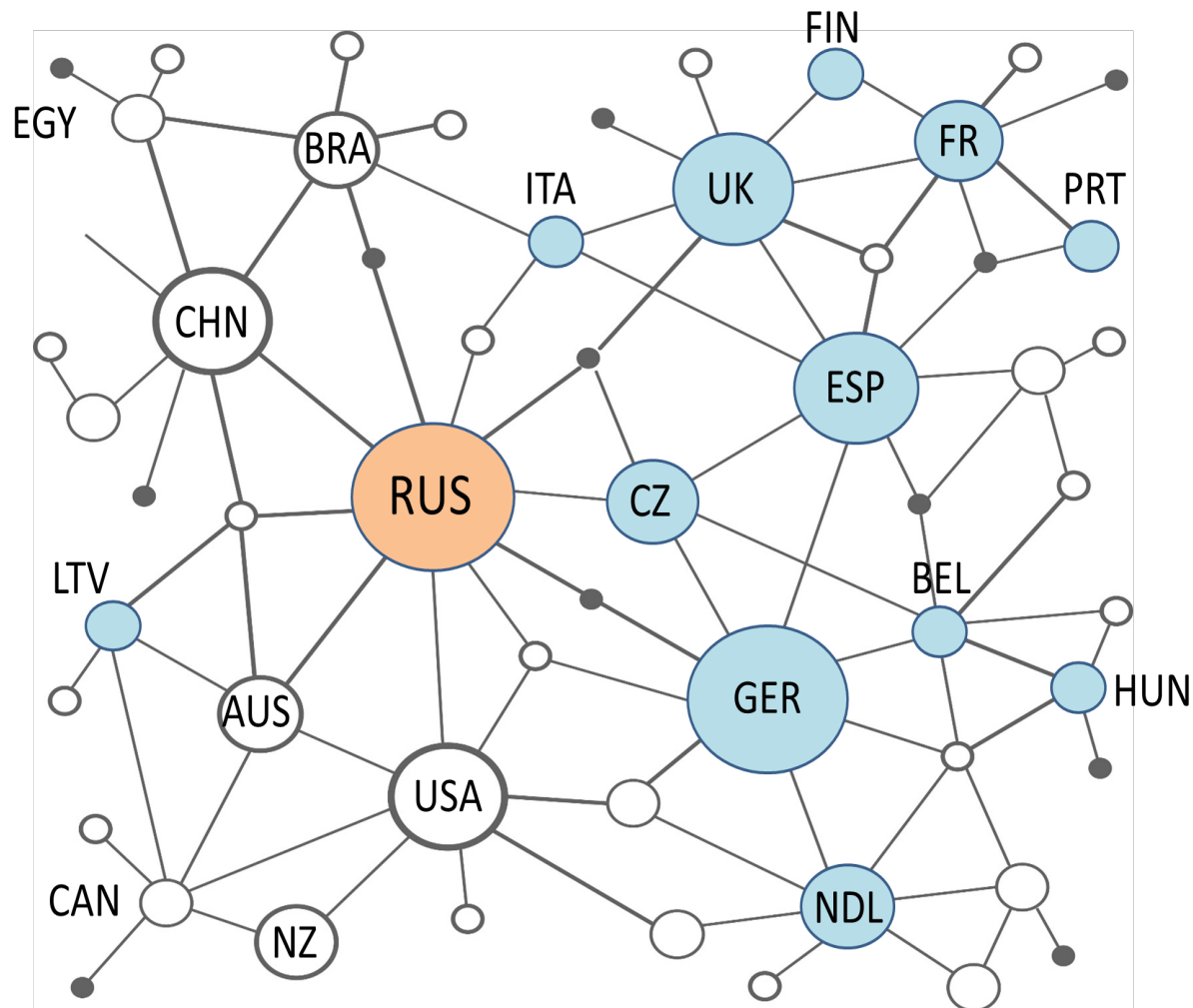
Network of Russian scientists' international collaborations in AI captured by *Dimensions.ai* (2010-2018)

60% of Russian publications on AI-related areas were originated from ***international*** collaborations



TOP-20 Countries in Terms of Numbers of Joint Papers

8000 joint
publications
on AI related
subjects



Skoltech as an Example of Research and Educational Platform for International Collaboration in Research, Education and Innovation



- An **English-speaking** university in Russia (Skolkovo, Moscow) led by academician Alexander Kuleshov
- 40% of faculty, research staff and students are international
- Integrates **science, engineering and technology**
- An internationally recognised leader in **AI** and **Data Science**
Infrastructure: modern campus (140 000 sq m), **AI-tailored supercomputer** Zhores (first in Russia) and modern Big Data infrastructure, brand-new experimental facilities
- R&D and Educational Engine of the **Skolkovo Innovation city** (>2000 high-tech companies became residents of Skolkovo by 2019)
- Deeply involved in innovation activities in AI (19 spin-out companies only in 2018)

World's largest Data Science communities:



Open Data Science (ODS)

**Russia,
Community**

- 4 years
- 22,500 members,
~10,000 active
- 250,000 messages per
month
- **25 messages per month**



**India,
Community**

- 6 years
- 250,000 members,
~25,000 active
- 500 messages per
month
- **0.02 messages per
month**



**USA,
competition platform**

- 9 years
- 2,000,000 members,
~50,000 active
- 50,000 — 100,000
messages per month
- **1.5 messages per
month**

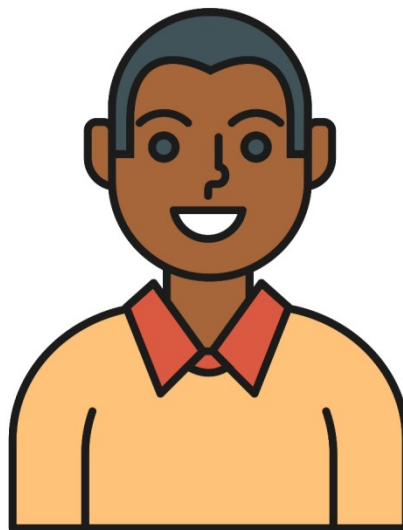
Who are the developers of modern AI systems in Russia?

They are **young people**;
age of 75% of them is
between 18 and 35



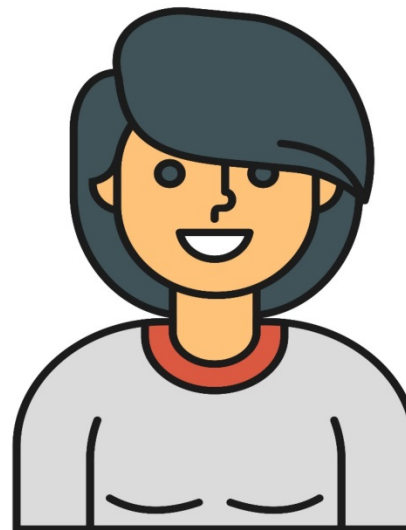
Without higher education

Intern/programmer
19 y.o.



Student

(junior) developer
21 y.o



Master in IT

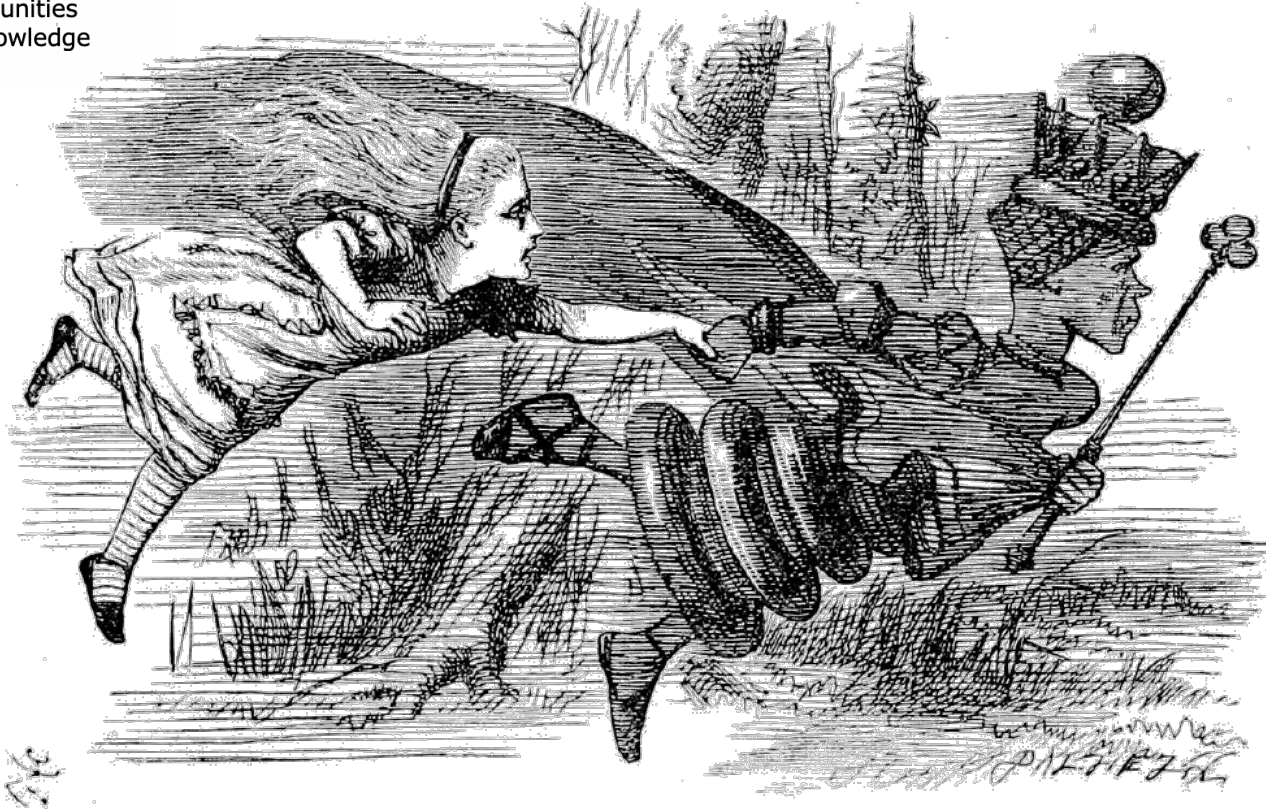
(senior) developer
28 y.o.



PhD

researcher
35 y.o.

'Specifics' of Data Science profession today

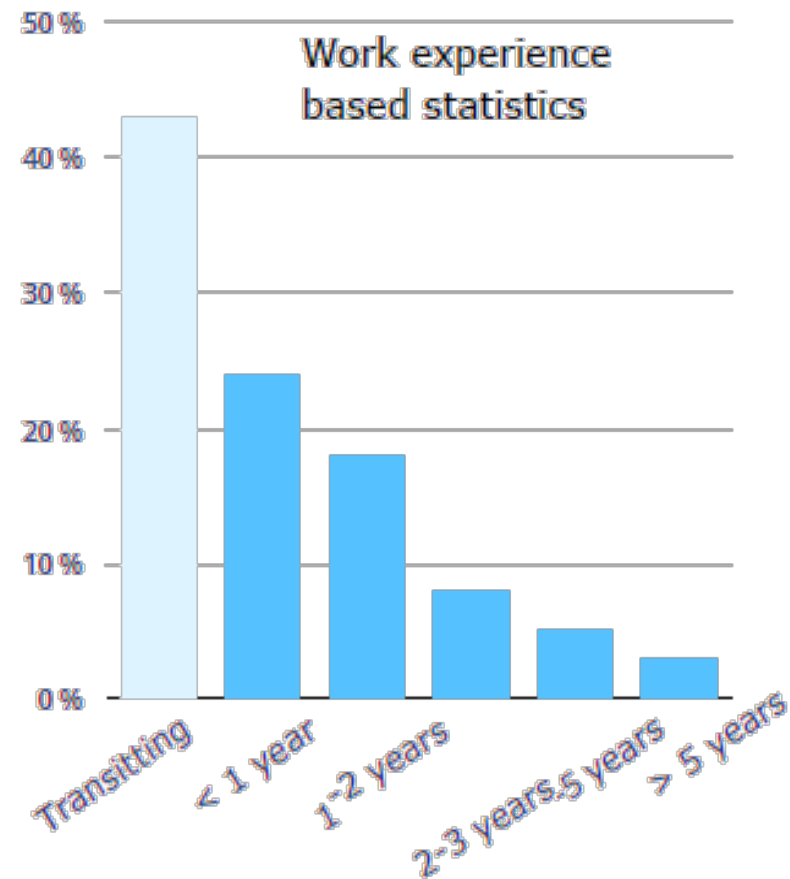
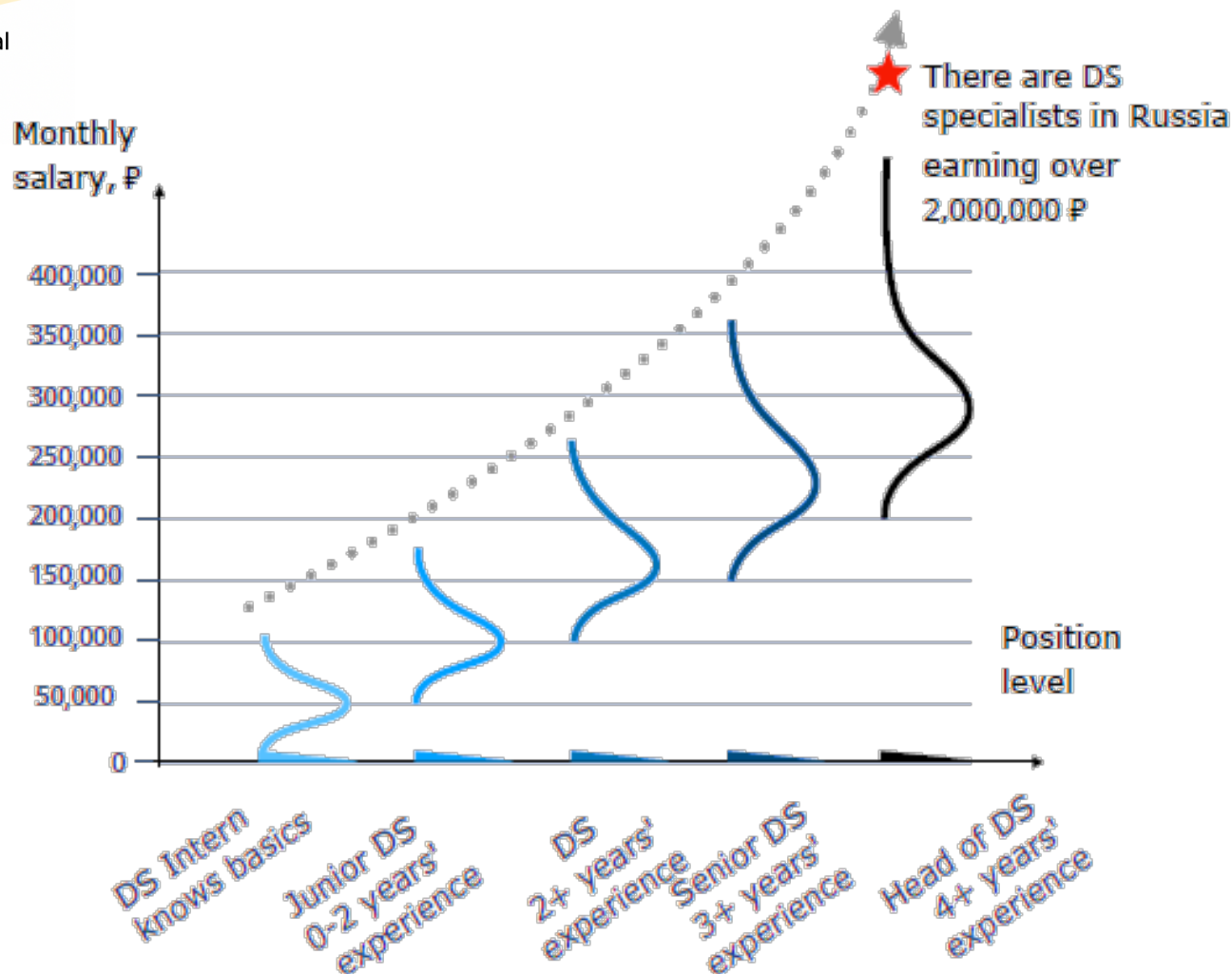


*"It takes all the running you can do,
to keep in the same place".*

1. Every 2 months: new libraries and tools
2. Every 6 months: new breakthrough accomplishments in several projects
3. Every year: changing major libraries and platforms

Career ladder in Moscow*

*1 Euro = 71-72 RUB



Based on Open Data Science research findings in December 2018 — January 2019

11 & 12 July 2019

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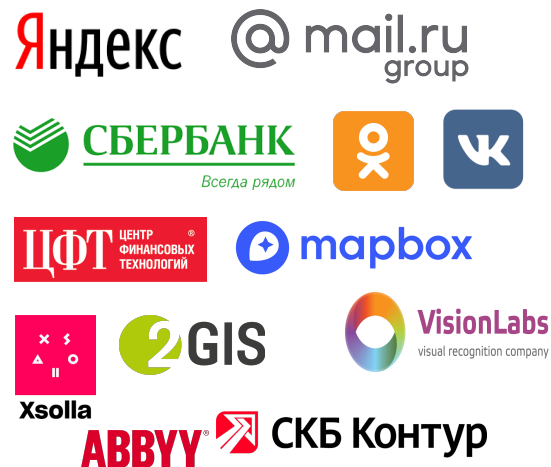
- 15th Edition -



Intellectual Capital
for Communities
In the Knowledge
Economy

Employment

Leaders in AI/IT



Companies from other sectors



Start-ups



International:



...and
hundreds of
others

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- 15th Edition -

Achievements of participants from Russia in machine learning competitions

19 out of 25 Kaggle competitions — **ODS** in **Top-10**

7 out of 25 Kaggle competitions — **ODS winners**



24 ODS competitors in **Top-100** Kaggle

3 ODS competitors in **Top-10** Kaggle



Open Data science community is a great competitive advantage for Russian specialists, companies and science

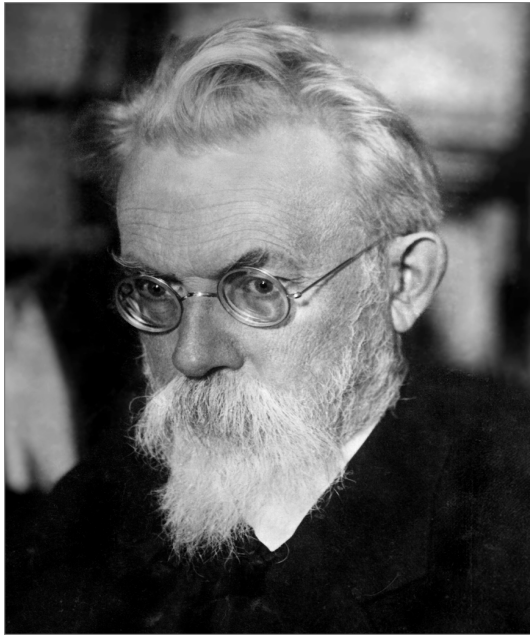
Experience sharing platform:

- Involving all industry representatives in the development of the field
- Catalyst for improving current professional skills
- Unique in its scope and content in terms of Russian-language knowledge database

International achievements:

- Continuous victories in machine learning competitions
- Holding major AI/Data science events worldwide
- Creating educational and technical background materials for developing the overall AI/Data Science field

Technosphere vs Noosphere: a New Stage of Human-Earth's Ecosystem Interactions



V.I. Vernadskii (1868-1945)

- **Reasonable** transformation of Earth for the needs of humanity;
- **Involvement** of people into decision processes;
- **Transparency** of technologies to human beings;
- Growing **interconnectivity** which leads to a **hyper-connected** world;
- **Sustainable development** is the *common* responsibility of humankind and **education** is the main instrument for it.

*Noosphere** - the sphere of human consciousness and mental activity especially in regard to its influence on the biosphere and in relation to evolution.

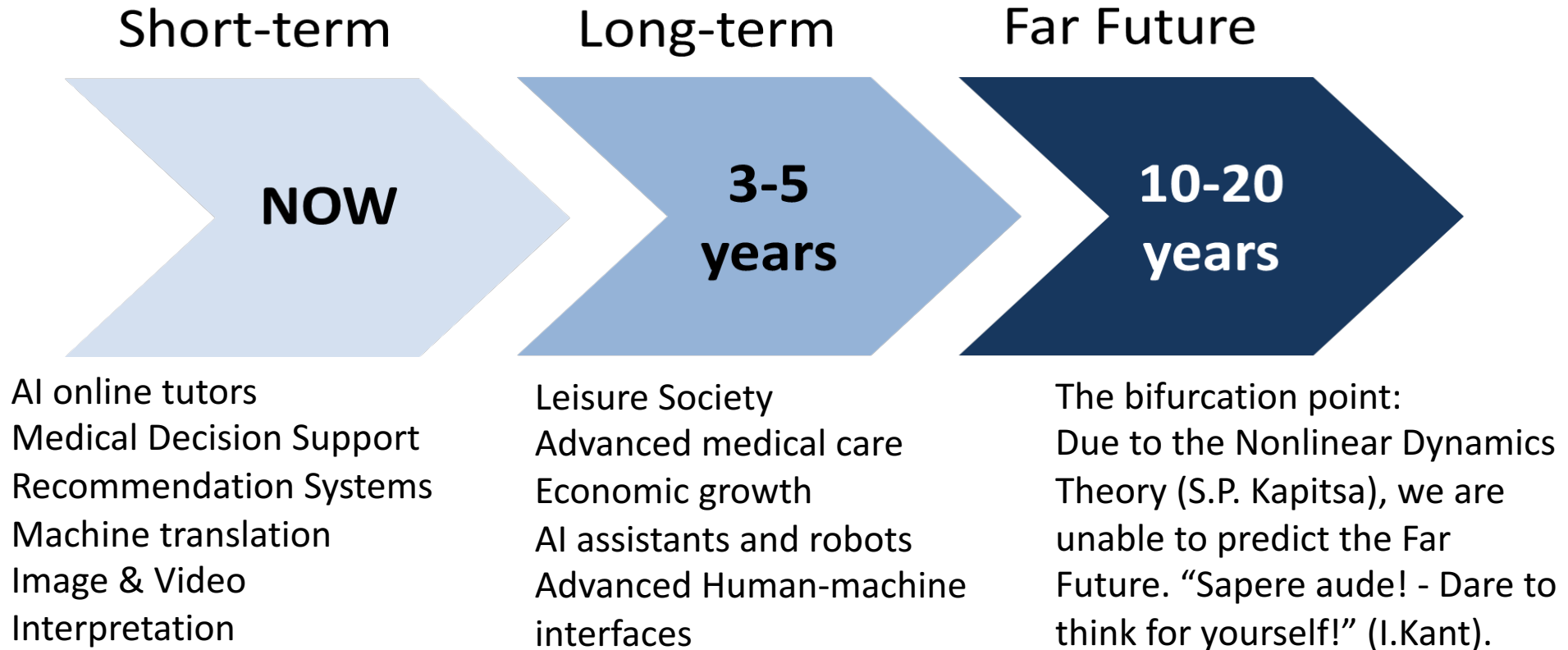


**The concept of noosphere was developed in the mid 1920s by Vladimir Ivanovich Vernadskii and Pierre Teilhard de Chardin with some involvement of Édouard Le Roy.*

Humans and Machines are Going to Evolve Together

However, this Co-Evolution Might Become More Radical than Ape-to-Human

Potential scenario of this co-evolution



Final Comments and Suggestions

- Russia stays involved in many international projects and activities in AI-related innovation and policies development in education. It closely cooperates on AI and education related matters with a number of international organisations: UNESCO, OECD, IEEE (Global Initiative on Ethics), ISO, ITU, etc.
- Its is important to *orchestrate and synchronise* all these efforts to ensure the efficient and effective international collaboration on development of the AI- and education related policies and to avoid duplications as well as inconsistencies in approaches to these important matters in different countries.
- An important step forward can be a creation of a *global* platform under UN auspices for discussion of AI-related matters in education and development of corresponding policies, agreements and recommendations.
- At the national level, it is important to promote comprehensive and consistent strategies in the field of AI education, to ensure close cooperation of the states, the scientific community and the IT industry.
 - **All new technologies related to AI and education must be human-centred:** National and international policies shall ensure that crucial AI decisions **have to be always vetted by humans**. And teaching by human teachers have to stay the core element of education. The human teachers will play an important role in monitoring results of applications of AI-based educational tools.
 - Educational programs in AI-related subjects must include *obligatory* courses in *ethical* aspects of these technologies.
 - An *international framework* has to be developed for ethical certification of AI-based educational products, systems and devices.

Thank you!

Maxim V. Fedorov:

M.Fedorov@skoltech.ru

Director of Skoltech Centre for *Computational and Data-Intensive Science and Engineering*

Skoltech website:

<https://www.skoltech.ru>