



STATANLY

technologies

Artificial Intelligence for your business

STATANLY TECHNOLOGIES LLC
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<https://statanly.com/>



Analytical systems based on artificial intelligence

Typical solutions based on machine learning algorithms and data analysis

■ General information

■ Predictive and recommender systems

■ Computer vision

■ Areas of use

■ Our solutions

History

2014

- An international machine learning laboratory has been created at the Department of Computer Technologies of ITMO University
- Students of the Department of Computer Technologies become ACM ICPC winners for the 5th time

2016

- The first major projects in the field of artificial intelligence implementation with Yandex companies, Mail.ru Group, In silico Medicine, VeeRoute
- Defense of the first Ph.D. theses in the direction of artificial intelligence

2018

- A company for the development of systems and services based on artificial intelligence, LLC «STATANLY TECHNOLOGIES» was established
- Stanley Technologies is the winner of the competition for the development of interpreted predictive models of drilling rig failure among the 15 largest companies in Russia

2020

- A new division for the development of systems based on «Computer Vision» has been opened
- First foreign orders (USA, Europe)
- A division has been opened to enter international markets
- Received a grant from the Foundation for the Promotion of Innovation for the development of photorealistic image generation and research in the field of generative neural networks



Company in «numbers»

10+

Leading developers, specialists
with a scientific degree

50+

Specialists involved in various
projects

250+

Projects in the field of machine
learning and computer vision

Founded

- Based on the international laboratory of machine learning at ITMO University.
- CTO is the head of the International Machine Learning Laboratory.

Partners and clients



Main directions

Research &
Development

1

Consulting,
Machine learning
and outsourcing

2

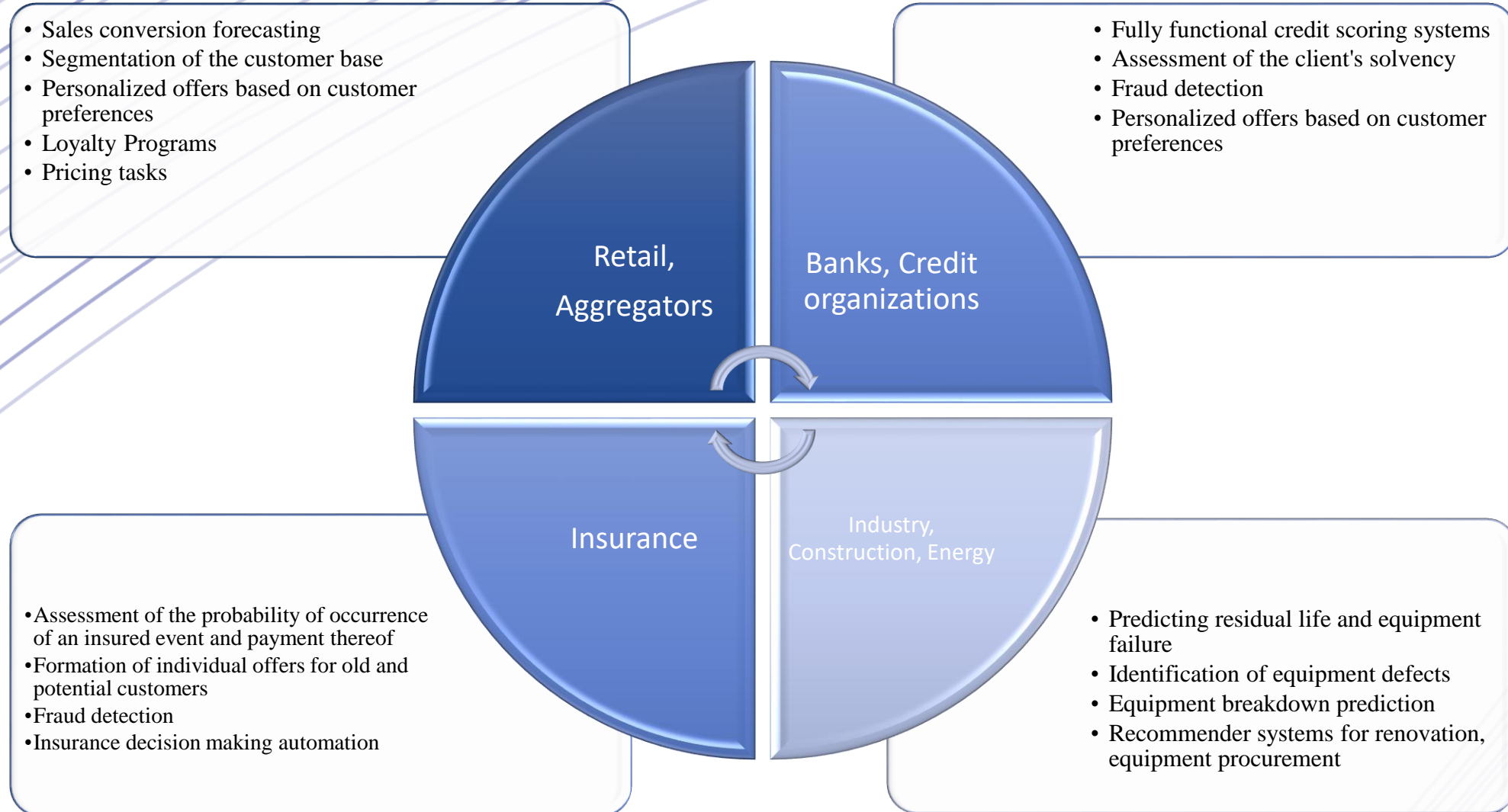
Systems and
services based
on machine
learning

3

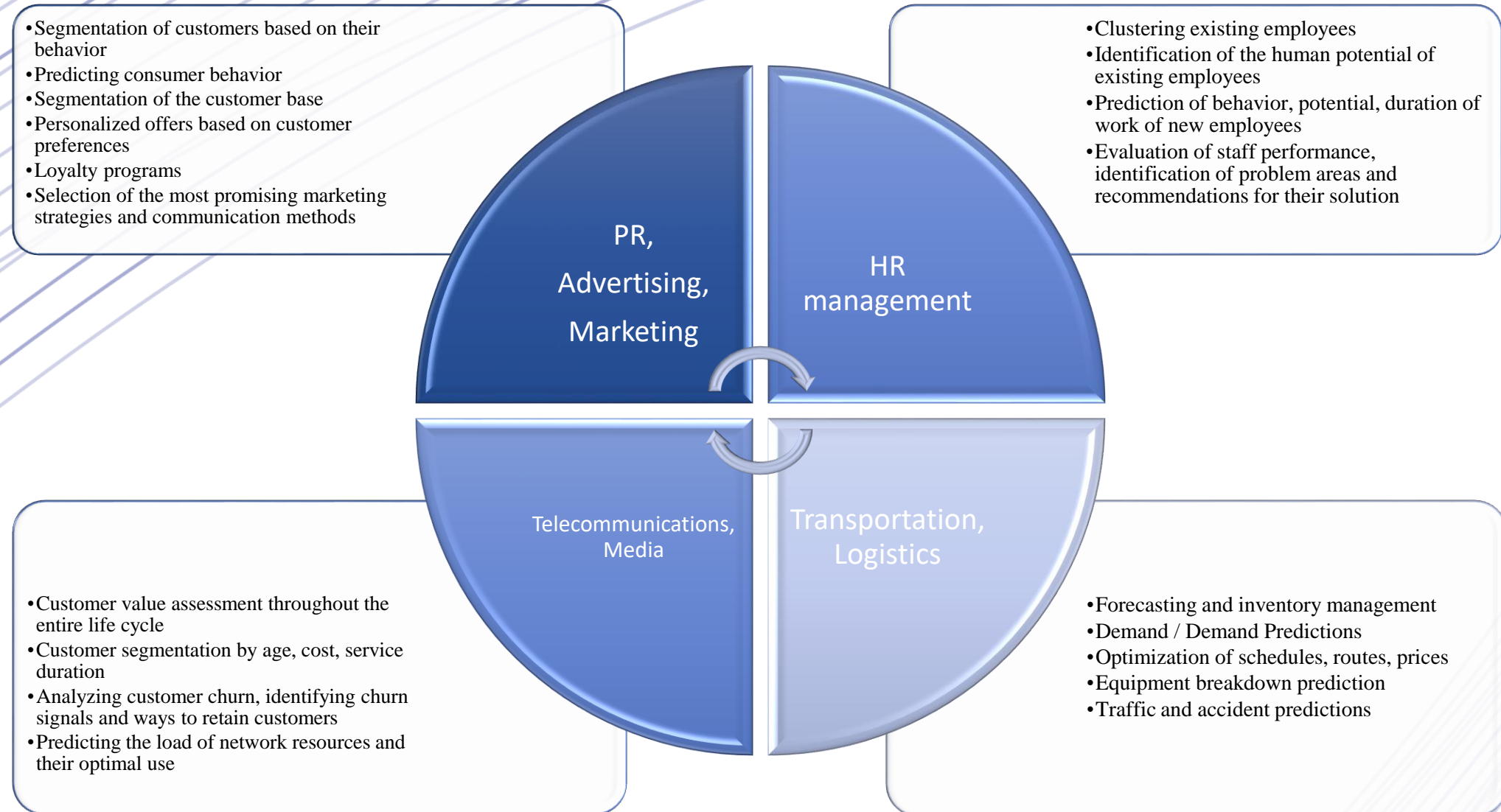
Development of
standard solutions
based on artificial
intelligence

4

Where AI is used

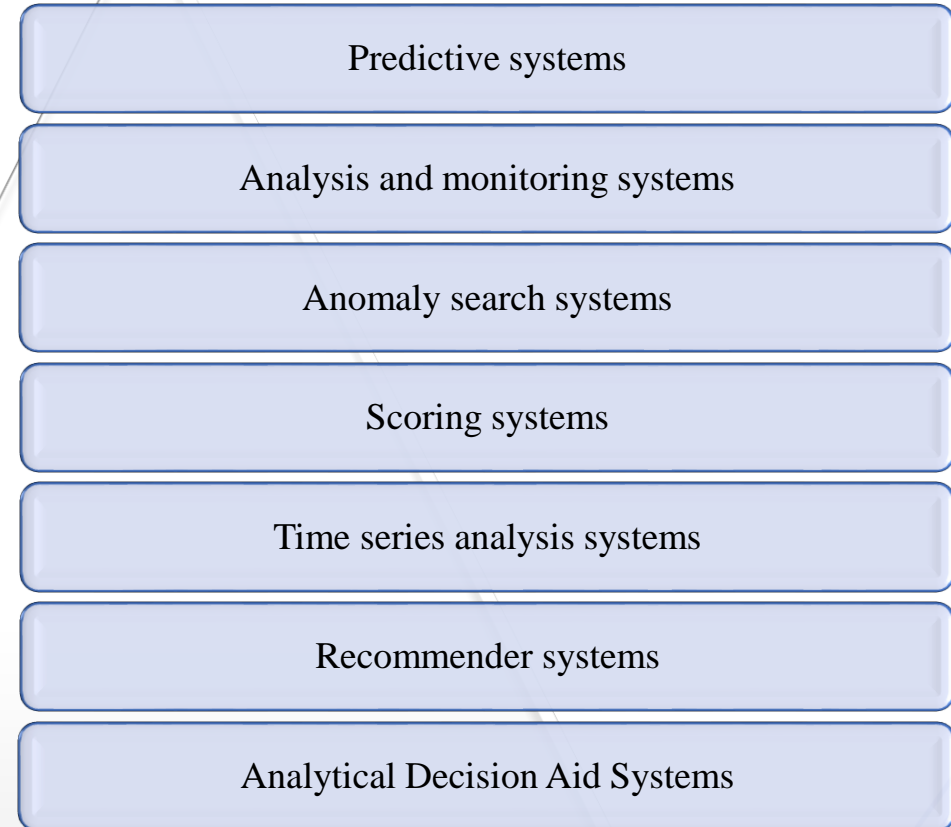


Where AI is used



Machine learning

Problems



Computer vision

Problems

Recognition of sizes and dimensions of objects

Detection of the speed of moving objects

Recognition of color and shape of objects

Recognition of types of objects (vehicles) from drones or satellite images

Recognition of inscriptions (numbers, QR-codes, markings, tables) of arbitrary alphabets in conditions of strong noise

Our solutions

Determination of the size of ore on the conveyor

Predicting residual life and equipment failure

Determination of vehicle dimensions

Predicting the load of network resources and their optimal use

Occupational health and safety systems

Equipment breakdown prediction

Recognition of numbers, articles, inscriptions

Sales conversion forecasting

Defect detection based on machine vision

Pricing tasks, forecasting price dynamics

Determining the speed of vehicles

Predicting consumer behavior

Control of production from drones

Prediction of behavior, potential, duration of work of new employees

Visual classification of objects

Customer churn forecasting

Predictive systems

- Predicting MTBF of mining equipment
- Decision making system for equipment selection based on predictive models
- Credit scoring systems

- Predicting shutdown in the production of peroxide grade
- Predicting the conversion of air ticket sales
- Predicting changes in the price of air tickets (pricing problem)



- Predictive system of failure of traction motors of electric locomotives 2ES6
- Predicting age based on blood sample

- System for continuous monitoring, data collection and statistical analysis of operational parameters of ship equipment
- Investment profiling and recommendation system

Computer vision

- System for detecting the size distribution of ore rocks on the conveyor
- System for analyzing the flotation pattern during mineral processing
- Video monitoring systems for complex systems and prevention of accidents

- Recognition system for arbitrary numbers of moving trolleys
- Occupational health and safety system based on machine vision
- Vehicle detection and classification




A system for detecting and recognizing texts of the English, Arabic and Chinese alphabets in a highly noisy environment



Recognition system for marked workpieces based on machine vision algorithms





Cases

Predictive systems



Building predictive models. Energy Company Gazprom Neft

Predicting the operating time to failure of mining equipment

- **Description:** Develop a methodology for predicting the average time to failure (SNO) of downhole equipment and planning the inter-repair period (MCI) of well operation, as well as a system for determining the technical limit of equipment operation in the well
- **General task:** Creating a system for predicting the average time to failure (SNO) of equipment by a group of specified parameters

Decision-making system for equipment selection based on predictive models

- **Description:** Develop a recommendation system for selecting downhole equipment and repair components
- **General task:** Creation of a decision-making system for the selection of equipment and components based on predictive models for predicting the time of failure and breakdowns of equipment

Statanly Technologies was the organizer of the tender for PJSC «Gazprom Neft» to create predictive models of operating time for failure of mining equipment.

The participation of Statanly Technologies in the creation of forecast models outside the competition allowed us to take the first place in the interpreted forecast models.



Pilot project: forecast system. SIBUR Holding Company

Predicting a shutdown in the production of peroxide grade

- **Description:** In the production of peroxide grade polypropylene, the last step is to cut the granulate. It happens that agglomerates begin to stick to the knives (and often they are clogged between the die and the knives), as a result, the knives begin to move away from the die, the process degrades and the equipment stops. This is a big loss for production. The degradation process can be indirectly traced by the presence of agglomerates on the vibrating screen. there are a large number of telemetry tags that can be used to predict the degradation of the process in advance (in our case, in an hour). There is data on the stops of the extruder. We have telemetry data for the whole year.
- **General task:** Use this data to implement a predictive system that predicts the shutdown.
- **Results:** Within the framework of the pilot project, LSTM and GRU were implemented and trained. The results obtained: LSTM: Training Accuracy= 0.96, Test Accuracy= 0.87 GRU: Accuracy= 1.000, Test Accuracy= 0.85.
These results can be significantly improved with further interaction with domain specialists and deeper data preprocessing.



The project took place
in the summer of 2018

Predictive failure system for traction motors



Predictive system of failure of traction electric motors of electric locomotives 2ES6

- **Description:** Based on the statistics collected during the operation of electric locomotives, predict the failure and identify the factors affecting the failure of electric motors 2ES6
 - **General task:** To develop a predictive system of electric locomotive failure
 - **Results:** Developed a software library for the analysis and processing of "raw" data
 - Developed predictive algorithms for the failure of electric locomotives 2ES6
- A web server for working with predictive algorithms has been created
- A test web service has been published to demonstrate how the algorithms work: <http://stm.statanly.com>



The project took place in 2019

Building predictive models. Retail.

City Travel Company

Forecasting the conversion rate of airline ticket sales

- **Description:** Provides historical data on the display of offers for requests for flights, their parameters (time, departure and arrival airports, number of transfers, transfer time, ticket class, number of passengers, etc.), as well as information about whether a ticket purchase was made. Based on this data, it is necessary to build machine learning models to predict the conversion of airline ticket sales.
- **General task:** Creating a system for predicting queries with the highest conversion rate. However, from the point of view of increasing revenue (minimizing impressions that do not lead to a purchase), the forecast system can be used to find queries that do not lead to a purchase

Forecasting changes in the price of air tickets (pricing task)

- **Description:** Based on the sales conversion forecasting system, the optimization problem is solved to select the optimal mark-up for the cost of air tickets (the problem of dynamic pricing)
- **General task:** Creating a system for predicting the margin on the cost of air tickets, maximizing the sales conversion

The project took place in 2017 and was successfully completed, predictive models were implemented in the company

Recommendation systems and credit scoring



Система профилирования инвестиций и рекомендаций

- **Description:** The bank's clients' depersonalized parameters and characteristics (gender, age, transactions made, bank products used) are given
- **General task:** Create a variety of recommendations on investment data, retail data, and social media



Система кредитного скоринга

- **Description:** The depersonalized characteristics of potential borrowers (gender, age, products used, transaction operations, etc.)
- **General task:** Creating a credit scoring system that takes into account the specifics of unbalanced data

The project has been running since 2017

Fraud detection. Insurance. Raiffeisen Life Company

- **Description:** Based on customer data and the insurance products used, it is necessary to build models to identify fraudsters in the field of motor insurance.
- **General task:** Creating a system to identify fraudsters in the field of auto insurance

Input data	Models	Result *
85190 - sample size 747 - fraudsters 32 - attributes	We used 6 models: <i>randomForest</i> , <i>GBM</i> , <i>AdaBoost</i> , <i>Neural network</i> , <i>SVM</i> , <i>Dummy</i> The best results showed: <ul style="list-style-type: none">• AdaBoost• Neural network	AdaBoost: 71% Neural network : 70%

**The final results showed an accuracy of about 71%.
The project took place in 2017**

Building predictive models. Medicine.

Insilico Medicine Company

Predicting age from a blood sample

- **Description:** More than 60,000 samples of total blood biochemistry and cell counts from standard medical examinations conducted by a single laboratory and related to chronological age and gender are given.
- **General task:** A system that predicts the human chronological age using a basic blood test

Detection and classification of possible cancers by DNA microchips

- **Description:** More than 60,000 samples of total blood biochemistry and cell counts from standard medical examinations conducted by a single laboratory and related to chronological age and gender are given.
- **General task:** A system for detecting and classifying possible cancers

Research has been conducted since 2016, and publications have been published at leading data analysis conferences.
The results are implemented in Insilico Medicine

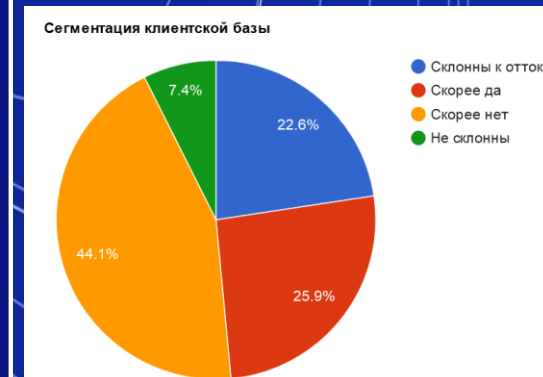
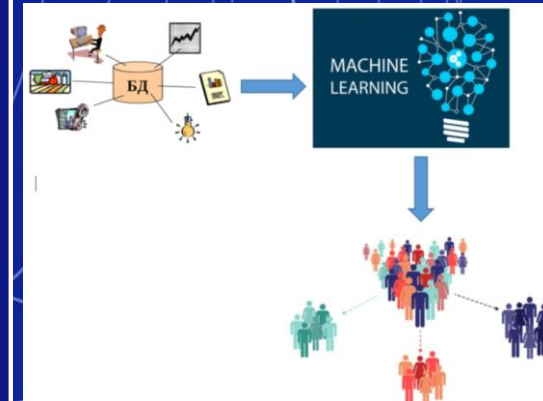
Predictive system of customer churn based on artificial intelligence

CusFlow.

Predictive Customer Churn system

- **Description:** Development of a forecast system for customer churn based on a customer database.
- **General task:** CusFlow algorithms allow you to divide the entire customer base into clusters and identify the segments of customers most prone to outflow. Our services are precisely configured for each customer base of our users, which allows you to get the maximum accuracy of predictions and, at an early stage, prevent customer churn.

Read more: <https://churn.statanly.com/>





Predicting TV viewing

Predictive TV viewing system

- **Description:** Based on machine learning algorithms, it is required to develop algorithms for predicting the respondents' viewing of a certain ad block. Input data – broadcast characteristics of the federal advertising block (date, time of release, volume of the block, etc.), data from the broadcast grid (program schedule, program characteristics, genre, presenters, etc.), data on respondents (social and demographic profiles of respondents), data on the viewing of respondents for each day for the last two years (date and time of the beginning and end of watching the TV channel). The algorithm should take the above data as input and predict, based on the available information, the probability of viewing an ad block for each respondent at a given time in the future on a given channel, taking into account the available information about programming.

The project took place in 2020



Cases

Computer vision

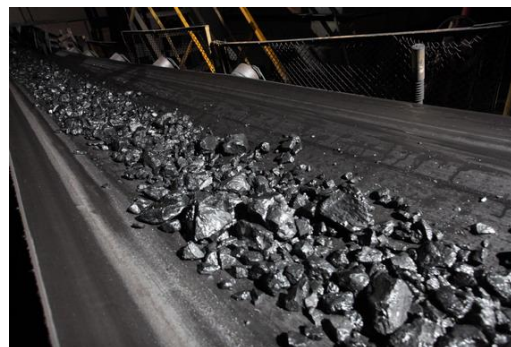
Ore rock sizing system

Task: Implementation of a system that determines the distribution of ore rock by size on a moving conveyor.

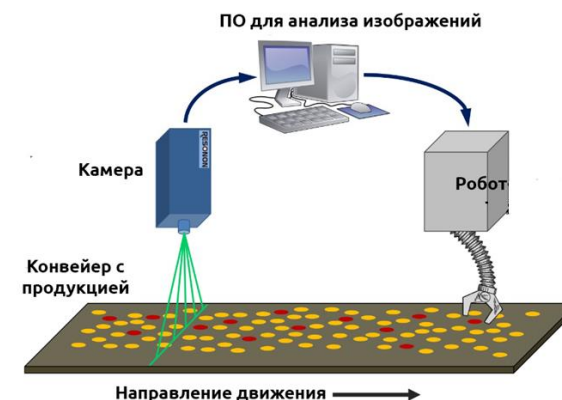
Relevance

- mining and metallurgical enterprises;
- determination of the granulometric composition "by eye»;
- manual operation of the mill;
- slow down for small ones, speed up for large ones.

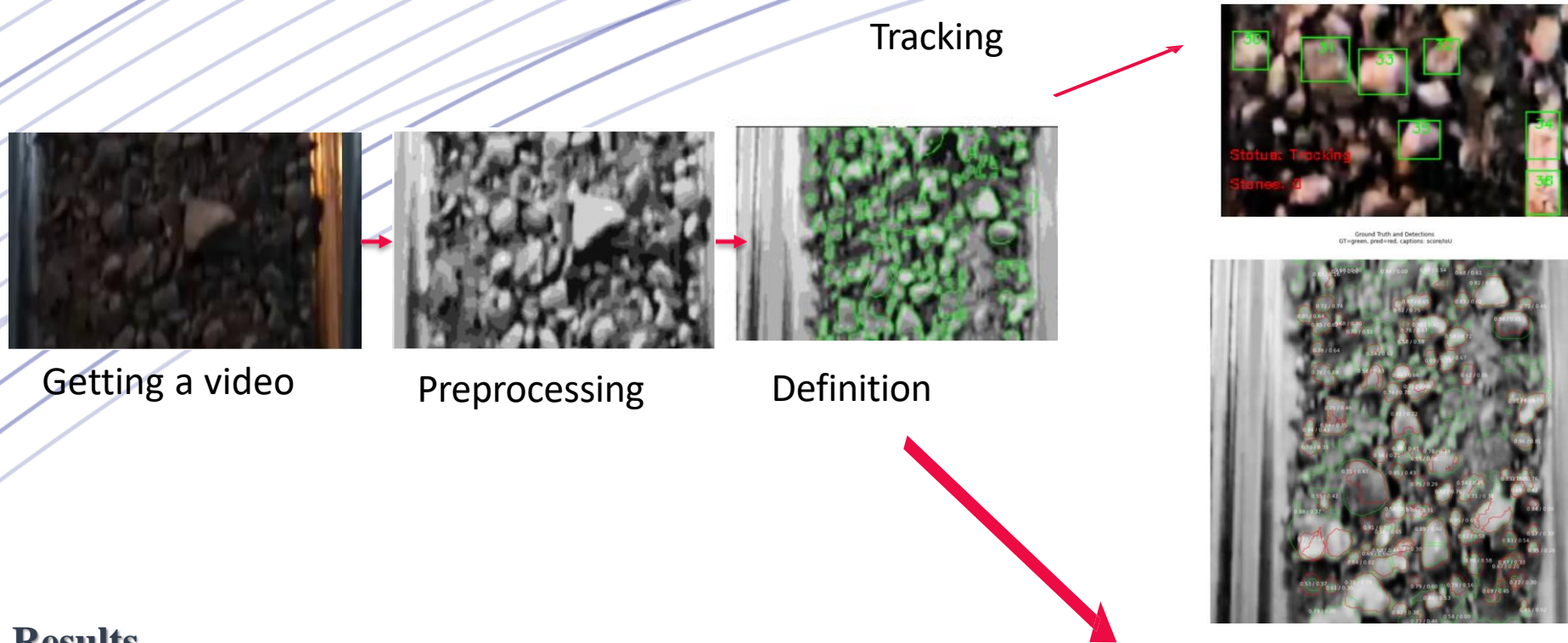
Granulometric composition - the distribution of ore stones by size, characterized by a percentage yield of the mass or number of pieces of ore.



Conveyor with ore rock

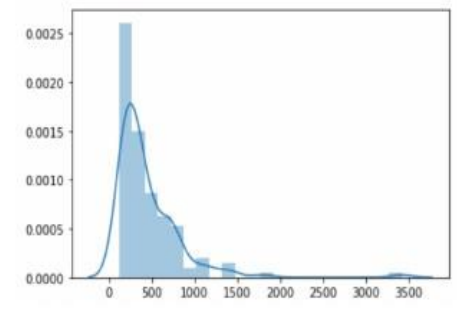


Ore rock sizing system



Results

	Real situation		Accuracy	Completeness	T (1 frame)
Calculated	Stones	Background	94,4%	94,9%	0.09 s
Stones	TP = 947	FP = 56			
Background	FN = 23	TN = 0			



Building a distribution

Flotation pattern analysis system for mineral processing

Foam Flotation Analysis System

Task: Detection of bubble size, number of bubbles, and rate of foam descent by computer vision methods.

Main analyzed indicators:

- Foam color
- Bubble diameter (distribution)
- Foam removal speed
- Bubble life time

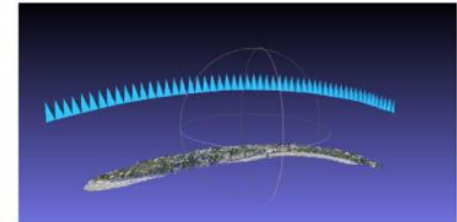


Vehicle detection and classification. STC Company

Vehicle detection and classification



- **Description:** Detection and classification of \ UAV (unmanned aerial vehicle) images)
- **General task:**
 1. Detection and classification of vehicles in UAV images
 2. Create a three-dimensional reconstruction from real-time UAV images



Results: Systems have been created that solve both problems and are adapted to industrial processes

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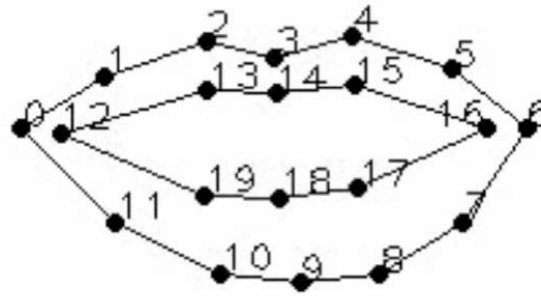
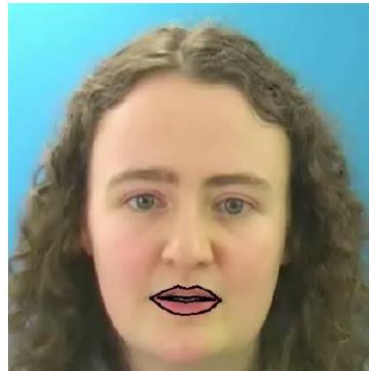


R&D projects

Speech recognition by reading the movement of the lips

Description: Speech recognition system based on a video stream with a speaker based on computer vision technologies

Partners: Machine Learning Works

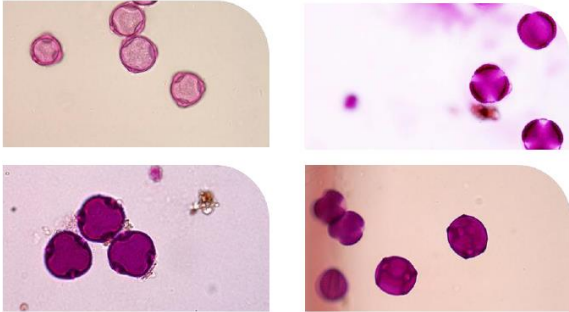


Research has been conducted since 2016, publications at leading data analysis conferences

R&D projects

Recognition of pollen grains

- **Description:** A system for determining the type of pollen grain based on computer vision algorithms.
- **Partners:** Perm State University



Detection of foot deformity

- **Description:** Detection of foot deformity when scanning a three-dimensional shape.
- **Partners:** Albrecht Center



Research has been conducted since 2017, and publications have been published at leading data analysis conferences.

R&D projects

WitsArt - synthesis of photorealistic images

- **Description:** Creating a GAN architecture capable of synthesizing photorealistic images (more photorealistic than they are now)



Research has been conducted since 2017, publications at leading data analysis conferences
<https://witsart.com/>

The background is a solid blue color with a series of white, curved, wavy lines that sweep across the frame from the bottom left towards the top right, creating a sense of motion and depth.

Cases

**Prediction of customer behavior, user
segmentation, analysis of social network profiles**

Choosing effective marketing strategies.



The task of targeting companies

- **Description:** Some description of Vk users who are potentially customers/consumers of the company's products (for example, those who really are) is given.
- **General task:** You need to define a strategy for displaying ads to users that maximize positive feedback



Segmentation of users by preferences

- **Description:** Given information about 30,000 users with known classes (frequent and rare viewers) and lists of sites they visited in the previous three months (about 170,000 different sites)
- **General task:** Classify users based on the time they spent watching TV, taking into account the list of visited websites

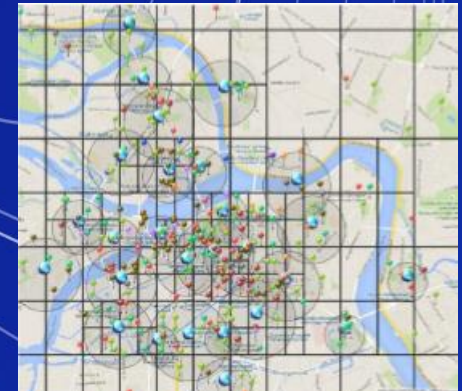
The project has been running since 2016, the results are implemented in Vk.com

Recommendation system. The Internet. Yandex Company

Yandex

Tourist recommendations of interesting
places in the city

- **Description:** The geography of visits to interesting tourist places, attractions of the city and the parameters of tourists (gender, age, nationality, etc.) are given. yandex.travel -depersonalized.
- **General task:** Based on the statistics and geography of visits, we recommend interesting places to various categories of tourists that they are likely to like.



Social media data analysis



Social network user profiling

- **Description:** The data of accounts from social networks with different content modality (Twitter — texts, Instagram — images, Foursquare — geolocation), as well as wearable devices are given.
- **General task:** To predict the characteristics of the user (gender, age, education, income level, psychological traits). On the basis of such forecasts, the construction of recommendation systems for proposals to groups of users (recommendations of places, people, groups).

The project has been running since 2016. Based on the algorithms, an analytical service for analyzing social network profiles is built




STATANLY Technologies

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