



GraphGrail Ai – Artificial Intelligence platform for Blockchain



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Introduction — What is GraphGrail Ai

GraphGrail Ai is the world's first artificial intelligence platform for blockchain built on the basis of natural language processing technologies with a marketplace of decentralized applications.

Our mission is the creation of a strong Artificial Intelligence (AGI), which would be open to the entire community and controlled and enhanced by the efforts of developers from all over the world.

Just as much as Elon Musk is organizing an OpenAI, we are developing an artificial intelligence ecosystem. But at the same time we are focusing on developing an understanding of natural languages, complex analysis of meaning and inference, as well as smart solutions.

We are developing a platform for analyzing large amounts of text data, solving problems of extracting knowledge and complex semantic classification on the basis of machine learning, neural networks and Deep Learning Technologies with a priority focus on the banking sector, retail, digital, biotech and medicine, security and law enforcement.

For the last two years, our team has been conducting research and development (R&D) in natural language analysis (NLP), Information Retrieval and the training of artificial neural networks. The result was the design of language models, which allow any user to simply create a construct and train a neural network for a variety of tasks. The scope of applications is broad and spans from spam model identification to distinguishing text styles and searches for fakes based on language attributes, to testing complex conditions in smart contracts on blockchain.

The platform consists of three key platform elements - the universal designer of language applications – the GraphGrail Ai Designer, the ecosystem of crowdsourcing data markup and the enrichment of data-sets – the GraphGrail Ai LabelLance, and the marketplace of ready-made applications – the GraphGrail Ai Marketplace.



Terms

No Programming (GraphGrail Ai Designer)

The application allows anyone to create their own language applications with an easy-to-use constructor. On the GraphGrail AI platform, anyone can create and train neural networks for various tasks, including complex classification using Google Tensorflow and other tools. Development of chat-bots for business, analysis of products and services in media, definition of authorship in the style of the text, precise definition of emotions in phrases - and all this and much more becomes possible without the application of programming.

Data Markup (GraphGrail Ai LabelLance)

The given applications allows the creation of datasets from data using rich platform capabilities, such as tree-classification and predefined lexical and semantic features. Users from all over the world will be able to mark out masses of text data in their own language and help businesses in areas they specialize in. An important feature of the platform is that it provides a full cycle of work with data, from collection and markup all the way to the final result.

Business executives, startup owners, developers, data-science experts and many others will have at their disposal a rich API and the ability to create custom applications for integration into their services and applications. Thus, we give other companies the opportunity to make AI solutions on our service and apply them in their businesses.

Marketplace applications (GraphGrail Ai Marketplace)

Users can monetize their activities on the platform by creating and selling their linguistic applications. Such undertakings are profitable for data-science professionals and businesses. Users from all over the world without special knowledge will have the opportunity to earn on the platform by creating, improving and voting for language models. To do this, the project implements the GAI (Graphgrail + AI - Artificial intelligence) Token based on the Ethereum blockchain network. In this case, the models can be different and include complex semantic classification, predictive or the best workflows for training neural networks.

Ai Laboratory (GraphGrail Ai Lab)

In the Laboratory of Artificial Intelligence, researchers and data analysis specialists from around the world will be able to develop and test new and promising solutions (RnD). The laboratory will become a platform for improving existing solutions and a powerful impetus for the creation of new ones that do not yet exist, creating completely new markets, such as strong conversational chat-bots, automatic summarization of scientific data, personal assistants and much more.



The Problem We Solve

Absence of data: both raw and processed

Today, there is not a single full-cycle service on the market that provides the possibility of creating linguistic models without programming. As a rule, this task is solved by other companies with the involvement of programmers and takes from 5 to 12 months for one subject area.

Why so long?

The fundamental problem of the Artificial Intelligence market, text data analytics, machine learning and the practice of using neural networks is the lack of sufficient data.

What follows is a step-by-step, in-depth analysis of how businesses solve problems, for example, the issue of analyzing products and services in comparison with competitors:

1. In many branches there are no publicly available text databases as they need to be collected, cleared and depersonalized.
2. Even if there is data, it is insufficient and requires from several thousand to millions of samples to apply machine learning.
3. The data is not labeled for the task as dozens of man-hours are required for markup and only after that it becomes possible to apply most learning algorithms.
4. As a result, it becomes possible to train a neural network. But only once.
5. The data quickly become obsolete as constant updating of text arrays with up-to-date information is required, and it is therefore necessary to supplement the model, that is, to repeat steps 1-4.
6. Throughout the process, the business pays for the work of specialists who, as a rule, are expensive and work only when the model needs to be retrained.

Every company solves the problem of searching for datasets using its own resources. There are no datasets in public domains. Meanwhile, linguists have access to open sources of texts, such as Wordnet (<https://wordnet.princeton.edu>) or NCRP (<http://www.ruscorpora.ru>), etc. Many areas of human activity have no such dedicated resources, which translates into the need to spend hundreds of man-hours of work of programmers for every company that wants to extract knowledge from text data.

The GraphGrail Ai team has also encountered this problem when developing a model for one of its customers, as there are no ready-made, mapped datasets in public domains. In addition, the markup is very complex and it is necessary to take into account a number of composite features when determining language attributes.

Our development solves this fundamental problem and provides a simple and intuitive interface for creating a domain model and subsequent machine learning. There are no comparable products on the market as of yet.



4.1. - AI IS NOT AVAILABLE TO PEOPLE WITHOUT SPECIAL KNOWLEDGE

Small and medium-sized businesses spend money to pay employees who perform simple functions that are easily amenable to automation using AI.

Businesses do not know about the possibility of using AI for the automation of routine business processes, and therefore continue to resort to human labor in the processing of information, or the so-called Big data area.

There is a wide variety of routine operations that can be automated by implementing AI solutions:

- Answers to frequently asked questions to customer support, sales departments and call centers;
- Filling of postal, legal, accounting documents, reports etc.;
- Analysis and reviews of products, individuals and companies.

Nowadays, to take advantage of technology, it is necessary to hire and manage a staff of highly qualified specialists in the field of data analysis, and this, by virtue of a very limited range of business customers, is difficult and expensive.

4.2. - MONOPOLIZATION OF THE MARKET.

The world's largest companies receive the greatest benefits from the development of artificial intelligence. Firstly, they already have significant financial resources for buying technology and hiring top-talented specialists. Secondly, they already have large datasets specific to their products and a large number of customers who provide constant data inflows in the process of using them. Thirdly, they control the full cycle of using their products and can therefore quickly field and test new AI solutions to improve their products.

This concentration creates barriers to entry to new and innovative start-ups to the market, which may have solutions that exceed the capabilities of large companies, but cannot test them on large data, and this slows the progress of the artificial intelligence industry as a whole. Moreover, large companies receive all the benefits from the use of artificial intelligence in the form of better productivity and better products and, as a result, accumulate wealth, while potentially killing competition.

In the end, cheaper production and competition, even among large companies, will lead to a decrease in the cost of solutions and an increase in their quality. PwC estimates these factors as the basis for economic growth.

The strategy of large companies for accumulating knowledge, talents and technologies is well understood. One of the analysts in the field of AI, Andrew Ng, calls this Virtuous Cycle of AI - a closed cycle of development of AI. This is a common pattern and the reason why companies are constantly improving their products.

Figure 2. Virtuous Cycle of AI - a closed cycle of development of AI with constant improvement of products



4.3. - PROBLEMS WITH THE TECHNOLOGY:

All modern text and dialogue systems and chat-bots have significant shortcomings as there are many functions in these services that are detrimental to the effectiveness of solving specific business problems. In an effort to create a universal chat-bot, programmers often fail to work out individual components, which reduces the effectiveness of the bot's work.

The simplest algorithms are based on rules. These rules are difficult and expensive to maintain as they must be constantly updated for each business segment.

Imperfect interfaces are another issue. Communication with chat-bots is usually done via texting. Artificial intelligence does not always understand what is being asked and cannot react to emotions.

Commercial chat-bots are generally inconceivable without programming as any non-standard bot actions require written code. The tasks that the programmer must solve are complex and extensive, some of which include:

- Making the bot understand speech patterns.
- Creating algorithms for finding the best answer (no context understanding).
- Integrating with third-party APIs.
- Writing other algorithms for processing and issuing data.

Our Customers

Blockchain Companies

The GraphGrail Ai platform is a meta-service designed to dramatically accelerate the creation of new companies and start-ups in data analysis and blockchain.

Application Cases:

1) The service will be useful inside the ecosystem of blockchain networks for checking whether the external conditions have been met on smart contracts. The conditions can be very diverse and related to the factors of the outside world, such as people, companies and their interactions:

- Meetings of businessmen and politicians;
- Conclusions of contracts;
- Buying or selling of companies;
- Judgments;
- Tracks of supply chain;



- Analysis of the news backgrounds and the stock markets;
- Changing of weather patterns;
- The onset of terms.

With the help of Oracle for smart contracts, GraphGrail Ai automates the verification of the terms of smart contracts and reduces the risks of arbitration between counterparties.

2) Ensuring security when concluding contracts is of great relevance in the modern world. Conditions of force majeure, which occur in exceptional cases, can be prescribed in smart contracts. It is necessary to automatically check these conditions on the basis of trusted external sources with analysis of unstructured information.

For example: two companies have concluded a supply agreement. However, the external conditions have changed significantly. It could be weather conditions (strong wind, low temperature, humidity, etc.), political factors (abolition or adoption of a law) or situational issues (another supplier could not deliver the components).

The GraphGrail Ai platform solves the task of providing data to a smart contract by accessing external sources, such as media, social networks, Wikipedia, etc., collecting and analyzing data important to the contract and providing the contractor with a basis for deciding whether to execute it or not. That is, it is a procedure that provides the foundation of matching for transactions.

Implementation on Sidechain

Sidechain is a new blockchain system based on the parent Bitcoin chain (for example). Sidechains implement new financial ecosystems through integration into Bitcoin, which distinguishes them from other cryptocurrencies, which ignore existing networks. Using sidechains, we can easily create all sorts of smart financial contracts, stocks, futures, derivatives and much more. On the basis of Bitcoin, one can create an innumerable set of sidechains with different tasks and features, whose assets will depend on the volatility of the main chain. Based on this, the sidechain contributes to the further expansion of the field of application and innovative space for blockchain technology. This allows traditional blockchains to support several types of assets, small payments, smart contracts, safe transactions, registration of real property rights, etc., and also increase the confidentiality of blockchain transactions.

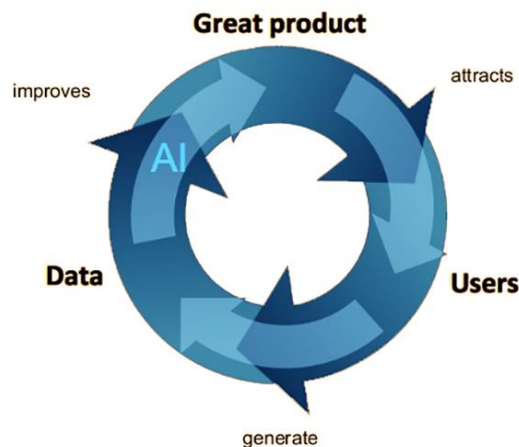


Figure 2. The main problem of smart contracts: in step 2, a smart contract almost never can reliably verify the fulfillment of a condition from the outside world

Smart contracts with the help of trained AI will become really smart.

3) Acquiring, lending and accounting will also use smart contracts - for example, for risk assessment and auditing in real time. Lawyers will be able to move from drawing up traditional contracts to creating model samples of smart contracts.

Also, the service solves a large number of business tasks. In fact, it is an AI designer, which allows developers to create solutions for a particular business (like the Microsoft Azure cloud platform, Unity game designer or Wix site constructor).

4) Predictive analytics. Based on Steemit and Golos.io, custom solutions will be able to collect and analyze posts about cryptocurrencies and provide a dashboard-adviser with a help function in trading and notifications about the danger of falling cryptocurrency exchange rates depending on the tonality of the news gathered.

5) Personal analysis of spam and filtering of interesting messages (Big data). For example, in Telegram, 100-200 messages per hour appear in each active chat, which the user does not have enough time to read, even with the desire to do so. A solution is needed to find useful messages for each thematic chat and for each individual user. After all, each person's goals in chats are different. Someone will use a GraphGrail Ai solution to find business proposals, someone will track news, another will monitor relevant experience of participants, and so on.

GraphGrail Ai is the "brain" for smart contracts.

5.1 OUR CUSTOMERS:

Existing Business



Currently, the service is used for analytics for business and government agencies, including tasks, such as analyzing business products (problems with products, negativity, etc.), searching for agitation or illegal statements.

At the current stage, the following cases in which the GraphGrail Ai platform is used are in operation:

1. Administration of the Rostov region. (working case)

Monitoring of city problems.

An instrument for increasing control and effectiveness of the state management apparatus. The main value of the application resides in informing authorities about acute urban issues (flooding, housing and public services disruptions, lack of manholes, strikes of dissatisfied co-investors, etc.). The system works on the anticipation principle, allowing monitoring city problems in social networks as they emerge and solving them promptly. The system reports of an emerging issue and notifies the city administration before the issue develops further. Currently, in such cases, authorities are informed of facts, when the media releases reports. The system works as intelligence for future events as opposed to modern methods, which deal with events that have come to pass and are history, rather than intelligence.

Similar tasks in a non-related field:

2. Digital agency for KFC - fast food network (negotiations ongoing)

Search, collection and classification of feedback on network products at the level of regional service with the aim of improving quality, offers and rapid, centralized regulation of conflict situations.

3. Mysmart.chat chat-bot sales assistant (conversational agent, working case)

Classification of calls made to customer service departments and selection of the most effective answers. This is an application tool for automating sales based on script for synthesis of typical questions addressed to sales departments / customer support services in order to automate replies, thus reducing the waiting time for customer responses, improving the efficiency of sales scripts and completely eliminating loss of calls due to human factors.

The second case, which the team has significantly focused on, is the case of the smart chat-bot (preliminarily named "MUCH"). The chat bot can sell products, and its main distinction from regular chat-bots is that it really is smart. It is able to usher the user to the sale stage better and more efficiently than regular chat bots. Within the framework of this case, the team is in the process of finalizing the algorithm of user interaction and integration of system components related to the chat-bot and to the GraphGrail AI. There will be an increase in the percentage of successful sales as the chat-bot will provide interfaces to end users, such as online stores, and small and medium businesses, which receive multiple similar questions at the initial input stage. Such a chat-bot frees people from answering comparable questions, as the solution is formulated by language components, which include the classification of requests (questions and answers that the user poses to the chat-bot), and the relevance of proposals (questions). Thus, the GraphGrail AI completely solves the issue of linguistic complications, classifications, determination of relevance, and use of algorithms, such as LDA, Word2vec.



Similar tasks in a non-related field:

Best Call, a Call Center - Calling potential clients based on customer scripts (negotiations ongoing)

This is an instrument aimed at increasing the effectiveness of calls. Analysis and classification of incoming questions in order to automate the provision of relevant answers. A script is analyzed and corrected with the help of random issuing of answers, according to which calls are conducted later on.

4. StatZilla - Data analysis for business, determination of the probability of purchases (working case). Automated markup of text data and categorization for custom tasks.

This case involves analysis of the syntax and morphology of texts for the purpose of their semantic classification.

The case and its application was designed specifically for video hosting owners as such users are interested in the popularity of videos being reeled at specific timeframes.

Video hosting masters are in need of such applications as they are necessary for ensuring balance of various video topics on video hostings. Variety ensures that the masters of hostings receive earnings from selling advertisements of such videos. A lack of advertisements would mean lost traffic and revenues, while a lack of variety on channels would result in loss of audiences to other channels.

GraphGrail Ai has come up with a solution to the issue through the development of specialized interfaces, which allow for compilation of solutions for segmenting videos depending on the textual headlines of videos by topic. Thus, information is provided on more popular topics, both its video hosting and the hosting of competitors. As a result, potential imbalances in certain topics are identified, thus helping to adjust media policies of resources, thereby increasing profitability.

In the near future, traditional business will begin a large-scale transition to blockchain technology and GraphGrail Ai will be ready to provide services in data analytics that business was accustomed to before the boom of blockchain technologies:

- Speech recognition services. Audio is transcribed into text and the service for analysis of speech is applied.
- Services for banks. Analysis and identification of fraud in posts. Such fraud takes on many forms from cards, banks, phones, anywhere. The system itself will find such posts without manual reading of the text.
- State structures. Analysis of society, conducting research and analysis of opinions of broad public masses. Election commissions can use the service to identify unlawful campaigning.
- Politicians. Political parties, deputies, senators and congressmen will be able to use the service to monitor public opinion about persons, events and phenomena.
- Fake news. Fake news is an informational hoax or deliberate dissemination of misinformation in social media and traditional media for the purpose of misleading in order to obtain financial or political benefits. The authors of fake news often use catchy headlines or completely fabricated stories to increase readership and citations. Largest companies from the media industry were involved in the fight against fakes, including Facebook. But the problem lies



in the fact that it is often impossible to establish the authenticity of news before checking the facts. GraphGrail Ai provides a tool for developing a fake news identification model based on linguistic attributes inherent to fake news.

- **Fraud.** GraphGrail Ai is able to adapt to changing business conditions and identify reports or complaints about fraud in a variety of industries, including new ones, for which there is no historical data as of yet.
- **Question-answer systems.** GraphGrail Ai solves the task of an intelligent helper for operators of support services, selecting answers relevant to issues, thus significantly reducing the time and complexity of supporting thousands of users.

5.2 OUR CUSTOMERS:

Roles

Positions in companies whose work is automated by our service:

1. Monitoring feedback and comments

Position - analyst.

Daily mandatory scenario: finding and collecting feedback and comments, classifying them into positive and negative, drawing up reports and recommendations for guidance.

Decision. Trained neural network + parser, automatically collecting necessary data in the network and accumulating it in the database of our platform.

Result. Saving time for collection and classification, full coverage of sources of opinions, instant awareness of users of reports on social moods.

2. Classification of questions and appeals to managers

Position - Manager.

Daily mandatory scenario: monitoring of appeals, answering typical and unique questions, classifying clients and sources of their references.

Decision. Trained neural network + chat-bot answering machine that selects answers based on their defined category of questions + database with a history of appeals classified as successful and unsuccessful for selection and optimization of answers for each category of questions.

Result. Saved time on monitoring calls, instant answers to typical questions, as a result of reduced customer waiting time and saved time on dialing messages, optimized instructions for working with clients through automated collection and analysis of the most effective answers.

3. Analysis and classification of texts

Position - Linguist

Daily mandatory scenario: reading texts, classifying and sorting texts, drawing up reports on



the quantitative and qualitative composition of texts, creating language models, analyzing the morphology and syntax for training neural networks, preparing training samples and datasets for training neural networks.

Decision. Neural network + morphological analysis module + syntactic analysis module + classifier (multiclass).

Result. Automation of processes at each stage of Big Data processing, training of a neural network on a pre-installed architecture, saving resources on the use of computing power (GraphGrail Ai partners in the field of cloud processing and data storage), constant improvement of the accuracy of results due to the permanent training and retraining of neural networks.

Market analysis:

According to IDC analysts, for a third of Fortune 500 companies, revenues from information products will double by 50% by the end of 2017 compared to the rest of the range of products and services. An important source of revenue will be the monetization of data. The amount of data created in the world (10 zettabytes in 2015) will grow to 163 zettabytes by 2025. In addition, IDC expects that more than a quarter of this data will, by virtue of its nature, be real-time data with 95% coming from the Internet of things.

The collection of data for analysis is one of the main purposes of the Internet of things platforms. To solve this problem, developers are moving to training and automation of systems with the help of artificial intelligence (AI). In 2018, investment in AI systems is expected to increase, as companies see real benefits from these investments.

According to the data set out in the review article of Forbes, the data analytics market expects rapid growth [2]. According to IDC analysts [3], the world market (PAM) of large data analysis will amount to \$ 187 billion in 2019 with a growth of more than 50% in a five-year period.

By 2020, predictive analytics will attract 40% of gross investment in business solutions. According to Wikibon [4], the Big Data market will grow from \$ 18.3 billion in 2014 up to 92.2 billion dollars with an annual growth (CAGR) of 14.4%.

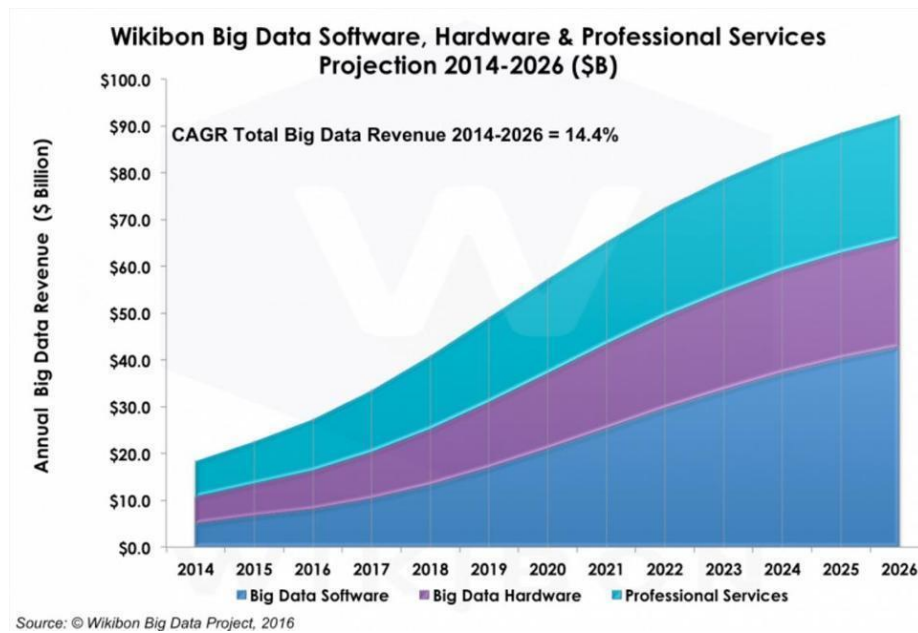
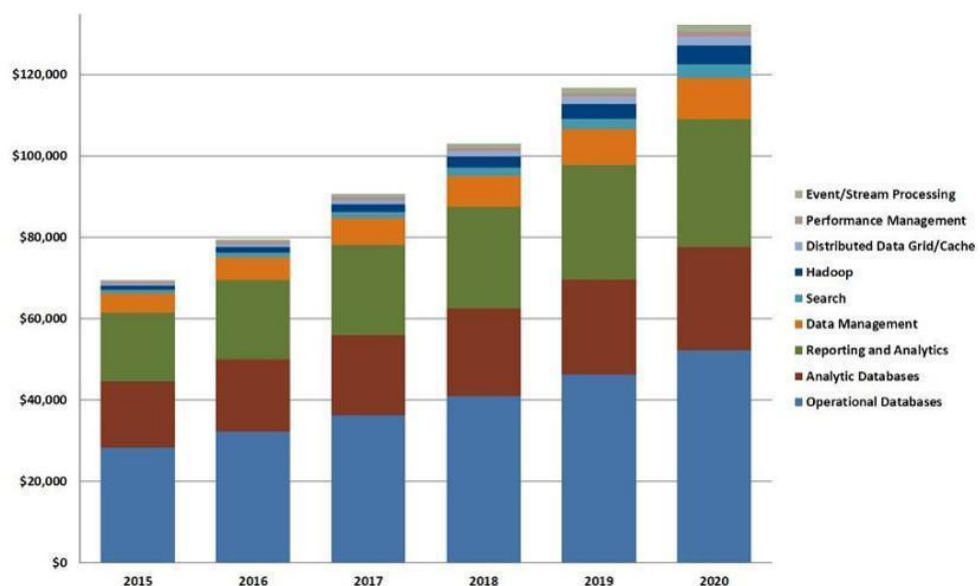


Figure 3. Growth of the Big Data sector will be 14.4% per year

IDC also predicts [5] that global costs for cognitive systems will reach about \$ 31.3 billion with an annual growth rate (CAGR) of 55%. More than 40% of the costs for cognitive systems will go to software, including complex cognitive solutions (namely: text and enriched media data, tagging, searching, machine learning, categorization, clustering, hypothesis generation, question-answer systems, visualization, filtering, signaling and navigation).

Worldwide Total Data revenue by segment (\$M) 2015-2020



Source: Market Monitor: Total Data, Q2 2016

Figure 4. Revenues of the world market for data analysis by segments

Service 451 Research’s Total Data Market Monitor also predicts [6] the growth of the data analysis market to 132 billion dollars in 2020.

Statistical service of the Statistician predicts [7] the revenues of the Artificial Intelligence market by 2025 at a rate of \$ 59 billion. .

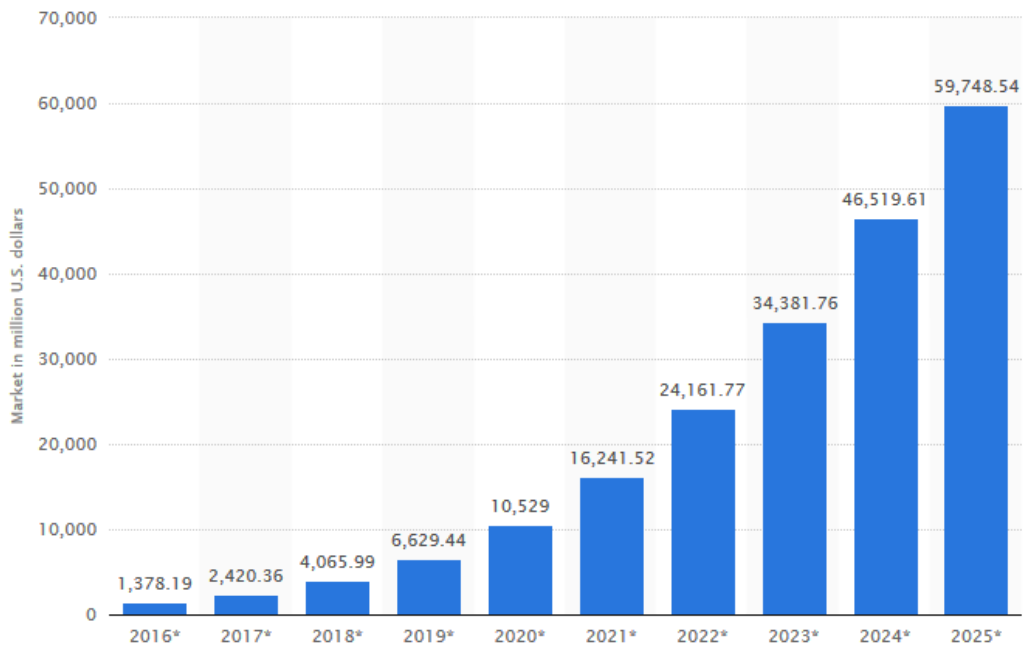


Figure 5. Revenues of the world market of Artificial Intelligence, from 2016 to 2025 (in millions of US dollars). Revenues from the artificial intelligence (AI) market worldwide, from 2016 to 2025 (in million U.S. dollars)

The main drivers of the market are social networks (including future blockchain giants like Status), messengers, startups, developing chat bots, smart assistants.

Report of the analytical company CB Insights on the market of artificial intelligence.

From 2012 to early 2017, startups in the field of AI have attracted 2320 rounds of investments in the amount of 15.4 billion dollars.

Since 2012, corporations have acquired more than 200 startups in the field of artificial intelligence. According to the number of acquisitions, Google leads as it bought 11 companies. In second place is Apple (7 acquisitions), and in the third place is Facebook (5 companies).

Why is artificial intelligence gaining momentum right now? After all, scientists have been engaged in cognitive technology development for more than 70 years. Two factors have coincided and have brought about this change - the growth of data volumes (the so-called big data) and the emergence of powerful processors capable of processing this data relatively quickly.

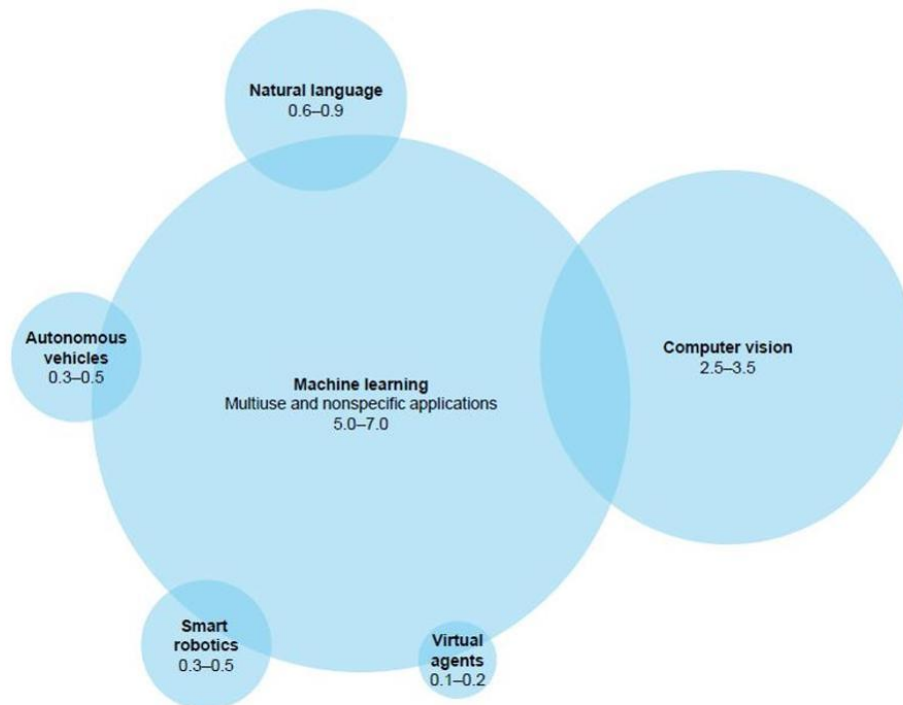
Nvidia, which specializes in fast processors for gamers, now officially states that its equipment can be used to train neural networks.

In the report, startups are considered to be standing at the junction of artificial intelligence and other spheres (medicine, education, commerce, etc.)

The natural language processing market (NLP) in 2016 was estimated by Market And Markets at \$7.63 billion, with growth to 2021 to \$16.07 billion, with an average growth rate of 16.1%. The company believes that the main drivers are the growing demand for a more advanced level of user experience, increased use of smart devices, increased investment in healthcare, the growing use of network and cloud business applications, and the growth of M2M technologies.

Machine learning received the most investment, although boundaries between technologies are not clear-cut

External investment in AI-focused companies by technology category, 2016¹
\$ billion



¹ Estimates consist of annual VC investment in AI-focused companies, PE investment in AI-related companies, and M&A by corporations. Includes only disclosed data available in databases, and assumes that all registered deals were completed within the year of transaction.

SOURCE: Capital IQ; Pitchbook; Dealogic; McKinsey Global Institute analysis

Figure 6. Investments in Artificial Intelligence, by categories, 2016

The market is growing rapidly. Artificial intelligence is creating a new market for communication with customers.

Developments in the field of creating bots on the basis of AI are also ongoing in companies like Facebook (FB, NASDAQ), Microsoft (MSFT, NASDAQ) and Google (GOOGL, NASDAQ). They are confident that the new technology will dramatically increase the efficiency of commercial applications.

Classical telephone services, such as a telephone informer, reduced the corporate costs of telephone services by more than 90%. Chat bots with artificial intelligence (AI) elements will open even more opportunities for interaction with customers and will ensure revenue growth for IT companies.

Bots based on artificial intelligence will advise clients on issues of services, accept complaints, wishes, sell goods and services. This will allow them to be most similar in communication with real human advisers.

Facebook has created a platform for commercial chat bots. Each company will be able to have its own chat-bot in Messenger and sell products and services directly to Facebook users.

Microsoft is developing artificial intelligence capable of understanding speech and able to communicate in speech, which will be implemented in the voice assistant Microsoft Cortana. According to Microsoft, the interaction of man and computer in a natural language will play an increasingly important role in our lives - from ordering pizza to writing programs.



6.1 COMPETITORS:

Among the competitors are:

IBM bought AlchemyAPI for \$ 100 million, in March 2015 (became the basis of Watson).

“Rostelecom” bought “Ikumen Ibs” for 525 million rubles, November 2015.

Google bought the API.ai, September 2016.

Data-processing startups continue to attract investment, the most recent ones are Narrativescience, Versive, Datamir.

The blockchain startup Numer.ai should also be noted, which solves the problem of retraining for data specialists, but it is more of a partner than a competitor.

Indirect competitors are services that monitor social networks. However, they are usually do not provide analysis, except for a simple positive / negative answer. These services include Youscan, Semanticforce, Wobot.

It is important that some of the services of competitors, although powerful, do not provide sophisticated semantic analysis and their capabilities are limited to extracting named entities (Named Entity Recognition). They do not provide convenient interfaces for working with text data, often you have to use several different solutions, facing problems of exporting and importing data, etc. They also do not work well enough with Russian and other inflectional languages, that is, languages with a free order of words.

Segments:

<https://narrativescience.com/> - the system of intellectual "narratives" - communication tools for business. The disadvantage is the complex integration of solutions.

<https://dandelion.eu/> is a useful service that provides typical language solutions for the API, such as classification, tonality, mentions of named entities. The service is not configured at all for the specific business sector of the client, and therefore often mistakes and produces an irrelevant result.

<https://rapidminer.com/> - AI designer for specialists in data analysis. The service can not be configured for the client due to the lack of data-specific client-specific data centers.

<https://datascience.ibm.com/>

IBM Data Science Experience is an environment that provides everything necessary for successful data analysis. Experience is an interactive cloud collaboration environment in which data professionals can implement their ideas with multiple tools.

Professionals in the field of data management can use the best open technologies and unique functions of IBM, expand their capabilities and share successes.

<https://www.ibm.com/en-us/marketplace/social-media-data-analysis>

IBM Watson Analytics for Social Media helps understand traffic of social networks and



automatically creates visual representations of data to identify valuable information, all in a cloud environment.

Microsoft Azure Machine Learning Studio (<https://studio.azureml.net/>), as well as the IBM Watson product line of services from Microsoft are extremely complicated to use and not designed for language analytics as they include disparate algorithms that are inconvenient to use, support and train. Their main focus is on predictive analytics, Focus is also shifted to other branches of AI, such as analysis of numerical data, images, etc.

Toloka (<https://toloka.yandex.ru/>) is a Yandex service that uses Wisdom of crowd to solve data markup problems (analogous to the crowdsourcing platforms of Amazon Mechanical Turk, Clickworker and CrowdFlower).

People evaluate the relevance of reference documents to search queries so search-ranking formulas can be guided on their basis. People rewrite audio recordings into text, so that the voice recognition algorithm tunes in on text data. People mark images by categories, so that, after learning from these examples, the neural network would conduct such operations without human interference and better than people ever could.

The tasks mentioned above are solved traditionally in Yandex with the help of trained experts, or assessors. The assessors look at how the search results match the query, find spam among web pages, classify them and solve similar tasks in other services.

This is a niche service as it does not represent any language algorithms and its only purpose is to solve the task of data markup.

Innovation: How We Solve the Problem

We create an infrastructure for mass adaptation of AI to real business

The GraphGrail Ai ecosystem provides a unified solution for the analysis of text data. We offer all the necessary modules for the preparation and processing of data, including collection and parsing, cleaning, marking (tagging) with the help of an Ai-designer for building a language domain model, testing, machine learning and setting up neural networks for specific business tasks. A ready solution is placed in the decentralized marketplace and starts making money, thus negating the need to use other services and conduct complex integration as all tasks are solved on the GraphGrail Ai platform.

We provide data-science specialists from all over the world with the best tools for developing Artificial Intelligence built on the basis of several innovative components of the GraphGrail Ai ecosystem.

The recent successes of in-depth training and neural networks have spread to a wide range of applications and continue to spread from machine vision to speech recognition and many other tasks. Floating neural networks are the most effective in vision tasks, and recurrent neural networks have shown success in tasks of processing natural language, including in machine translation applications. However, in each case a specific neural network is projected for each



specific task.

This approach limits the use of in-depth training, because the design needs to be repeated for each new task. It also differs from how the human brain works, which can learn several tasks simultaneously and still benefit from transferring experience between tasks.

The GraphGrail Ai ecosystem will provide users with freedom in using various types of neural networks, including neural networks for knowledge transfer.

Markup - an innovation in addressing the lack of data (see Market Analysis section)

Stream in your own examples or real-world data from live APIs, update your model in real-time and chain models.

GraphGrail Ai is a workspace for specialists in the field of AI who can order work on marking (tagging, annotation):

1. Specification of any number of categories;
2. Provision of any nesting categories depending on the complexity and detail of the focus of business. Categories can be flat lists or complex ontology trees;
3. Automatic ontology building based on data. Thanks to our pre-model sets, the system is able to parse and prepare data from internal databases of business customers, thus reducing manual work;
4. Loading and editing ontologies with the support of various relationships, such as category-subcategory, part-whole (car - engine), relations of synonymy, antonyms;
5. The GraphGrail Ai ecosystem contains massive data sets with information on lexico-semantic features, based on partial semantic markup of texts. With this markup, most words in the text are attributed to one or more semantic and word-forming features, for example, 'person', 'substance', 'space', 'speed', 'movement', 'possession', 'human property', 'diminutive', 'verbal name', and so on. A facet classification is used, in which one word can fall into several classes.

Actually, lexico-semantic clutters are grouped according to the following fields:

1. Taxonomy (thematic class of a lexeme) - for nouns, adjectives, verbs and adverbs;
2. Mesiology (indication of the relationship "part - whole", "element - set") - for subject and non-name titles;
3. Topology (topological status of the designated object) - for subject names;
4. Causation - for verbs;
5. Service status - for verbs;
6. Evaluation - for subject and non-obvious names, adjectives and adverbs.

Examples (for nouns, verbs):

t: hum - person (person, teacher)

t: hum: etn - ethnonyms (Ethiopian, Italian)

t: hum: kin - relationships (brother, grandmother)

t: hum: supernat - supernatural beings (mermaid, aliens)

t: animal - animals (cow, giraffe, magpie, lizard, ant)



- t: plant - plants (birch, rose, grass)
- t: stuff - substances and materials (water, sand, dough, tin, silk)
- t: space - space and location (space, city, taiga, ravine, entrance)
- t: physq: color - colors (red, colorless)
- t: physq: taste - tastes (sour, luscious)
- t: physq: smell - smells (fragrant, rotten)
- t: physq: temper - temperature (hot, icy)
- t: move - movements (run, twitch, throw, carry)
- t: move: body - changes in the position of a body and body parts (bend, crouch, nestle)

Thus, pre-defined semantic features help AI application developers in marking data into complex semantic categories. The data partitioning subsystem is the foundation for further development of solutions, such as chat-bots, psychotherapists, storytellers according to a pre-set scenario, personalized assistants, analysis of the speaker's intentions, subtle analysis of sarcasm and irony in speech. In the future, developers will be able to collect more complex applications, for instance create bots with personality and thinking abilities who apply logical conclusions and understand the world around them, are aware of emotions and understand ethical principles and problems, feel and react to pain.

Algorithms are a system of components with algorithms for analyzing natural language, innovation on a synergetic effect. (<https://www.fundamental-research.ru/en/article/view?id=40899>). Thanks to the flexible architecture of the language components of GraphGrail Ai, the whole becomes larger than the sum of its parts, that is, the interaction of two or more strategic business units of the company in total gives more than the activity of each of them separately. At the same time, the emerging synergy can increase not only the value of the product or service for the consumer, but also sales as a whole, as well as contribute to a significant reduction in production costs within the organization.

The ecosystem uses cascades of algorithms to transfer knowledge between trained neural networks.

Algorithms:

1. The use of vector pre-models - word2vec and doc2vec. These vector models allow the automatic determination of the semantic proximity of words, such as synonyms and antonyms.
2. Latent Dirichlet allocation (LDA) allows for determining the proximity of the subjects of documents.
3. Proprietary development product: a technique of constructing linguistic models using ontology, which allows for extracting structured knowledge. We use a whole set of relationships, such as taxonomy (category-subcategory), part-whole, etc.
4. Specialized software tools for training artificial neural networks (RNN, LSTM) with the ability to save the resulting model to a file. Gensim (thematic modeling) and Sklearn (package for scientific data processing and machine learning).
5. Lda2vec - Word2vec simulates word-word relationships, while the LDA models the document-word relationship. The Lda2vec model tries to combine the best elements of both of the above models into one framework. The Lda2vec model is designed to build both document-based themes and word-based themes (simultaneously), and it is theoretically possible to use

the model for training with a teacher to create a so-called supervised topics with different parameters.

6. Models based on Neural Turing Machines <https://arxiv.org/pdf/1410.5401.pdf>

Ai-designer - an innovation in the design of language applications.

The GraphGrail Ai ecosystem designer is built in such a way that it provides multiple use of the same components in various business tasks without programming and complex settings. Components on the one hand are so simple that they are available for use by people without special technical knowledge. On the other hand, they are powerful and flexible enough to be able to assemble a complex end-to-end solution for business.

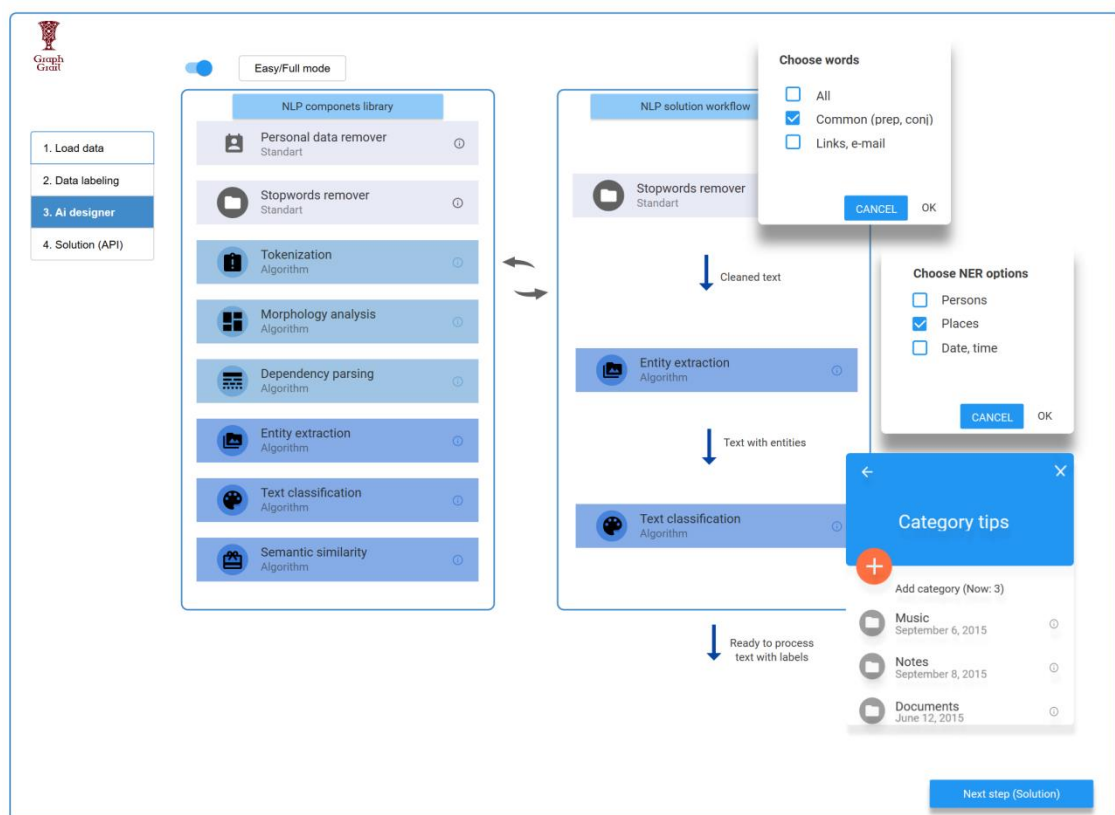


Figure 1. GraphGrail Ai designer - the designer of language applications with a set of components, libraries and algorithms

The Ai-designer provides platform participants with the following options:

1. The ability to combine in a single interface different levels of text semantic analysis, from low-level morphological and syntactic analysis to high-level pragmatic analysis;
2. The ability to flexibly configure the logic and workflow, such as the flow of text data and the order of application of algorithms;
3. The ability to create Agents, or independent applications from components that interact with each other and help each other solve complex tasks of artificial intelligence;
4. The ability to configure paylines in the application of algorithms and cascade sequential and parallel application of trained neural networks at various stages of processing text data

streams.

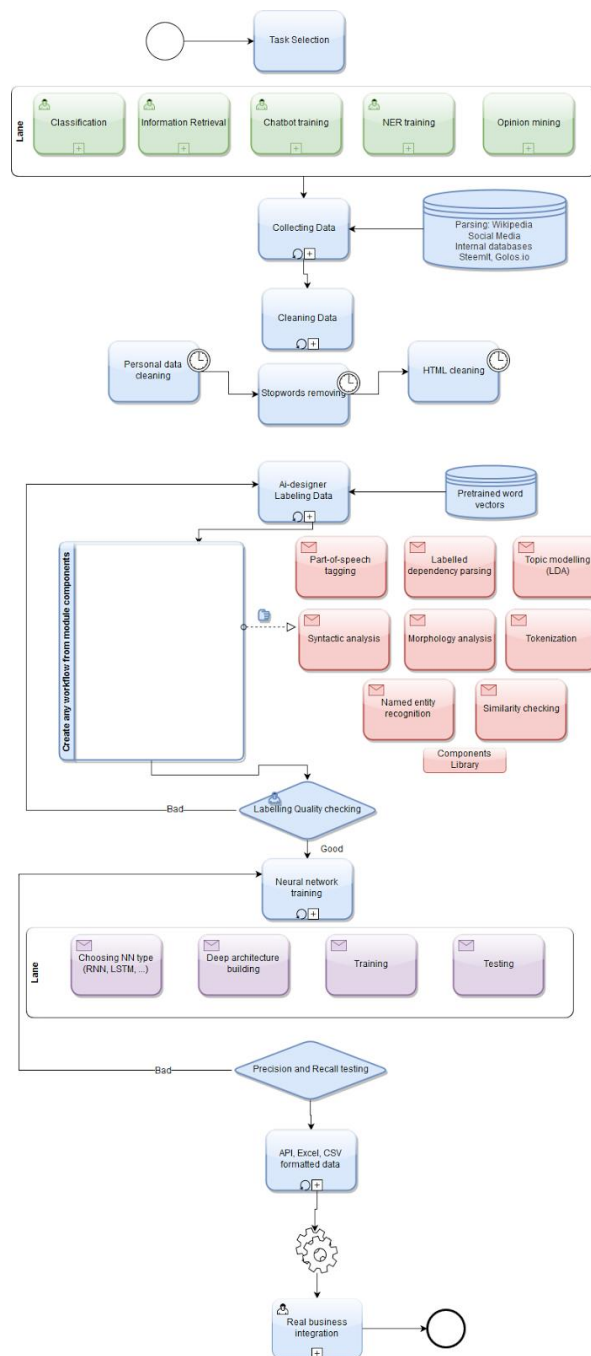


Figure 1. GraphGrail Ai designer – User work principle with the designer of language applications on the platform

Modern networks for successful learning require learning large data sets. They do not know how to understand something based on one or more examples. This makes it difficult to use them in areas, where large data sets have not been created. At the same time, a couple of particular examples are often enough for a person to make a deep generalization. Retraining (overfitting) prevents modern networks from summarizing based on a small number of samples. The fact is that when there are few samples and the subject area is complex (that is, many parameters need to be described for its description), then the network remembers special cases instead of deep generalization. As such, it shows good results on the training sample, and poor results on the test sample, as there are other special cases involved in the latter scenario. The bigger the problem, the more there are network parameters (the curse of dimension), and the



fewer there are training samples. There are three approaches to solving the problem - regularization, architectural tricks, transfer of knowledge. The technical and scientific solutions that will be implemented in our product will be able to effectively solve the task of internal transfer of knowledge using pre-mediated models and semantic categories. Thus, the problem of one-shot learning can be successfully solved.

Blockchain, Marketplace Models and Economic Incentives

The greatest advantage of transparent and fair trading platform on blockchain with smart contracts is that all the facts of buying and using the IPA are visible to all parties. The system allows for checking quality of data markup by the community on blockchain, which allows for providing a solution to businesses in the quality it needs, automatically rating users. Blockchain is the basis for the development of the GraphGrail Ai ecosystem, providing a foundation for trust and a decentralized nature of the interaction of participants.

The advantage of using blockchain technology in comparison with the classical development of a closed project is that the development of Artificial Intelligence products is accelerating significantly, now a narrow team of 5 data-savvy experts is working on the task, and hundreds of thousands of developers from all over the world are involved.

Tokens are paid to participants for the creation, improvement and testing of language models. Since users will create models and share them, we need a public database that would be protected from unauthorized modification of these models.

Integration with blockchain platforms will allow the system to access the blockchain and make use of data for training an artificial neural network.

Marketplace solutions for business in the languages sector will give developers complete freedom to "cross" models and obtain new solutions. The use of smart contracts written in the blockchain solves the problem of the ownership of raw data, datasets (enriched data), trained neural networks (models obtained from training on data sets), final business applications (the use of data-sets, neural networks and the API for their connection).

By analogy with the Steemit blockchain media platform and Voice (golos.io), Tokens are paid to users in accordance with the internal formula, the main parameters of which are:

- The average complexity of the model and the number of words and figures of speech in it;
- The complexity of the subject area;
- The presence or absence of public domain data for the domain;
- Size of the learning and markup dataset;
- Difficulty of markup of the dataset;
- Number of layers in an artificial neural network;
- Number of neural network learning epochs;
- Precision and recall for the final result when testing on data;
- Demand for business solutions;
- The number of API requests required for a business task.

In accordance with the principles of fairness, the platform is the service provider for end developers and allows anyone to earn on the sale of access to the API within the framework of partnership. At the same time, all intellectual property created using the platform belongs to



GraphGrail Ai.

Blockchain is an ideal platform for an independent database for various service providers and consumers for sharing content. GraphGrail Ai also works through the JSONrest API, which means that each company with its own specialized system can easily connect to the GaphGrail Ai API system for sharing data, while remaining fully protected. This means that our Artificial Intelligence development ecosystem offers a secure and encrypted environment for cross-platform exchange.

The value of the blockchain also consists in providing the possibility of using data on the platform with mutual benefit for the owner and buyer of finished NLP applications.

The GraphGrail Ai Token allows the platform to capture the actions of platform users in the blockchain and the results that they receive when training a neural network, loading and / or spacing data. This allows other users, with the permission of the owner, to analyze the usefulness of data, data sets or trained models, use them and leave comments about the quality of solutions.

On the other hand, thanks to the protocol of proof-of-quality-work, users get the opportunity at any time to monitor calls to their units and receive an appropriate reward for their work, which they themselves will assign. This guarantees both parties the desired benefits.

Laboratory of Artificial Intelligence

The Research Laboratory allows anyone to collect and test solutions that are not yet on the market, using the latest developments in the field of deep learning (Deep learning).

1. It is the basis for the development of Strong Artificial Intelligence;
2. It allows developers from around the world to create experimental solutions and applications and test them on real data;
3. It provides developers with free access to a huge number of models of artificial neural networks, accumulated during the operation of the platform;
4. It allows the creation of perspective and new solutions in the field of artificial intelligence, such as the library from Google Tensor2Tensor from the authors of the scientific work "One model for learning everything" from the group Google Brain Team (a unified model of in-depth training that will solve problems from different areas. In particular, MultiModel is able to learn simultaneously on eight data sets, including the WSJ speech recognition enclosure, ImageNet image base, and can simultaneously learn tasks from different domains, translating knowledge and giving good results;

<https://habrastorage.org/web/9cf/26e/676/9cf26e67620d4ce98759cf6b1afb7763.png>

The scientific work is published on the website of the preprints arXiv.org (arXiv: 1706.05137).
<https://geektimes.ru/post/290263/>

5. The GraphGrailAi Ecosystem will provide developers with the necessary interfaces to access Open Neural Network Exchange capabilities for efficient model portability between frameworks and programming languages (PyTorch and Caffe2).

As reported by Microsoft, Facebook and Amazon Web Services, the partners in the Open Source project of the Open Neural Network Exchange (ONNX) format, which provides



interoperability of artificial intelligence (AI) frameworks, this format can already be implemented. The release of its version 1.0 is a major milestone in the development of the software ecosystem of AI, with which the latter can become more accessible to developers and enterprises interested in deploying their own systems.

The Open Neural Network Exchange (ONNX) format will provide a common way of presenting data used in neural networks. Most platforms today have their own specific format of models capable of working with models of other platforms only when using special format conversion tools. ONNX will allow the free exchange of information that models have without the conversion procedure. The model, trained on one platform can be used on another platform.

Developers can choose the most suitable platforms for themselves, because each of them is optimized for different usage scenarios, such as fast training, support for flexible network architectures, obtaining results on mobile devices, etc. Typically, one has to optimize models for each framework manually, which takes a lot of time. <https://tproger.ru/news/facebook-microsoft-onnx/>

<https://research.fb.com/facebook-and-microsoft-introduce-new-open-ecosystem-for-interchangeable-ai-frameworks/>

Such an approach is the foundation for the development of a strong Artificial Intelligence, where special functionality will be made available that will “cross” various models.

Using our platform, businesses will receive

An intuitive application designer for AI;

A store of ready solutions tested in the real-world;

A workspace for AI specialists who can place requests;

Everyone, without programming skills, linguistics, deep machine learning will be able to use AI like an iPhone;

A technical paper;

Gethub;

An MVP to test the Alpha version.

7.1 WHY DO WE NEED BLOCKCHAIN AND TOKENS:

Provision of the possibility of using data on a platform with mutual benefit for the owner and buyer.

The Token allows the platform to hash in the blockchain platform the users and the results that they receive when training a neural network, downloading and / or spacing data. This allows other users, with the permission of the owner, to analyze the usefulness of the data or the trained models, use them and leave comments about the quality of the decisions applied.

On the other hand, thanks to the protocol, users have the opportunity to monitor hashes to their blockchain at any time and receive an appropriate reward for their work, which they themselves will assign. This guarantees both parties the desired benefits.

Any business has its own set of tasks, problems and nuances, which do not vary cardinally from industry to industry.



When a user of our platform has learned to solve a problem using AI, for example, they have trained a seller's construct in the chat-bot mysmart.chat to sell (for example, the services of a cosmetologist or lawyer), a trained neural network (containing all the important indicators, such as conversion from calls to the chat-bot for sale, the transaction cycle, the result of the work of the chat-bot, such as a record for consultation or receipt of prepayment etc.) is recorded in the blockchain and can be used by peers in other cities or other price segments. Businesses, as a rule, have a very similar set of tasks, problems and nuances, which do not vary cardinally from industry to industry. This is why it is possible to reuse applications on neural networks in related businesses or for a new segment after subjecting them to the additional training and adaptation of the application to new data.

To use the chat-bot, one needs Tokens, which will grant access and record the request. The owner of the smart contract will receive a reward and the buyer will save time on training and profit from efficiency. It is impossible to accomplish these tasks without blockchain on a distributed platform.

Platform Profitability - Monetization

The service is provided by the SaaS business model - software as a service.

A subscription model is used with monthly payment for six months or a year.

For the segment of analysts and developers of ready-made language solutions, the platform is available with payment of Tokens and their freezing for access to ready-made solutions and solution designers with flexible tariff plans, depending on the amount of data processed per month, the complexity of analytics or the number of sources,

Also, API requests are separately charged.

For the business client segment, use of the platform assumes reference to a blockchain protocol through the GAI Token for gaining access to:

Platform tools;

Raw and processed data;

Proven solutions and trained neural networks;

Requests for work by rated users of the platform;

Leaving comments with ratings of solutions.

Each operation is fixed on the blockchain and all users can track the history of all the information on the platform at any time.

This is not possible without using Tokens, which are the internal currency of the project.

In addition to commissions provided for currency circulation within the platform between its users, Tokens will be charged as payment for the platform itself.

8.1. USING THE PLATFORM:

The platform provides two types of users - customers and performers.



To use the platform's tools, with the help of the partner platform Ens.domains, performers are authorized in the blockchain to conduct works, register their authorship and their results.

To do this, the platform needs to freeze 100 GAI Tokens.

After completing data processing and training of a neural network, or creating ready-to-use algorithms, the users can be sure that the results of these actions are fixed in the blockchain, and further, if desired, with the help of a smart contract, solutions can be placed on the platform market for subsequent lease or sale.

8.2. MARKETPLACE:

The basic problem of the industry is the lack of data and the high cost of processing and enriching it, the high cost of developing algorithms and an acute deficit of industry specialists.

To solve these problems, the platform provides for the possibility of turnover of assets / resources among users of the platform.

Results recorded on the blockchain are evaluated by the performers and, if desired, placed for further paid use by other users of the platform. For payment transactions on the platform, a commission is charged from the seller or lessee.

If the marketplace does not have the necessary tools / algorithms, a suitable data or the data is occupied for other kind of tasks, the platform provides for a labor exchange where anyone can place an order for such jobs.

8.3. LABOR EXCHANGE:

Depending on the task, the customer can place an application for collecting / searching for data sets, enriching available or newly collected data, training neural networks, or setting up full-fledged algorithms to solve the tasks.

The price of works is formed on the basis of an auction. Depending on the complexity of the task, it can be distributed among different performers in order to save the expensive time of high-level specialists. After agreeing on the conditions, the customer will freeze payment for the work on the platform before the services are rendered.

Works can be performed both by project specialists and users of the platform, the involvement of which is described in detail in section 10. Marketing - implementation and scaling

8.4. API:

If the user's tasks do not provide for the deployment of AI, the platform provides an API for using the platform's capabilities

To work on the API, depending on the complexity and resource intensity of tasks, post-commissioning of the platform will form a tariff grid. Due to partnership with cloud computing projects in the field of cloud computing and cloud data storage, the cost of queries is estimated to be negligible compared to usual rates.



8.5. RENTAL OF FACILITIES:

Partnership with the same projects will allow users of the platform to use cloud-based facilities for training, additional training and retraining, data storage and performance of calculations related to the operation of algorithms.

Project Roadmap

2014:

July - Creation of the company by two students, SFU researchers (SFEDU)

The first sales of analytical solutions for analyzing the language of business customers.

A service was developed to search for illegal campaigning in the period of pre-election campaigns. The product was based on a proprietary development – an agitation language model (a complex semantic classification algorithm). The service was sold and successfully found necessary information in masses of text data.

2015:

- Incubation in the Southern IT Park: the team tested the hypotheses and market needs in analytics for 4 months.

- Pivot: a turn in the development direction of the company, the company fully focuses on linguistic models and machine learning.

- Investment: a well-known venture capitalist and founder of a closed VentureClub, Alexander Borodich, invests in the startup.

2016:

- Sales to business clients of analytical research: a marketing agency for the analysis of cosmetic brands, analysis of the market for educational courses for the well-known English language service LingvoLeo <http://lingualeo.com/>

- GraphGrailAi is one of two companies in the Russian Federation with a search service and subtle semantic analysis of illegal statements and insults on the Internet. The service was based on a proprietary linguistic model and showed high quality of processing of streaming text data from the social network VK.com

July, 2017:

- The Whitepaper of the GraphGrail Ai project was published and received first feedback from the community.

- GraphGrail Ai campaign on closed Presale of Tokens.



August – September, 2017

- Testing the product on pilot projects, working with opinion leaders and communities;
- Preparation for the public launch of the first version;
- Marketing campaign and preparation for open Presale of GraphGrail Ai Tokens;
- Public launch of the Alpha version of the service;
- Publishing of a smart contract of the public Presale.

October – December, 2017

- Presale of the GraphGrail Ai;
- Strengthening of the team of developers and specialists in data analysis (data-science);
- Participation in the crypto conference Russian Blockchain week 2017;
- Participation in the panel of experts at the event Weare Ecosystem.

January, 2017

- Public release of the Beta version of the product on the GraphGrailAi platform, including monitoring systems with the ability to flexibly configure the categorization of texts using language models;
- Platform Load Testing;
- Alpha testing of market models of language models;
- Attendance of the largest foreign crypto conferences with the presentation of the project and investment relations.

February, 2017

- Crowdsale (main TGE of GraphGrail Ai);
- Public release of the Beta version of the product on the GraphGrailAi platform, including Smart chat for sales automation.

March – April, 2018

- Full-scale launch of the platform and library of linguistic models with access through APIs;
- Drag-n-drop release (drag and drop) of the interface for dragging components with which platform clients can create applications;
- Testing and integration of English, the 2nd language for the platform;
- Scaling of the platform;
- Implementation of blockchain to control the quality of data marking (proof-of-quality-work);
- Launch of premium accounts and an adaptive formula for delegate remuneration.

May – July, 2018

- Registration of IP and patent;
- Implementation of the monetization model: payment for IPA requests;



- Implementation of the system of ensuring the fairness of the work of the marketplace (proof-of-honesty);
- Testing the system of automatic rating and reputation of users of the platform;
- Implementation of ready-to-use sets of semantic categories (category-subcategory, taxonomy, part-whole);
- Start of partnership with companies and startups of the artificial intelligence industry and analytics of large masses of text data: Telegram (TON).

Q2 of 2018

Creation of the Laboratory of Advanced Solutions of Deep Machine Learning and Artificial Intelligence of the Future on the Basis of Platform Models (RnD Laboratory with deep learning)

- Start of partnership with top companies in the blockchain industry.

Project Team

Victor Nosko, CEO, Founder, Ai, Data-science. Higher education from the SFU, winner of various university competitions, winner of Startup-Sabantui, resident and graduate of Southern IT Park (Rostov-on-Don, Russia). The Founder of the "GraphGrail" startup for the analysis of data.

Python developer with Django framework development skills. Also has skills in stack of technologies for language processing: NLTK + Celery + Pymorphy2 + GLRparser, etc. Has extensive experience in using systems for training artificial intelligence constructs like Google TensorFlow. Specializes in information retrieval, engineering of linguistic attributes, vector models (doc2vec, word2vec). Databases: PostgreSQL.

Has 5 years of experience in the implementation of grants of scientific funds (RFBR, RGNF) and internal grants of SFedU. Developed algorithms, carried out software implementation, led the creation of a product corresponding to the market and business as a whole. Led negotiations with customers. Managed and made sales to a marketing agency, the Electoral Committee RO, the Center of Expertise. Developed a service for complex semantic classification of large texts.

Alexander Borodich, Venture investor, CMO. Technological futurist, business angel, serial entrepreneur, founder of the closed VentureClub of the projects MyWishBoard, MyDreamBoard, SuperFolder. Business Angel, Chief Dreams Officer and Managing Partner of Future Action, the founder of FutureLabs future laboratory and crowd investment platform and investor club VentureClub.ru, an investor in more than 70 projects.

Managed the marketing of Mail.ru Group and Acronis, since 2010 acts as an entrepreneur. Director of the Economics and Mathematics School at the Moscow State University, since 2003 has been teaching the development of creative thinking and entrepreneurship skills. Received his MBA from the Stockholm School of Economics in 2007.

Graduated from the Moscow State University of Electronics and Mathematics and received higher education in marketing at the State University of Higher School of Economics.



Has a US patent in the field of assessing the effectiveness of information dissemination in social networks.

Finalist of MobileBeat 2012 (San Francisco). Began his career as a web developer in the American company ThinkWave. In 2002-2003 acted as the head of e-commerce in the research and consulting company Direct Info. From 2003-2005 was engaged in online marketing at MAR Consult. In the past was engaged in personal projects, including FutureLabs, MyWishBoard and others.

Zahar Ponimash, Ai, Data-science, Developer. Specialist in the development of strong artificial intelligence. Developer C#. Realized projects in the field of machine learning, neural networks, mathematics, evolutionary computing, biology and physics.

Has experience in developing a framework for AI. Developed chat-bots, signal processing, computer visions, systems of text analysis, including logical output modules, symbolic computing, and recognition of signals (one-dimensional, two-dimensional). Developed a chat (client-server TCP \ IP) and created a simple 3D game from scratch using XNA (Without the engine).

Platform Economics - Token:

In our project, blockchain and the economy of Tokens are the foundation of the platform and an integral part of the service, its virtual skeleton.

The role of the Token.

The GraphGrail Ai (GAI) Token is a utility Token and acts as the internal currency within the system. For the Token, the business customer of the NLP end product gains access to the system and the ability to quickly order and receive a solution, such as software development of the application and the markup of data for it.

Tokens are paid to data markers for their work, the testers and voters, who monitor the quality of models and the community. The balance of demand and supply of Tokens on the platform is achieved on the basis of flexible pricing. The more difficult the work on markup of data, the higher the payments to participants of the platform.

Advantages for Token holders.

The utility of the ecosystem is provided by the balance of supply and demand for services and requests from business clients. This ensures more customers and more people on data markup and larger segment coverage each of which requires custom language models.

To access the platform, a business representative needs to buy from the exchange 5,000 to 10,000 Tokens. Thus, liquidity is withdrawn from free circulation. Businesses will be able to spend Tokens for purchasing internal platform services, such as collection, cleaning, data marking, custom settings for training neural network, etc. The more participants in the system and the more orders are placed in the application marketplace, the greater the benefit the business brings to the platform, providing a long-term foundation by accumulating valuable data and models for all participating parties, such as data marts, businesses and vendors of models on the marketplace.



The role of blockchain in the system

Nowadays, problems do not arise regarding the reliability and quality of work, when data-related work is done by employees on a salary basis in centralized analytical decisions of large companies. Each employee passes interviews and proves their competencies, and in case of poorly done work, they can be fined or dismissed. Private business is a closed, centralized system with a clear hierarchy of control and subordination.

But what if the ecosystem becomes open and the number of employees, participants and users of the platform increases from 10 from 1000, or even tens of thousands? How, and most importantly, who and with what capacities can assess the competencies of each participant? How can an organization then ensure the quality of work of the participants on the platform and at the same time the acceptable cost of their work?

The answer to all these questions is provided by blockchain.

All stages of work with data are recorded in the blockchain system for each platform participant and for each stage of markup and cleaning of text data. The system calculates hash from the processed text and it is stored in the blockchain for each task / order created on the platform. In the event that the work on markup and training of the neural network was performed poorly, we can always roll back to an earlier version, a "snapshot", to determine who and at what stage performed poor work.

In an open ecosystem, all these actions are performed automatically, based on rating systems and delegates, ensuring business with high quality of order fulfillment, filtering and selecting competent participants paid in Tokens, corresponding to the competencies and scope of work performed. Thanks to such a system, a decentralized application marketplace is formed.

Tokens are issued for the creation, improvement and testing of language models. Since users will create models and share them, they need a public database that would be protected from the unauthorized modification of these models.

The advantage of using blockchain technology in comparison with the classical development of a closed project is that the development of Artificial Intelligence products is accelerating significantly, now a narrow team of 5 data-savvy experts is working on the task, and hundreds of thousands of developers from all over the world are involved.

Integration with blockchain platforms will allow the system to access the blockchain and make use of data for training an artificial neural network.

Marketplace solutions for business in the languages sector will give developers complete freedom to "cross" models and obtain new solutions.

In accordance with the principles of fairness, the platform is the service provider for end developers and allows anyone to earn on the sale of access to the API within the framework of partnership. At the same time, all intellectual property created using the platform belongs to GraphGrail Ai.

Project Legality – Smart Contract

The platform uses several smart contracts:

1. Smart contract crowd-labeling between the Customer and Data Makers. The contract



implements a mechanism for checking and confirming the quality of the work of markers on the platform, a proof-of-quality-crowd-work. The contract allows to coordinate the work of the platform participants on data layout and enrichment of data sets, payment and its size for this work, depending on the quality, training and retraining of neural networks.

By analogy with the Steemit blockchain media platform and Voice (golos.io), Tokens are paid to users in accordance with the internal formula, the main parameters of which are:

- The average complexity of the model and the number of words and figures of speech in it;
- The complexity of the subject area;
- The presence or absence of public domain data for the domain;
- Size of the learning and markup dataset;
- Difficulty of markup of the dataset;
- Number of layers in an artificial neural network;
- Number of neural network learning epochs;
- Precision and recall for the final result when testing on data;
- Demand for business solutions;
- The number of API requests required for a business task.

The contract also implements the mechanism of automatic rating of platform participants and the work of assessors in assessing the work of markers and developers of AI solutions.

In the process of performing the markup of datacenters, the necessary information, such as date, time, user name, dataset topic, samples of the marked data, labels and their structure is selectively stored in the blockchain to ensure transparency and fairness of evaluation and payments to users.

Smart contract marketplace (between developers of AI applications and the GraphGrailAi platform).

The contract provides absolute transparency of sales of the final solutions on the GraphGrail Ai marketplace. The smart contract registers every facet of the sale of a product on blockchain, including the API trained neural network, the amount of remuneration to the AI developers and to the owners of the AI application (see Smart Contract for Intellectual Property). The contract also regulates the accumulation of data and neuronets on the marketplace, and their further use in the Ai-laboratory on the platform.

Smart contract for Intellectual Property.

The contract implements business logic by recording, storing and using intellectual property on the platform, including company data-sets, enriched data-sets, trained neural networks, and finite AI applications.

A smart contract can be created by:

a) Developers of AI applications to improve quality with the help of additional training of neural networks on new data;

b) Final business customers offering the community on the platform to use additional data for other tasks.



When a user of our platform has learned to solve a problem using AI, for example, they have trained a seller's construct in the chat-bot mysmart.chat to sell (for example, the services of a cosmetologist or lawyer), a trained neural network (containing all the important indicators, such as conversion from calls to the chat-bot for sale, the transaction cycle, the result of the work of the chat-bot, such as a record for consultation or receipt of prepayment etc.) is recorded in the blockchain and can be used by peers in other cities or other price segments. Businesses, as a rule, have a very similar set of tasks, problems and nuances, which do not vary cardinally from industry to industry. This is why it is possible to reuse applications on neural networks in related businesses or for a new segment after subjecting them to the additional training and adaptation of the application to new data.

To use the chat-bot, one needs Tokens, which will grant access and record the request. The owner of the smart contract will receive a reward and the buyer will save time on training and profit from efficiency. It is impossible to accomplish these tasks without blockchain on a distributed platform.