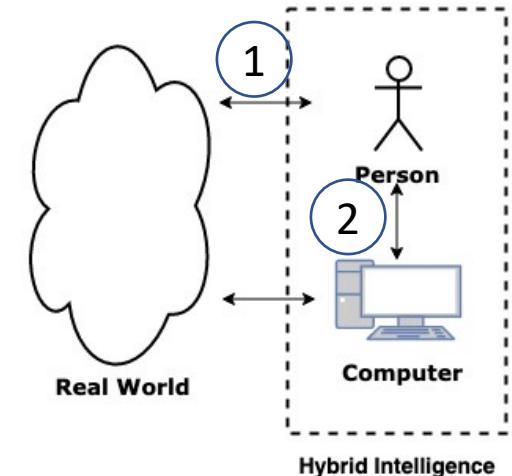
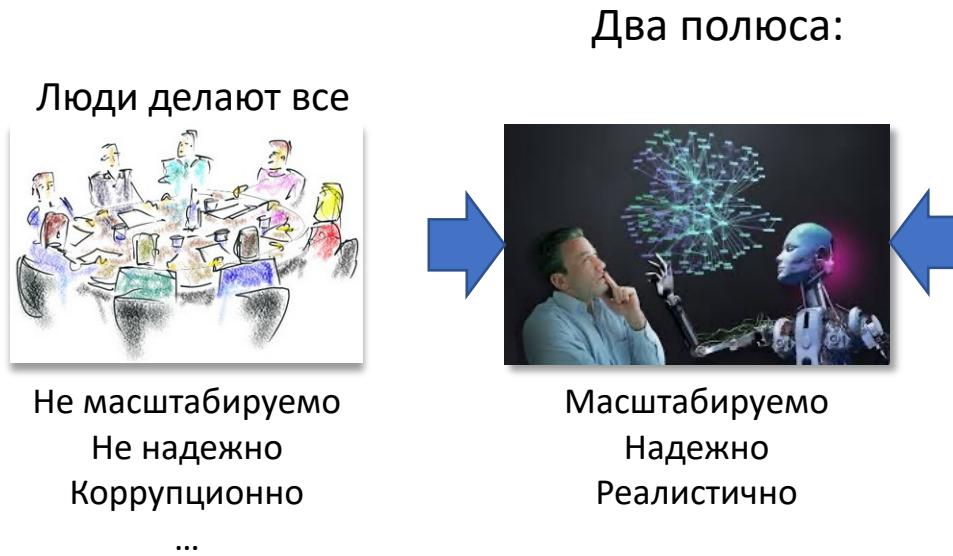


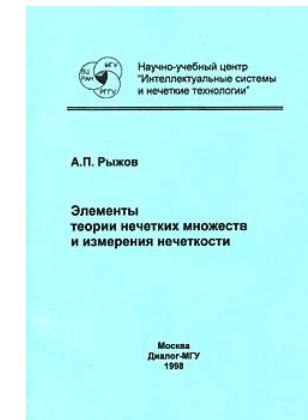
Гибридный интеллект

Презентация для встречи со студентами 2 курса 2021 г.

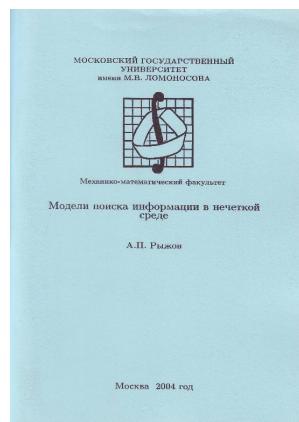
Гибридный Интеллект: основные проблемы



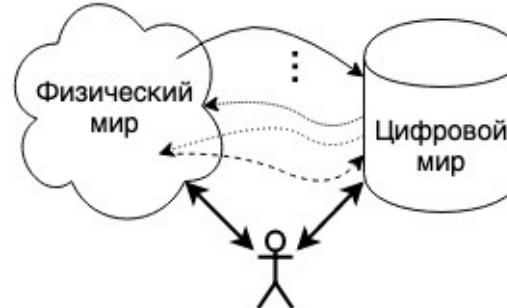
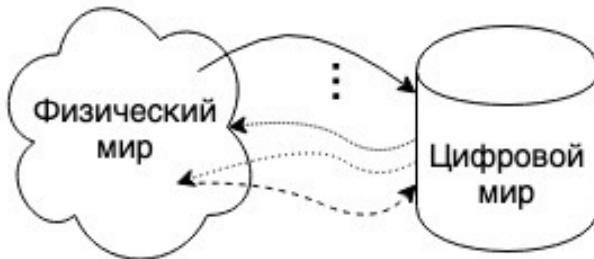
- Проблема 1 (Perception modelling):
Как мы описываем объекты окружающего мира? Можем ли мы описывать объекты самым надежным и самым эффективным для последующей обработки способом?
- Проблема 2 (Perception-base computing):
Как мы обрабатываем описания объектов, данные людьми (например, ищем, обобщаем, распознаем)? Можем ли мы оптимизировать эти процессы?



[http://www.intsys.msu.ru/staff/ryzhov/
FuzzyRetrieval2010.htm](http://www.intsys.msu.ru/staff/ryzhov/FuzzyRetrieval2010.htm)



Зачем нужен Гибридный Интеллект



IDC и Seagate:

- в 2016 году объем данных измерялся 16 Збайт
- к 2025 году этот показатель увеличится до 175 Збайт
- к 2025 году около 20% всей информации будут играть критически важную роль в повседневной жизни, а примерно 10% этих данных будут "сверхкритичными"

<https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf>

2019 This Is What Happens In An Internet Minute

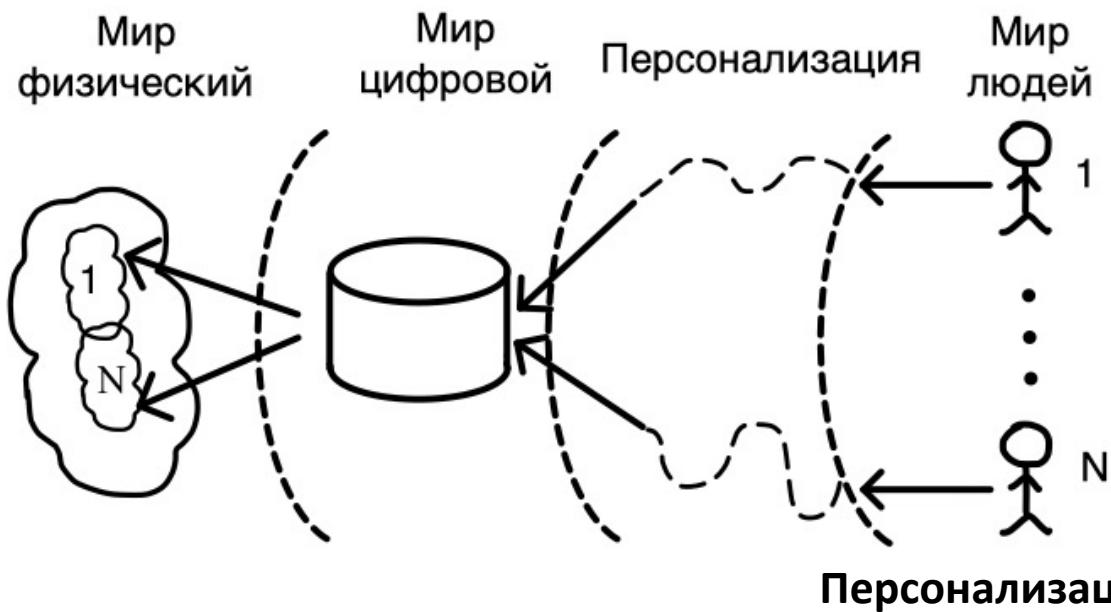


This is what happens in a minute on the internet

<https://www.weforum.org/agenda/2019/03/what-happens-in-an-internet-minute-in-2019>

Сценарии использования Гибридного ИНТЕЛЛЕКТА

МАГАТЭ
ФОИВ РФ
ЦПМ МЗ РФ
Cadence Design Systems



Оценка и мониторинг сложных процессов



- Поиск информации
- Компьютерное обучение (Uchi.ru)
- Дизайн (одежды, аксессуаров, жилья)
- Распознавание образов
- Анализ данных (ассоциативные правила)
- Социология (круги Донбара, социальные сети)



Полезные ссылки

- NSF: NSF's 10 big ideas - https://www.nsf.gov/news/special_reports/big_ideas/index.jsp
Big Idea #1 https://www.nsf.gov/news/special_reports/big_ideas/human_tech.jsp
(Building the **human-technology partnership**, **Augmenting** human performance)
- DARPA: Третья волна ИИ <https://www.darpa.mil/work-with-us/ai-next-campaign>
(DARPA research and development in **human-machine symbiosis** sets a **goal to partner with machines**)
- Whitehouse: Национальная стратегия США в области ИИ
<https://www.whitehouse.gov/wp-content/uploads/2019/06/National-AI-Research-and-Development-Strategic-Plan-2019-Update-June-2019.pdf?fbclid=IwAR3qk0nDr8-sGAqaJnch2m8-asO1JS1D9DjvapEEBth2CA9y5M6-thfhKIY>
(Increase understanding of how to create AI systems that **effectively complement and augment human capabilities**)
- Stanford founded the Institute for Human-Centered AI (HAI) : to guide and build the future of AI <https://hai.stanford.edu/>
- Google's \$5 Mn Funded AI Institute Will Explore Human-AI Interactions
(<https://analyticsindiamag.com/googles-5-mn-funded-ai-institute-will-explore-human-ai-interactions/>)



The screenshot shows the NSF homepage with a prominent banner for 'NSF'S 10 BIG IDEAS'. The banner features a stylized profile of a human head filled with gears, set against a dark background with a network of glowing nodes. Below the banner, text explains the initiative's purpose: 'Since 2017, NSF has been building a foundation for the Big Ideas through pioneering research and pilot activities. In 2019, NSF will invest \$50 million in each Big Idea and continue to identify and support emerging opportunities for U.S. leadership in Big Ideas that serve the Nation's future.' Below the banner, there are six categories: Future of Work, Growing Convergence Research, Harnessing the Data Revolution, Micro-scale Research, Navigating the New Arctic, and Understanding the Rules of Life. At the bottom, it says 'Technology' and 'Norris research to understand design new technologies to emerge socio-technological learning with technology.'



The screenshot shows the DARPA website with a banner for 'AI Next Campaign'. The banner features the DARPA logo and the text 'Defense Advanced Research Projects Agency > Work With Us'. Below the banner, there is a section titled 'AI NEXT CAMPAIGN' with three sub-sections: 'AI Exploration', 'Ongoing AI Programs', and 'AI Colloquium'. Each sub-section has a brief description and a small image.



For more than five decades, DARPA has been a leader in generating groundbreaking research and development (R&D) that facilitated the advancement of learning based AI technologies. Today, DARPA continues to fund a broad portfolio of R&D programs, ranging from basic research to applied development. DARPA believes this future, where AI can be used to support decision making, will bring significant benefits to society. The AI Next Campaign will help to ensure that the AI research and development landscape remains dynamic and innovative, and that AI technologies continue to be developed in a responsible and ethical manner.



THE NATIONAL
ARTIFICIAL INTELLIGENCE
RESEARCH AND DEVELOPMENT
STRATEGIC PLAN: 2019 UPDATE

A Report by the
SELECT COMMITTEE ON ARTIFICIAL INTELLIGENCE
of the
NATIONAL SCIENCE & TECHNOLOGY COUNCIL

JUNE 2019

Очень полезные ссылки



William Ross Ashby: "***Intellectual power, like physical power, can be amplified. Let no one say that it cannot be done, for the gene-patterns do it every time they form a brain that grows up to be something better than the gene-pattern could have specified in detail. What is new is that we can now do it synthetically, consciously, deliberately***"
(Ashby, W.R., (1956). *An Introduction to Cybernetics*. London, UK: Chapman and Hall, 1956 (p. 271). Retrieved from <http://pespmc1.vub.ac.be/books/IntroCyb.pdf>)

Joseph Carl Robnett Licklider : "***Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership... Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform them***"
(Licklider, J.C.R., (1960). Man-Computer Symbiosis. *IRE Transactions on Human Factors in Electronics*, vol. HFE-1, 4-11 (p. 4) Retrieved from <http://groups.csail.mit.edu/medg/people/psz/Licklider.html>)



Самые полезные ссылки



In a paper published in 1961 entitled “From Circuit Theory to System Theory” ... I wrote:

“There is a fairly wide gap between what might be regarded as ‘animate’ system theorists and ‘inanimate’ system theorists at the present time, and it is not at all certain that this gap will be narrowed, much less closed, in the near future. There are some who feel that this gap reflects the fundamental inadequacy of conventional mathematics—the mathematics of precisely-defined points, functions, sets, probability measures, etc.—for coping with the analysis of biological systems, and that to deal effectively with such systems, which are generally orders of magnitude more complex than man-made systems, **we need a radically different kind of mathematics**, the mathematics of fuzzy or cloudy quantities which are not describable in terms of probability distributions. Indeed, the need for such mathematics is becoming increasingly apparent even in the realm of inanimate systems, for in most practical cases the *a priori* data as well as the criteria by which the performance of a man-made system are judged are far from being precisely specified or having accurately-known probability distributions.”

It was this observation that motivated my development of the theory of fuzzy sets, starting with the 1965 paper “Fuzzy Sets”, which was published in *Information and Control*.

From Computing with Numbers to Computing with Words. From Manipulation of Measurements to Manipulation of Perceptions. - IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—I: FUNDAMENTAL THEORY AND APPLICATIONS, VOL. 45, NO. 1, JANUARY 1999
(<https://ieeexplore.ieee.org/document/739259>)

“The advent of the Computer age has stimulated a rapid expansion in the use of quantitative techniques for the analysis of economic, urban, social, biological and other types of systems in which it is the animate rather than inanimate behavior of system constituents that plays a dominant role. At present, most of the techniques employed for the analysis of *humanistic*, i. e., human-centred systems are adaptations of the methods that have been developed over a long period of time for dealing with *mechanistic* systems, i. e., physical systems governed in the main by the laws of mechanics, electromagnetism, and thermodynamics. The remarkable successes of these methods in unraveling the secrets of nature and enabling us to build better and better machines have inspired a widely held belief that the same or similar techniques can be applied with comparable effectiveness to the analysis of humanistic systems.... It is in this sense that **precise quantitative analyses of the behavior of humanistic systems are not likely to have much relevance** to the real-world societal, political, economic, and other types of problems which involve humans either as individuals or groups.”

Outline of a New Approach to the Analysis of Complex Systems and Decision Processes (IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS, VOL. SMC-3, NO. 1, JANUARY 1973 - <https://pdfs.semanticscholar.org/1c08/0ebc575e1524f09cc1cb250cd087551b0989.pdf>)

Будьте здоровы!



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<http://www.intsys.msu.ru/en/staff/ryzhov>



http://itm.ranepa.ru/node/566?fbclid=IwAR0uA8ELkZWv7WapvnESnmbbMlZj3_CXjsEW37E0QsUe05tsbIOxd6xtRg

Также можно посмотреть:

- Big Data --
<https://www.youtube.com/watch?v=1bo27Jkn5OI>
- Гибридный Интеллект --
<https://www.youtube.com/watch?v=IK0EATttbww>

Темы дипломных работ 2019:

- О поляризации групп в моделях влияния в социальных сетях
- Прогнозирование продаж новых продуктов методом сравнения
- Построение психологического портрета методами анализа данных
- Разработка методов расчета границы принятия решений скоринговых моделей с учетом пассивов и активов банка

Темы дипломных работ 2020:

- Персонализация поиска информации средствами нечётких множеств
- Построение модели машинного обучения для прогнозирования доверенности пользователя видеозвонком по статистике соединения
- О зависимости качества ассоциативных правил от метода дискретизации числовых переменных
- О задачах теории игр с нечёткими множествами
- Применение алгоритмов машинного обучения для текстовой задачи

Темы дипломных работ 2021:

- О структурах социального взаимодействия людей и моделях социальных сетей
- Построение многофакторной регрессионной модели рейтинга университетов
- О возможности оптимизации гибридных интеллектуальных систем прогнозирования