Deep machine learning as a way to build a portfolio of missing knowledge

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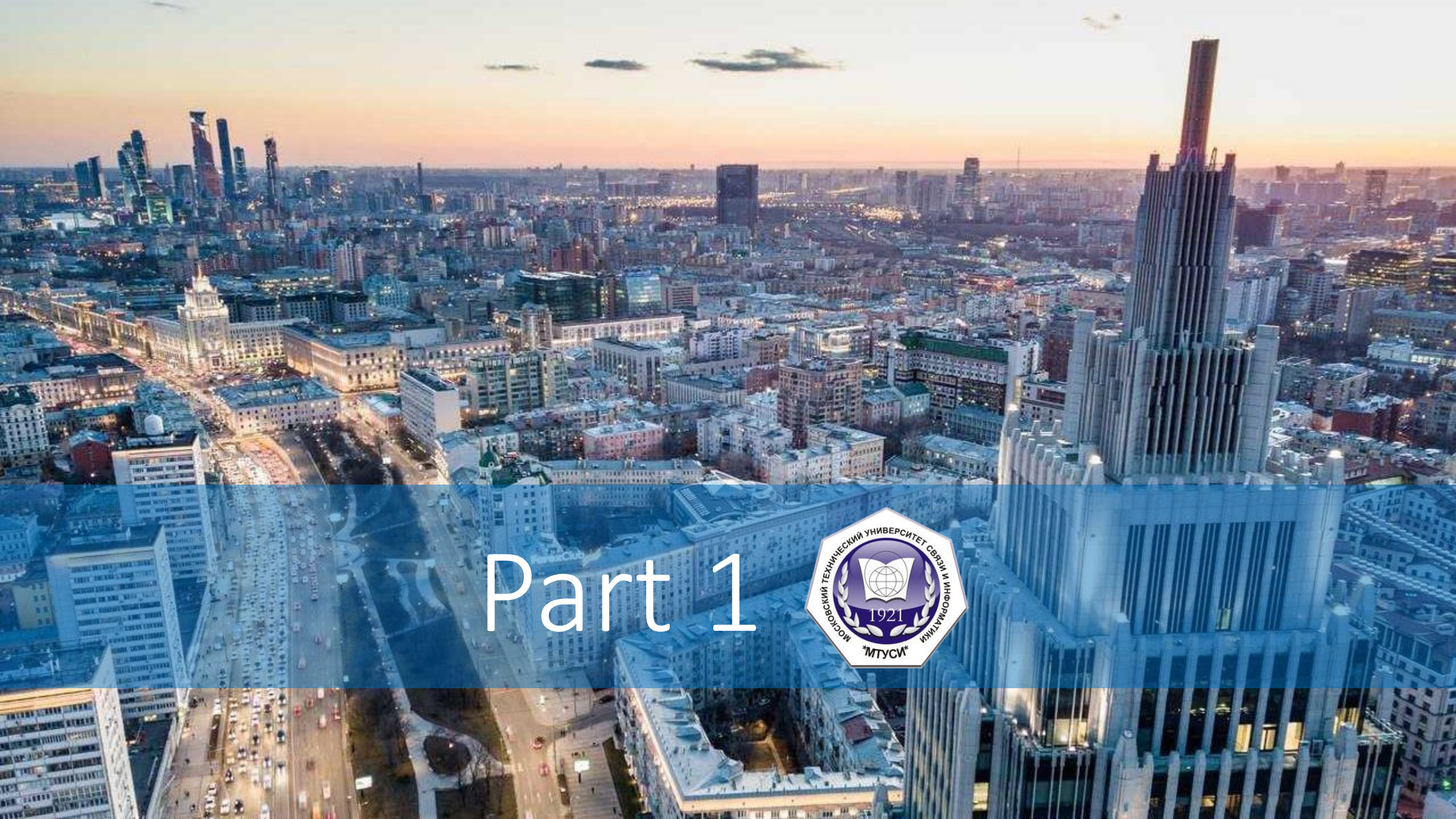
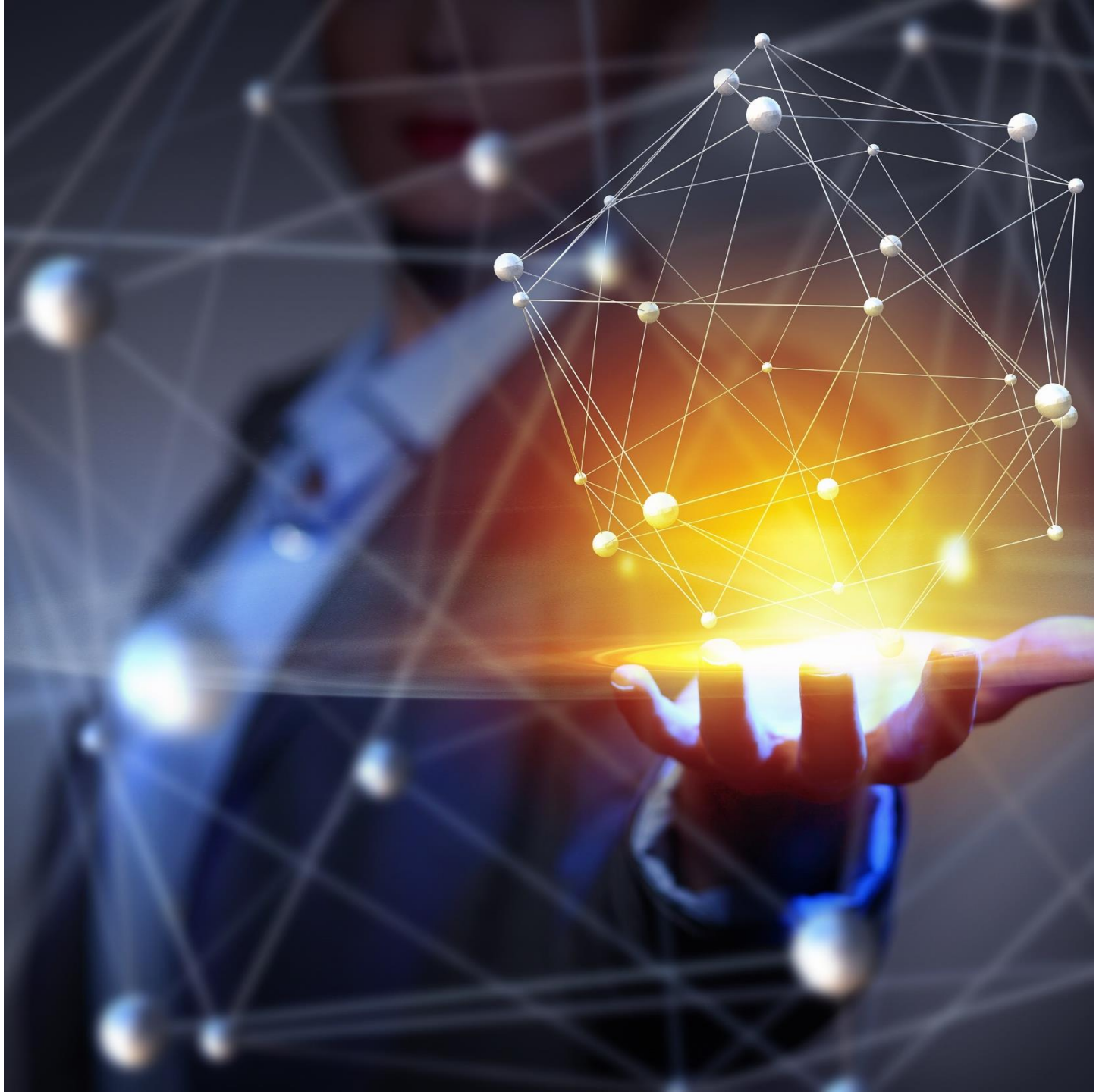


Part 1

Machine learning

Machine Learning is an extensive subsection of artificial intelligence that studies methods for constructing learning-capable algorithms. There are two types of training. Case-law training, or inductive training, is based on the identification of general patterns from particular empirical data. Deductive learning involves formalizing expert knowledge and transferring it to a computer in the form of a knowledge base. Deductive learning is usually referred to the field of expert systems, so the terms machine learning and case studies can be considered synonymous.

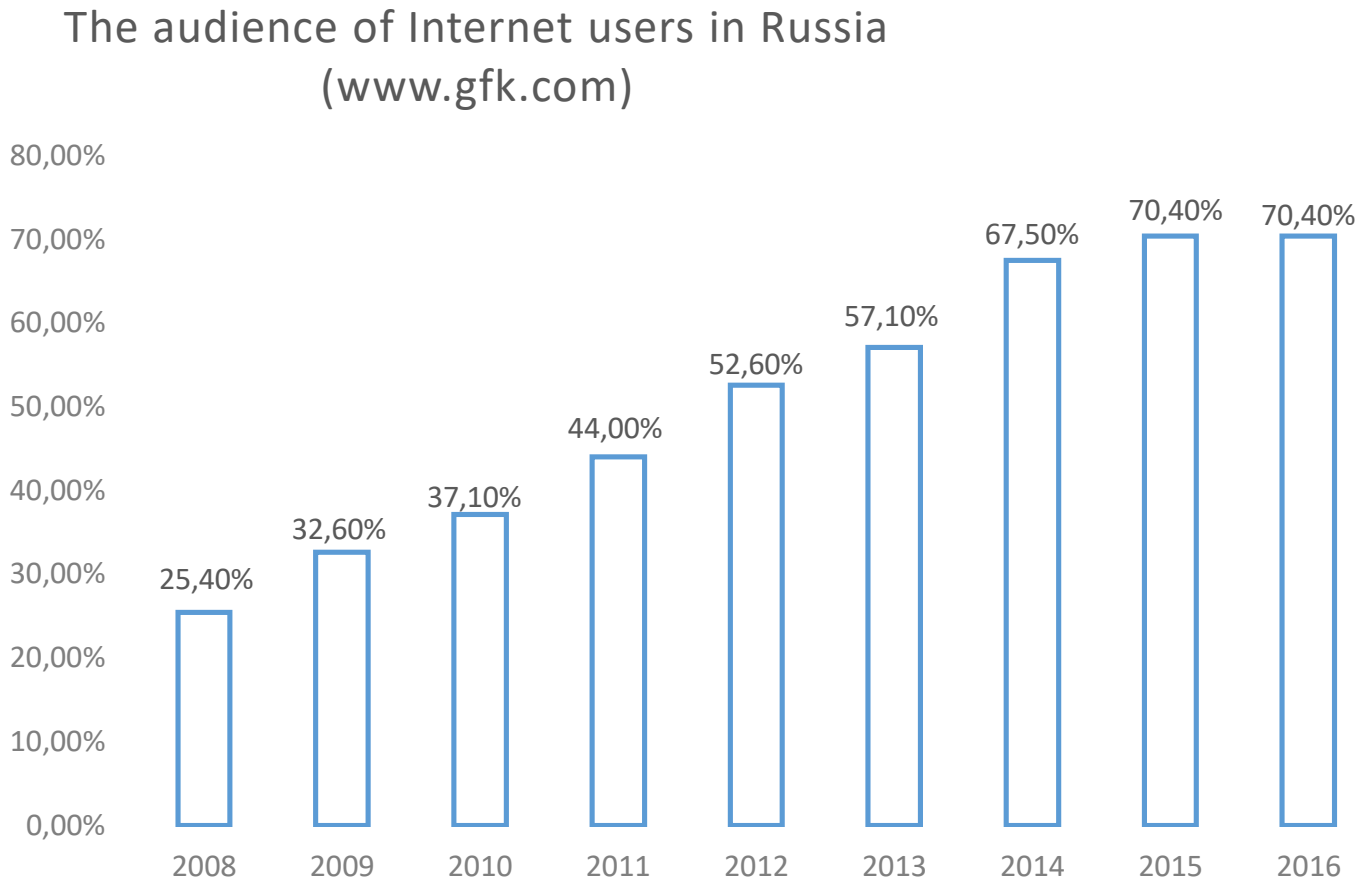


Deep machine learning

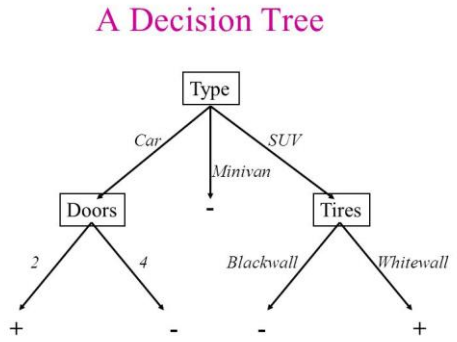
The deep learning process includes the following steps:

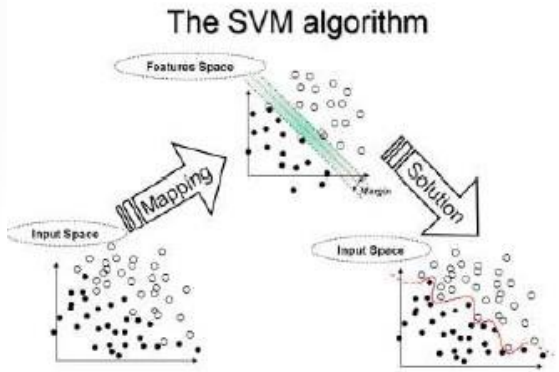
- ✓ANNs ask a set of binary questions in the form of yes / no.
- ✓Retrieving numeric values from data blocks.
- ✓Classification of data according to responses received.
- ✓Data labeling

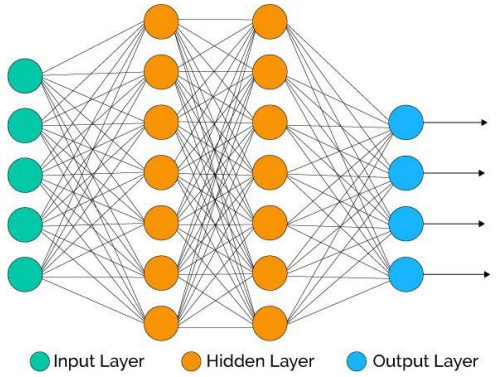
Machine learning in the educational process

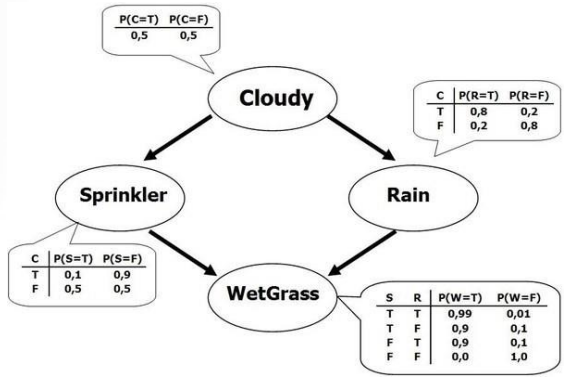


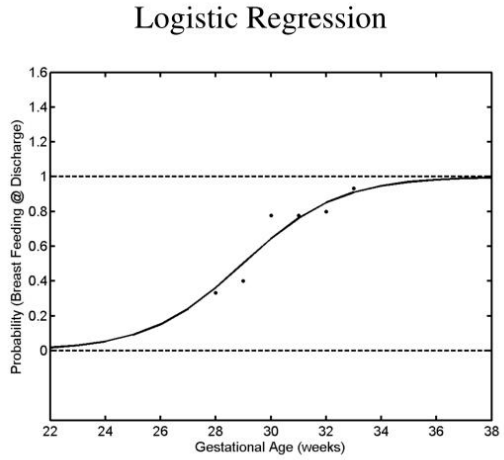
«Use of machine learning techniques for educational proposes: a decision support system for forecasting students' grades»





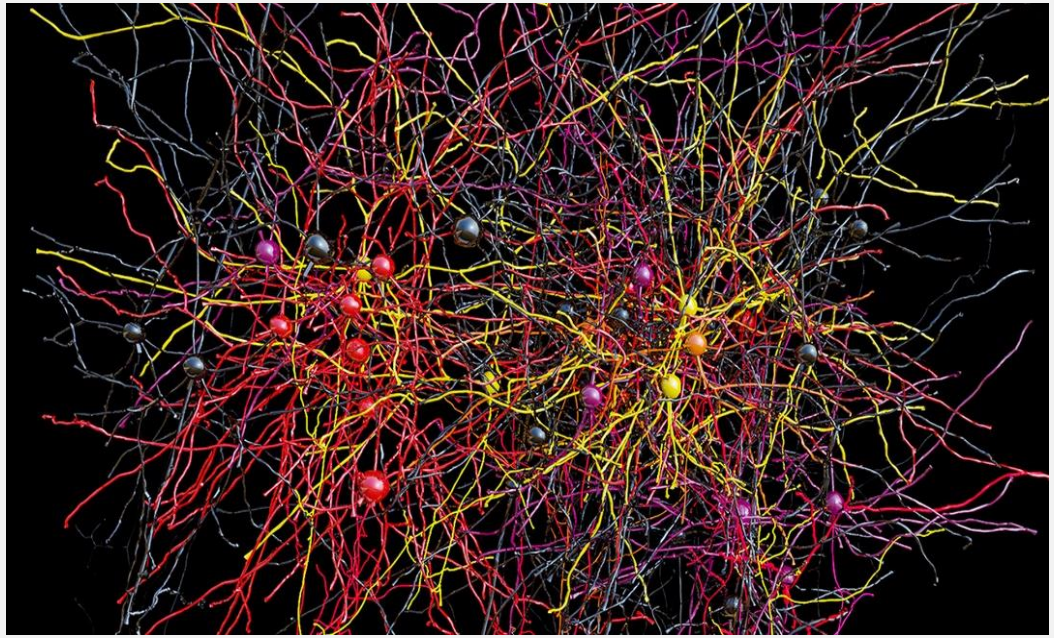






China

Already, an intelligent system has been installed in Chinese schools, which, using deep machine learning technology, determines the knowledge map for each student. The principle of operation of such a system is that it collects data of completed homework, written tests.



Part 2

Legislation

- ✓ The Bologna Process
- ✓ Federal Law No. 273-FL “About Education in the Russian Federation”
- ✓ The methodology of the use of distance educational technologies (distance learning) in educational institutions of higher, secondary and additional professional education of the Russian Federation.

Intelligent Education Systems

ITS models usually consist of the following component:

- domain model;
- student model;
- learning model;
- learning environment.

Advantages:

- In the ITS system, a large number of students can work simultaneously;
- System availability at any time;
- The operating mode and time spent on material for each student are individual;
- The availability of the necessary material in one place;
- An adjusted learning path, focused on the individual characteristics of the student;
- Improving grades and understanding after working with the system.

Disadvantages:

- ITS requires a lot of time for their development, selection of the necessary information and structuring of the material;
- If the system provides for the conclusion of the correct answer at the end of training, then the student may lose motivation to study the material in order to get the correct answer to the question;
- The effectiveness of using ITS systems begins to decline after a year of use;
- Integration into the educational process as an additional type of activity.

Hight School of Economics

85%

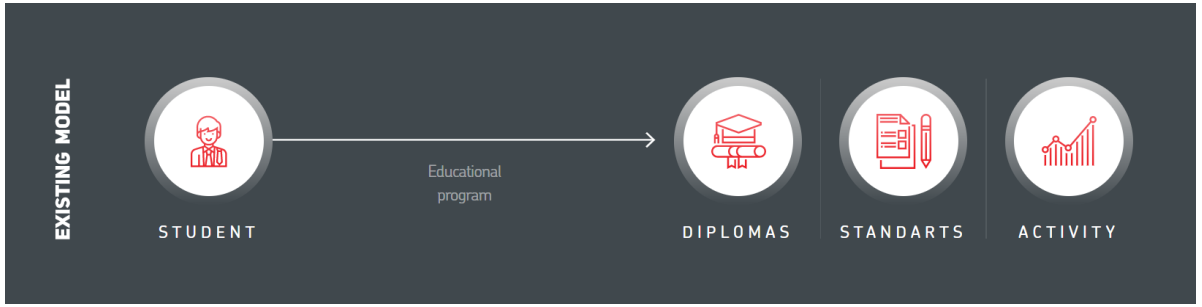
2012 > 2016

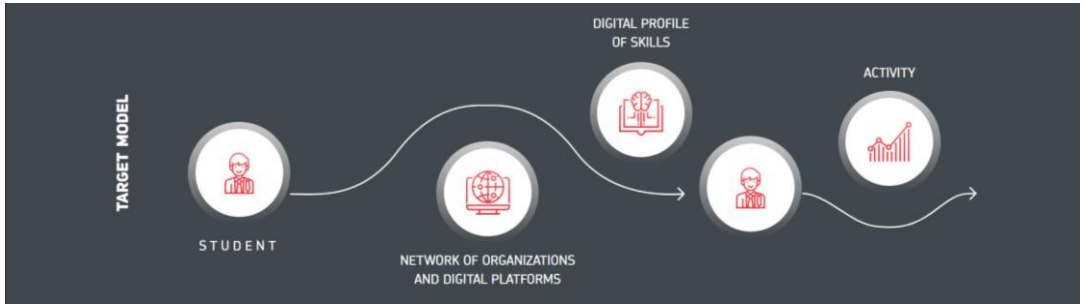
52%

2012 > 2016

University 20.35

- **WHAT IS UNIVERSITY 20.35**
- University 20.35 is the first university in Russia providing opportunities for professional development by creating individual educational trajectories and tracking digital skill profiles.
- It is aimed at training business leaders, participants of the National Technology Initiative and professionals entering new global markets.University 20.35 pioneers a new network-based learning principle, where educational trajectories for each student are selected in a personalized manner. Different universities, online education platforms and other organizations are providing this customized content. Students are trained both offline and online through the digital platform of the University.
- University 20.35 was established by the Agency for Strategic Initiatives (ASI) to promote new projects. Partners: Skoltech, Innopolis, ITMO, SPbPU, MIPT, Novosibirsk State University, Tomsk State University, Far Eastern Federal University.





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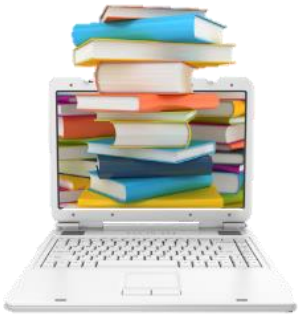
Electronic educational information environment

Schedule



Digital library

E-learning resources

Student's personal account

Internet

Personal account of the teacher

Administration

MTUCI

Результаты прохождения теста «Линейная алгебра»

Логин пользователя: student
Имя пользователя: Первый Студент
Группа: Отсутствует

Время начала прохождения: 20:21:52 (26.11.2017)
Время окончания прохождения: 20:22:42 (26.11.2017)
Результат: 6 (пройден)

Вопрос №1: Матрицу K размерности $m \times n$ (т.е. имеющую m строк и n столбцов) обозначим через $K_{m \times n}$, а через K^T - матрицу, транспонированную к матрице K. Пусть даны две матрицы $A_{3\times2}$ и $B_{2\times4}$. Укажите операцию, которую можно выполнить.

1. $A + B$
2. $A \cdot B$
3. $A \cdot B^T$
4. $B \cdot A^T$
5. все варианты ложны

Ваш ответ: 3;

Правильный ответ: 2;

Вопрос №2: Система линейных уравнений $\begin{cases} x + y + z = 3 \\ y - z = 2 \\ 2y + \lambda z = 5 \end{cases}$ несовместима, если λ равно …

1. -2
2. -5
3. 5

Интерактивная система обучения и контроля знаний обучающегося — Вы вошли как Первый Студент

Тест «Векторная алгебра»

Осталось вопросов: 6 | **Осталось времени до завершения тестирования:** 8:44

Ответить | Пропустить вопрос | Завершить тестирование

Вопрос №3: Вектора называются коллинеарными, если

- они образуют базис
- векторное произведение не равно нулю
- скалярное произведение равно нулю
- располагаются на одной прямой
- параллельны одной прямой

Интерактивная система обучения и контроля знаний обучающегося — Вы вошли как Первый Студент

Тест «Векторная алгебра»

Осталось вопросов: 2 | **Осталось времени до завершения тестирования:** 6:56

Ответить | Пропустить вопрос | Завершить тестирование

Вопрос №7: Заполните пропуски в названии

Два вектора называются ... , если они параллельны и их направления совпадают.	ортогональными
Вектора называются ... , если их скалярное произведение равно нулю.	ортогональными
Два ненулевых вектора называются ... , если они лежат на одной прямой.	ортогональными

Интерактивная система обучения и контроля знаний обучающегося — Вы вошли как Первый Студент

Тест «Векторная алгебра»

Осталось вопросов: 5 | **Осталось времени до завершения тестирования:** 7:41

Ответить | Пропустить вопрос | Завершить тестирование

Вопрос №4: Найти определитель матрицы $A = \begin{pmatrix} 0 & 2 & 0 \\ 0 & 2 & 1 \\ 0 & 2 & 0 \end{pmatrix}$

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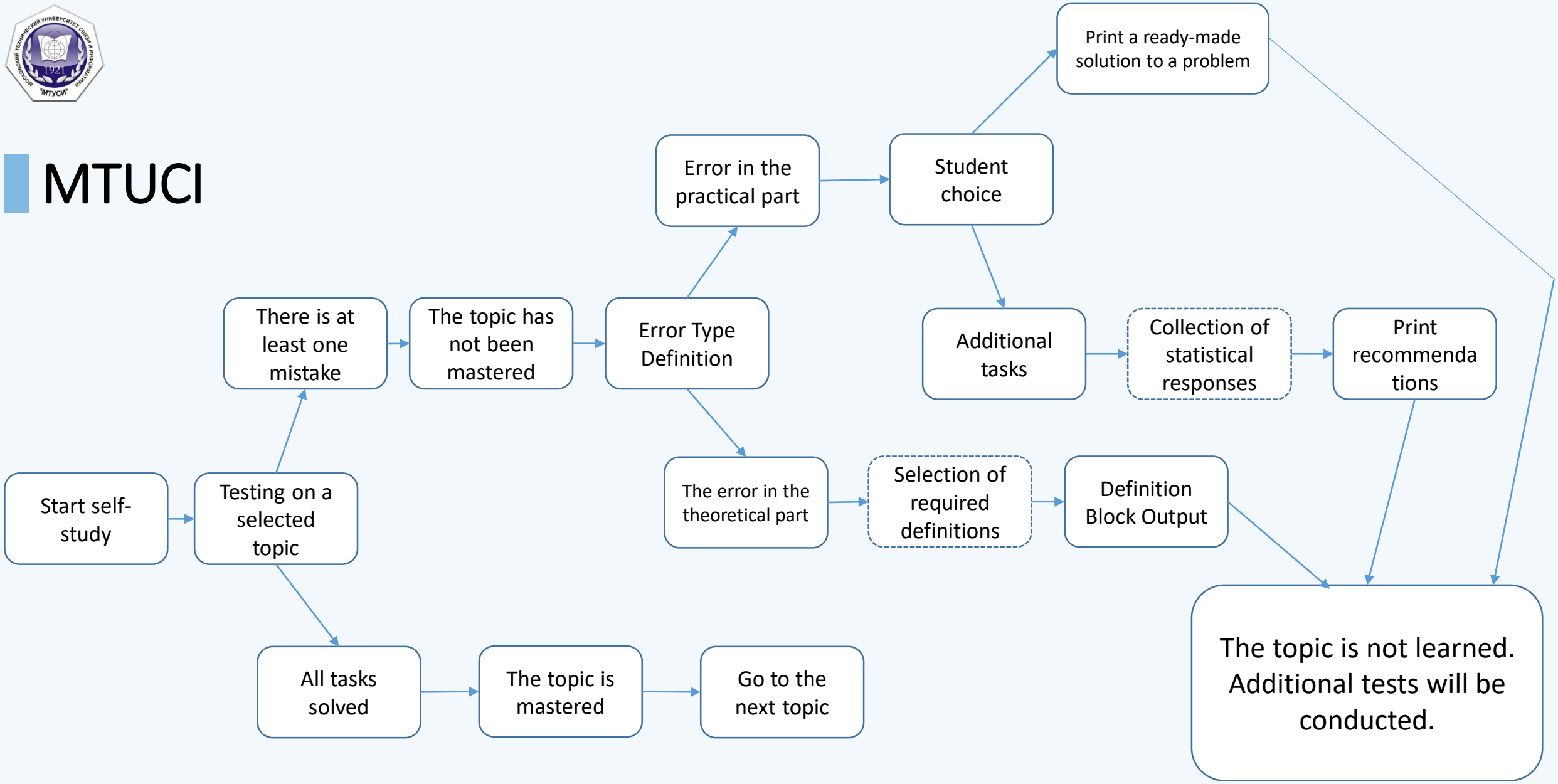
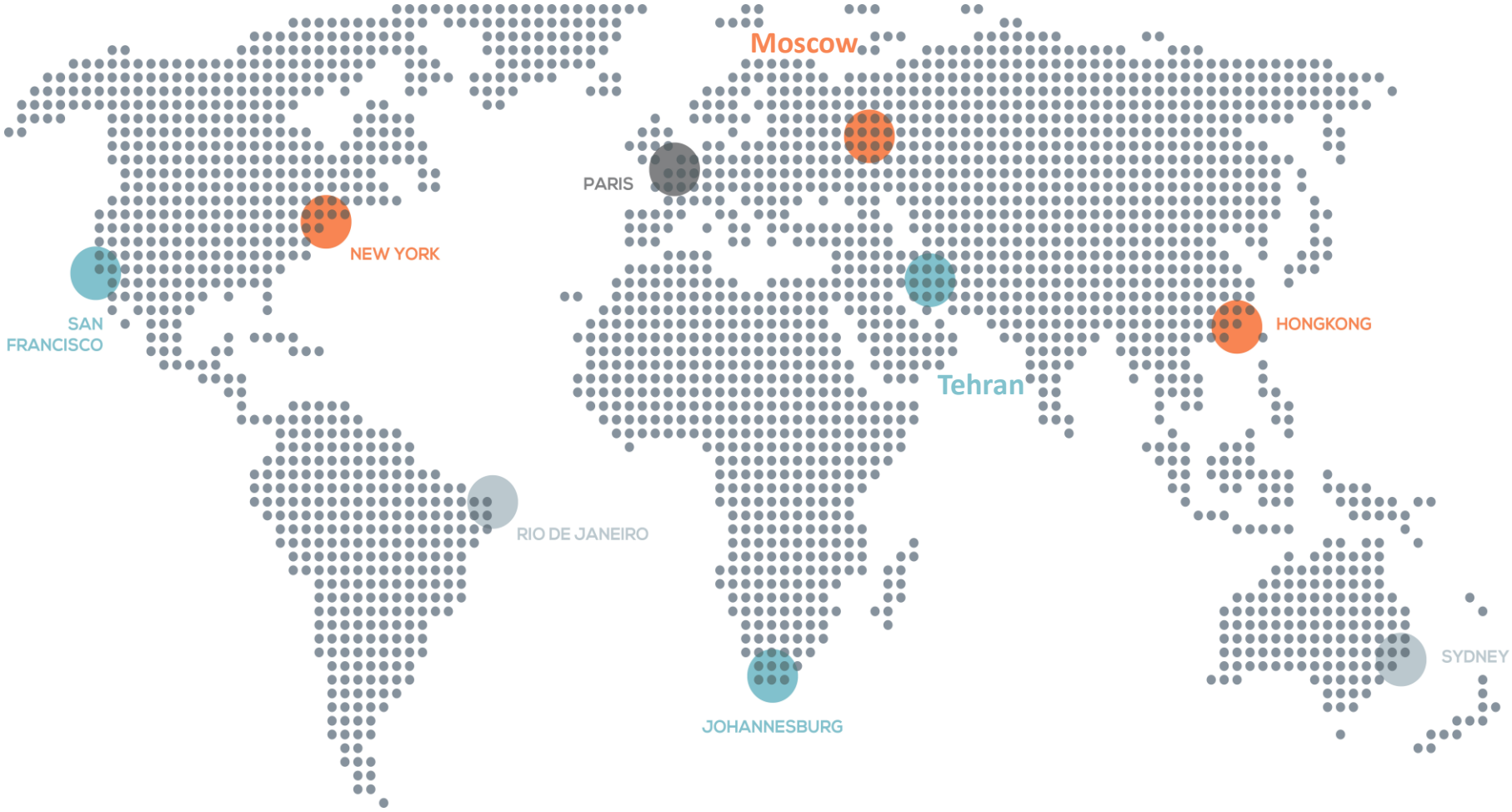

Print a ready-made solution to a problem
Error in the practical part
Student choice
There is at least one mistake
The topic has not been mastered
Error Type Definition
Additional tasks
Collection of statistical responses
Print recommenda tions
Start self-study
Testing on a selected topic
The error in the theoretical part
Selection of required definitions
Definition Block Output
All tasks solved
The topic is mastered
Go to the next topic
The topic is not learned. Additional tests will be conducted.

Conclusions

Given the rapid increase in information, the massive use of tablets, gadgets, smartphones and laptops, as well as increasing computer literacy of the population, the development of intelligent education systems and their introduction into the educational process is critically relevant at the moment.



Thank you for attention!

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