АНО

Информационно-семантическое общество
по развитию математических исследований

AI-cluster - a secure foundation for high-tech projects (deep tech)

We develop and implement the explanatory Semantic Artificial Intelligence. The solution offered by the machine must be understandable for a human being.

KAMAFLOW
BUSINESS LAUNCHER

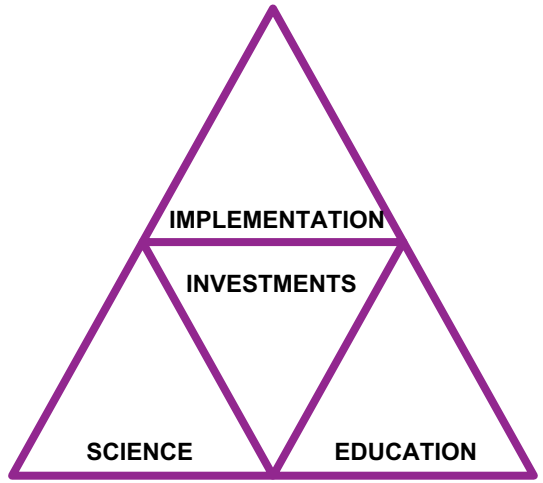
We commercialize high-tech technologies (deep tech)

Our goal: To create a platform for the commercialization of high-tech technologies (deep tech) in the field of Semantic Artificial Intelligence (technology transfer).

Our approach: We rely on the method of integration of education, science and production: "Lavrentyev's Triangle", developed in the USSR by Academician M.A. Lavrentyev, a world-famous scientist, the founder of the Novosibirsk Scientific Center.

Investment tools: “Lavrentyev’s Triangle” proved its effectiveness as far back as the USSR. But we want to supplement it with modern financial instruments. We are already cooperating with the fund KAMAFLOW BUSINESS LAUNCHER and we look forward the new investment partners.

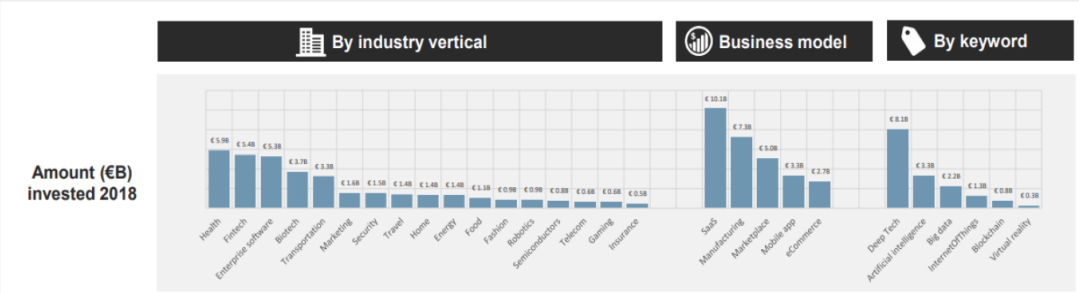
- **Implementation.** We solve the tasks of our industrial partners using the most modern scientific research.
- **Science.** We rely on the scientific potential of the Novosibirsk Academgorodok, one of the largest scientific centers in Russia and the world.
- **Education.** We closely cooperate with Novosibirsk State University, which participates in Project 5-100, a program for enhancing the international competitiveness of Russian universities among the world's leading scientific and educational centers.
- **Investments.** In order to integrate science, education and production tasks, we cooperate with investment partners.



What kind of problem do we solve

Deep tech was by far the most popular theme for investors

https://sifted.eu/articles/venture-capital-dealroom-data-2018/



Investments in science-based projects and companies: Venture investments in science-based projects and companies (deep tech) remain among the most popular instruments on the American and European markets.

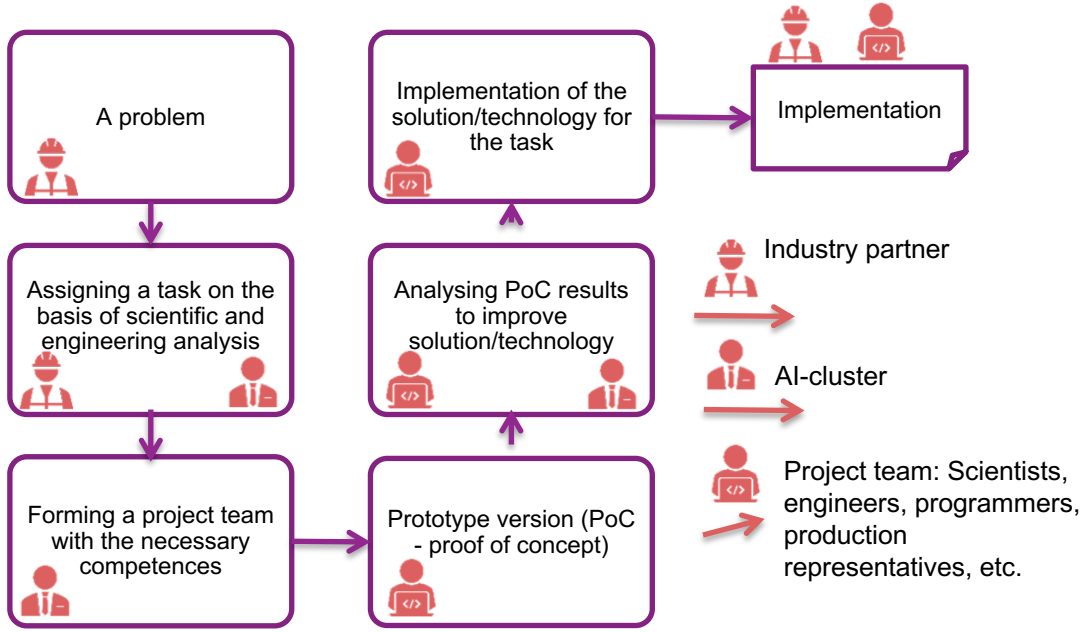
Deep tech is hard to copy: The popularity among investors is explained by the fact that unlike the "usual, proven" business, deep tech is difficult to copy to competitors, as it is based on scientific developments and R&D.

Deep tech is difficult to assess: But the benefits of deep tech also cause complications for investors and businesses.

- **Investors**. Investors find it difficult to understand the scientific and technical details of a project. It is also known that investments in deep tech require a much longer period of time to generate profit and require additional investments in R&D.
- **Production**. The same is true for production. In Russia today, production is not ready to invest in deep tech projects, even if they solve important production problems. It requires either a ready-made solution or an investor.

We offer a problem-solving approach: The focus is on the specific problem that the industrial partner wants to solve in order to achieve the desired business goals.

- **Investors**. Risks are reduced because investments are directed to a project or startup that already has a customer.
- **Production**. Receives the decision of a problem with application of the newest scientific approaches. At the same time, standard startups do not solve customers' problems with sufficient precision. Iterations and efforts are required to adapt startup products to the needs of customers.
- **Startups**. Risks are reduced, breakthrough technologies are created.



Structure of AI-cluster

Investment partners

- creation of a seed venture fund to support venture projects from the start of the project
- investments in AI-cluster infrastructure
- preferential right to engage in R&D
- forming a scheme to make a profit on investments

Industrial partners

- are the clients of new projects for AI-cluster residents
- are experts in projects
- venture investors for projects within the sphere of interests of an industrial partner
- investors of AI-cluster infrastructure will have benefits in R&D in this case.

AI-cluster

Supervisory Board	Board of Directors
Executive Board	
Marketing	Administrative and juridical support
Residents' project investment support service	
Regional front-office	Investment Committee and subcommittees
Competent expert boards.	

Expert community

- establishing competent expert boards
- finding customers to do R&D for the AI-cluster

Government

- implementation of projects under government policies and programs

Educational and scientific institutions

- staff for AI-cluster, internship for students
- generating new ideas and theories
- lecturers of educational institutions, being experts and consultants, maintaining contact with their students for further scientific work
- NSU as a university of National Technology Initiative, inclusion of venture projects in NTI programs

Novosibirsk State University, Novosibirsk Science Center, Novosibirsk State Technical University, Shandong University

Why did we choose Semantic Artificial Intelligence

The global AI market reached $2,500,000,000 last year and will grow to $137,200,000,000 by 2024. More than 30 countries around the world have recognized the critical importance of AI and adopted appropriate national strategies.

In 2018, the market volume in Russia amounted to 2,100,000,000 roubles. (0.2% of the global market). By 2024, it will increase to 160,000,000,000 rubles. (1.8% of the global market).

cnews.ru Стратегия развития Искусственного Интеллекта в России

- One of the conceptual problems to be solved in order to apply AI everywhere is the so-called "Black Box" problem.
- Nowadays AI methods (neural networks, machine learning) cannot explain how a trained system makes a decision.
- This makes it impossible for AI to work autonomously in areas where the cost of error is high: medicine, defense, judicial practice, etc.

Unlike neural networks and other methods of machine learning, ***Semantic AI (Explainable AI) has the ability to "explain" its choice of solution, and a person is able to "understand" this explanation, because Semantic AI is based on the same principles as human thinking - logical rules***.

Using scientific elaborations of the Siberian mathematical school we already apply Semantic AI in commercial projects!

Since 1971, the Institute of Mathematics in Novosibirsk has been developing a theory that formed the basis of the Semantic AI (Semantic DataMining & Semantic Discovery). Today, the results of its application in various fields have already been obtained, which showed an advantage over other methods of AI, including neural networks.

- Medicine. Cancer Diagnostic System.
- Financial forecast.
- Bioinformatics.
- Adaptive systems, animats. AI working on the principles of human thinking

Eyeline.mobi in a close cooperation with scientists has made a commercially available semantic transaction processing platform ESDP based on semantic modelling theory for telecom and banking industry.

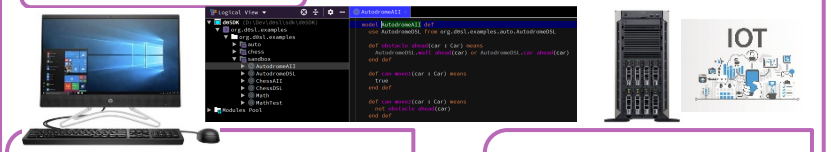
МТС TELE2 Beeline Alfa-Bank

ESDP (Eyeline Semantic Definition Platform)

ESDP is a platform for decision making automation, which is based on the mathematical theory of Semantic Modeling, developed in Novosibirsk Akademgorodok.

With ESDP, it is possible to control the behavior of artificial intelligence, robots, complex business processes using the d0sl specification language, which is understandable to a specialist in the subject area and does not require programming skills.

ESDP PLATFORM



Workspace for creating specifications in d0sl

SVM - virtual machine executing d0sl specifications

Stack of technologies: Java, DSL, Meta Programming System, XML

APPLICABLE PROJECTS/DIRECTIONS USING ESDP

FINTECH, TELECOM

Payment management, service management, frod processing, routing, recommendations, stock exchange forecast

ARTIFICIAL INTELLIGENCE

Robotics, animates, swarm tasks, automatic text processing, smart contracts, recommendation systems, Internet of Things

MEDICINE

Expert disease diagnostic systems, second opinion USA, telemedicine, distance diagnosis

Roadmap

✓	12 years ago, an ESDP version was developed to describe the logic of transaction processing in the Telecom sphere. It has been implemented in large-scale projects.	MTS, Tele2, Alfa Bank, Beeline, Moscow City Government, etc.
✓	The basic language of specifications d0sl and SVM has been developed - semantic virtual machine executing d0sl. The methodology of integration of semantic specifications into projects of almost any sector and branch has been developed. Including Internet of Things devices and robotics.	www.d0sl.org
✓	The technology is ready for use in commercial projects.	The search for new industrial and financial partners.
	Integration with semantic artificial intelligence technologies is planned: Semantic DataMining, Semantic Discovery, Semantic NLP	R&D, development of tools and libraries, scientific research.

Competitive advantages:

- The system is lightweight and can be used in Internet of Things and robotics.
- Unlike other approaches, semantic Artificial Intelligence can "explain" how it makes decisions, so it can be used in juridically significant smart contracts, medicine and other crucial areas.
- ESDP reduces the cost of ownership of the product for the customer by several times as much as it does not require programming when changing the logic.

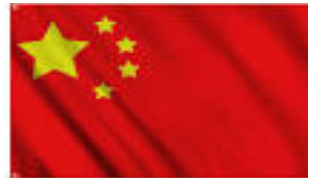
МТС TELE2 Beeline Alfa-Bank MOSCOW CITY GOVERNMENT

AI-cluster.ru unites AI companies and research organizations

AI-CLUSTER.RU

Members	Partners	Scientific and Research Partners
Bacup IT, Eyeline.mobi, Semantic Technologies, ExpaSoft, SoftAge, Computational Systems, SibInCo, d0sl.org, aigents.com, RiT IT **Sobolev Institute of Mathematics, Russian Academy of Sciences**	Azoft, StaffCop, NIPS, Intermobility, РАКИБ, NPO National Platform of Industrial Automation, Tornado Systems, SCC Group, Alecta, Eltex, Beijing Tianyuan Mathematics and Information Technology Research Center, Axxteq Controls (Singapore), KamaFlow, JIC Capital Management (Tianjin) Co., Ltd, Polar Bear Systems (China)	Novosibirsk State University, Institute of Information Systems RAS, Qingdao Collaborative Innovation Institute for Financial Research (China), Shandong University (China)

Russia



China

Switzerland

Prospective projects for industrial partners

Automation of turbine starting

❖ Starting up turbines in the energy industry is a process that is difficult to automate because the equipment is running in a stand-alone mode at the start-up time.

❖ With the help of the semantic law search system Semantic Discovery it is possible to identify the regularities of turbine start-ups by analyzing historical data. It is also possible to consider the experience of specialists in the subject area.

❖ With the use of the ESDP platform, it is possible to develop an AI-system that will allow to automate the process and reduce the number of human-induced errors.

Processing of tender applications

❖ Although tenders are accepted electronically, the processing of tenders requires a significant amount of human resources due to:

- ❖ Large number of applications
- ❖ Presence of unstructured information
- ❖ External requirements: Legislation, tender conditions

❖ With the use of ESDP platform and semantic text analysis, it is possible to extract essential conditions from applications and check them automatically.

❖ This will allow to significantly reduce human resources and minimize human error factor

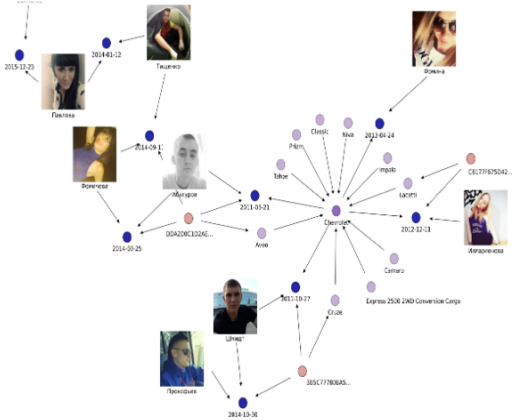
Digital Railway

❖ In 2017, the scientific and technical council of Russian Railways adopted the concept of "Digital Railway".

❖ The semantic law search system Semantic Discovery and ESDP (Semantic Artificial Intelligence) platform are light enough to be used in IoT (Internet of Things) and Edge computing devices.

❖ Due to its simplicity, the Semantic AI is able to solve problems such as:

Tracing the depreciation of the railway surface using wheel sensor readings and thermal imaging inspection of the track structure.



Searching for information in public sources

A number of projects have already been implemented which have used AI to extract meaningful data from the unstructured Internet. It was possible to considerably increase the productivity of the customer's employees

❖ **Finmonitoring.** Search for individuals and organizations that violate the law on arms trade

❖ **Rosatom.** Search for item values (up to one million items), including documents from various suppliers in different languages with regional and other logistics requirements.

Thank you!

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