STATANLY technologies

Machine learning, computer vision, data analysis

Cases, projects, competencies

LLC «Statanly»,
Birzhevaya liniya, 16, Saint-Petersburg, Russia
https://statanly.com/

Key milestones of STATANLY technologies

2014 – 2016

Creation of an international machine learning laboratory at the Department of Computer Technology of ITMO University

Students of the Department of Computer Technology become **ICPC winners** for the **5th** time

2016 – 2018

The first major projects in the field of artificial intelligence introduction
with Yandex, Mail.ru Group, Insilico Medicine, VeeRoute

Defense of the first **PhD dissertations** in the direction of artificial intelligence

2018 – 2020

A company for the development of systems and services based on artificial intelligence **LLC «Statanly Technologies»** has been established

Statanly 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 – 2023

A new division for the development of systems based on «Computer Vision» has been opened

First foreign orders (USA, Europe, UAE)
A division has been opened to enter international markets
Grants have been received from the Foundation for Assistance to Small Innovative Enterprises (FASIE),
Residents of Skolkovo

Company today

2022

- The company is based on an international machine learning laboratory at ITMO University.

- ITMO programmers set a record, winning **7 times** at ICPC (World Programming Championship).

10+

Leading developers, specialists with a degree

50+

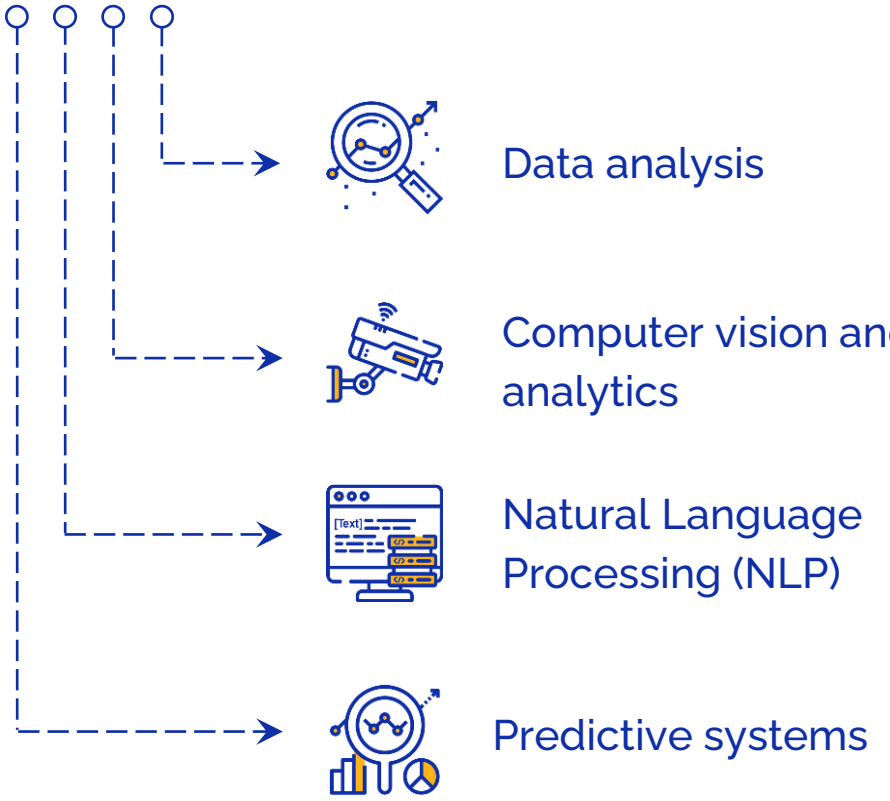
Specialists involved in various projects

300+

Machine Learning, Computer Vision and Data Analysis Projects

Our expertise

DIRECTIONS

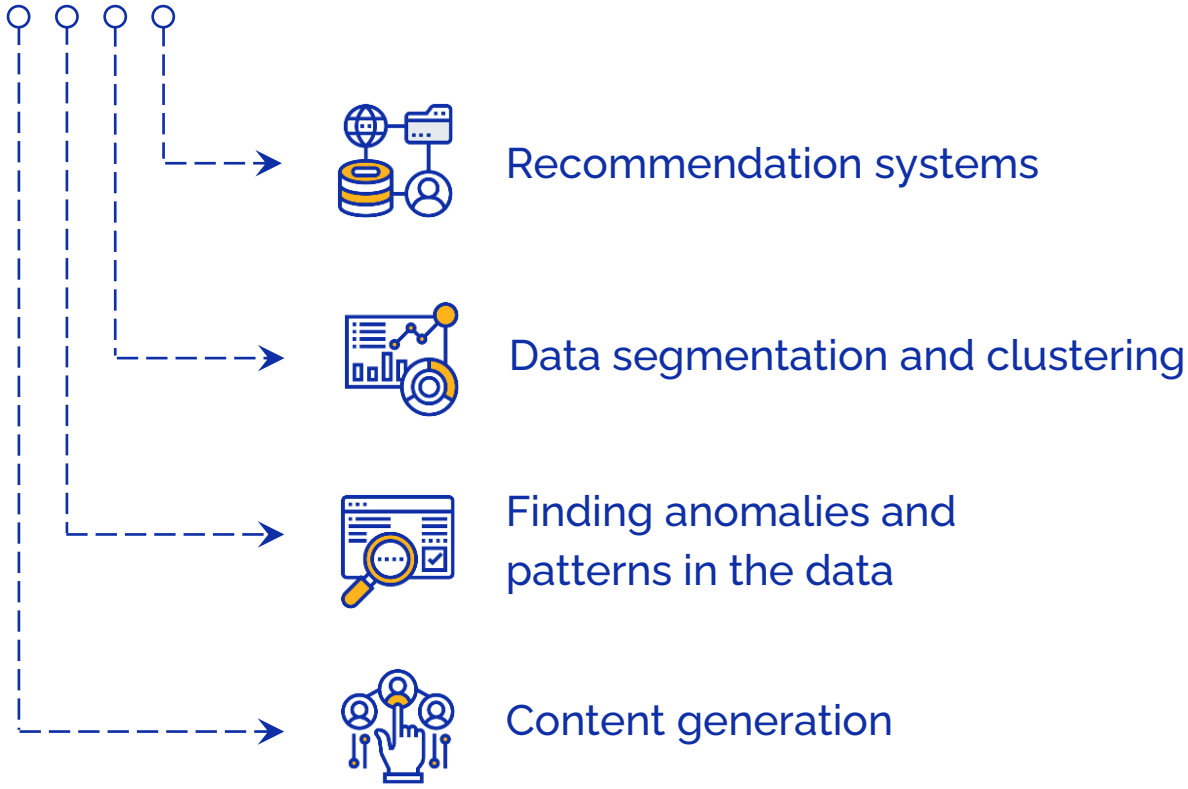


Data analysis

Computer vision and video analytics

Natural Language Processing (NLP)

Predictive systems



Recommendation systems

Data segmentation and clustering

Finding anomalies and patterns in the data

Content generation

Our products
Prototype solutions

Part classifier
A part classification system based on computer vision algorithms allows you to automatically determine the type of part, its article, characteristics, as well as select defective parts

Defect recognition system
System for detecting defects on various surfaces, foreign substances, printing quality, etc.

Facial recognition system
A system for recognizing faces, silhouettes, age, gender and much more. Object tracking

Number recognition system
Recognition of numbers, markings, QR codes, and free-form labels

Object characteristics detection system
Determining the number, type, shape, speed, color, and geometry of objects

Monitoring and safety system
Monitoring of presence in hazardous areas, violations of zone boundaries, fires and smoke

Forecast outflow system
Define outflow-prone customer segment in the database

Conversion prediction system
Sales conversion forecasting, optimization of product margins

Text analysis system
Highlight keywords, tags, text tones, analyze the meaning and intonation of texts

Analytical systems
ADVANTAGES

- CPU, GPU and **TPU** support (tensor processors, import substitution)
- Modular system (quick assembly of the system **for any task**)
- Huge number of **pre-trained** models ready for use
- Various **software delivery** options (boxed solution, SaaS, uncovered source code)
- Support for stereo vision and analysis from multiple cameras

Where AI finds application

EVRAZ РУСАЛ НОРНИКЕЛЬ СИБУР

Industry, Energy, Logistics

- Prediction of residual service life and equipment failure
- Identification of equipment defects
- Inventory optimization
- Recommendation systems for upgrade, procurement of equipment

СБЕР Точка банк для предпринимателей БАНК САНКТ-ПЕТЕРБУРГ Райффайзен БАНК

Banks, insurance

- Fully functional credit scoring systems
- Customer solvency assessment
- Fraud detection
- Personalized offers based on customer preferences

МегаФон LIFE TWILIO segment TBU

Telecommunications, advertising, media

- Assess customer value throughout the lifecycle
- Customer segmentation by age, cost, service duration
- Customer outflow analysis,
- Network Resource Load Prediction

City.Travel Яндекс

Retail, aggregators, sales

- Forecast sales conversion
- Customer base segmentation
- Personalized offers based on customer preferences
- Loyalty programs
- Pricing objectives

Our expertise

COMPUTER VISION

- Vehicle classification system
- Determining the speed of objects
- System for detecting penetration of objects into prohibited places
- A system for recognizing hazardous conditions
- Defect detection and quality control system
- System for recognition of inscriptions, markings, numbers
- System for determining size, type, shape, color
- Facility counting system
- Distance determination system
- Object tracking system

Our expertise

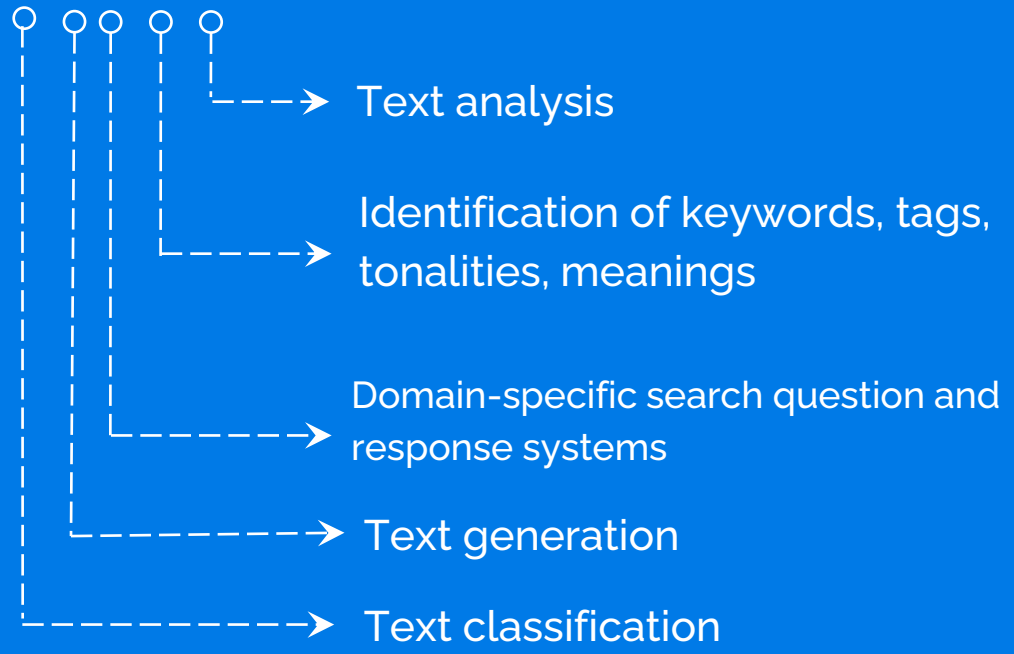
Machine learning

(Predictive and advisory systems, Data analysis)

- Equipment Failure Prediction
- Forecasting sales conversion, clicks, and transitions
- Customer outflow forecasting
- Recommendation systems of goods and products
- Clustering of Users by Interest
- Fraud detection
- Optimization of advertising companies
- Look-alike audience (LAL)

Our expertise

NATURAL LANGUAGE PROCESSING



- Web scraping using LLM
- Structured data extraction from documents
- Question and response system using document collection, RAG (Retrieval-Augmented Generation)
- Dedicated Dialog Agents/Chat Bots (ChatGPT)
- Chat Bots with knowledge graph support, able to introduce knowledge into it, and use information beyond the context window
- Summarization
- Personalized copilot
- Automatic translation
- LLM agents (example AutoGPT)
- Document Review
- Voice Assistant
- Text Paraphrasing Systems

Key features

Product

- Computer vision plug-in system for enterprise management and monitoring solutions.
- Affordable transparent pricing mechanism. Different solutions (modules) for different tasks and budgets.
- The solution is easily scalable and independent of Western technology.

Compact Neural Computer Synapse - 8

Allows you to perform on-site analytics and transfer metadata to a central server.

- 10.6TOPS INT8 AI computing power
- 1.3 TFLOPS FP32 AI computing power
- 8 channels 25 fps HD video decoding
- up to 8 channels of analytics

Compact Server Neural Computer Synapse-456/192

- 211 TOPS INT8 AI computing power
- 26 TFLOPS FP32 AI computing power
- 456 channels 25 fps HD video decoding
- up to 192 analytics channels

Server neural calculator Synapse-566/288

- 316.8 TOPS INT8 AI computing power
- 39.6 TFLOPS FP32 AI computing power
- 684 channels 25 fps HD video decoding
- up to 288 analytics channels

Server neural calculator Synapse-960/480

- 528 TOPS INT8 processing power
- 66 TFLOPS FP32 processing power
- 1140 channel 25fps HD video decoding
- up to 480 analytics channels

Support for tensor processors

The developed system supports work not only on the CPU and GPU (currently generally accepted), but also on specialized solutions based on **TPU (tensor processors)**, freely supplied from China, which are able to analyze hundreds of video channels at the same time.

All algorithms and models are adapted to work on such devices

PROJECTS

Computer vision and video analytics

Part classification system

Part classification, scrap detection, characterization

System description

A part classification system based on computer vision algorithms allows you to automatically determine the type of part, its article, characteristics, and also select defective parts.

Composition of the system:

- IP cameras
- Compute server/computer for analysis and output of results
- Software
- «Part Classification System»
- (optional) lighting, specialized surface

Implementation results: automation of the process of classification of any parts, spare parts, detection of defects, defects

System features

- Classification of any parts and objects, definition of scrap, geometric dimensions
- Works with standard IP cameras
- Quick adjustment (further training) of the system for new types of parts without the participation of developers
- Simple and easy-to-understand interface (web/desktop)
- The functionality allows the user to select different cameras by range, upload new articles to the database, retrain the model, print labels based on recognized articles
- Define Part Area for Cost Determination
- Calculation of the total number of processed parts

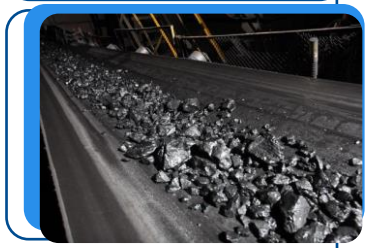
System accuracy 99.9%:

НОРНИКЕЛЬ

Parameter recognition systems processes

Project example №1

ORE SIZING SYSTEM



Task:

Development of a system that determines the size distribution of ore rock on a moving conveyor.

Relevance:

- mining and metallurgical enterprises;
- determination of particle size distribution "eye-to-eye" composition;
- manual control of the mill;
- slow down with small, speed up with large

Implementation results: automation of the ore crushing process by controlling the grinder depending on the rock size

Project example №2

SYSTEM FOR ANALYSIS OF FLOTATION PATTERN DURING MINERAL ENRICHMENT

Task:

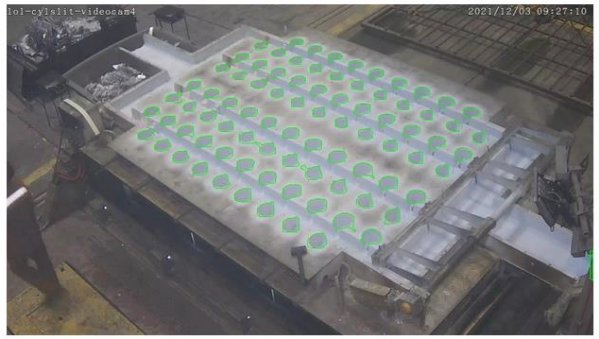
Detection of bubble size, number of bubbles and foam rate by computer vision techniques.

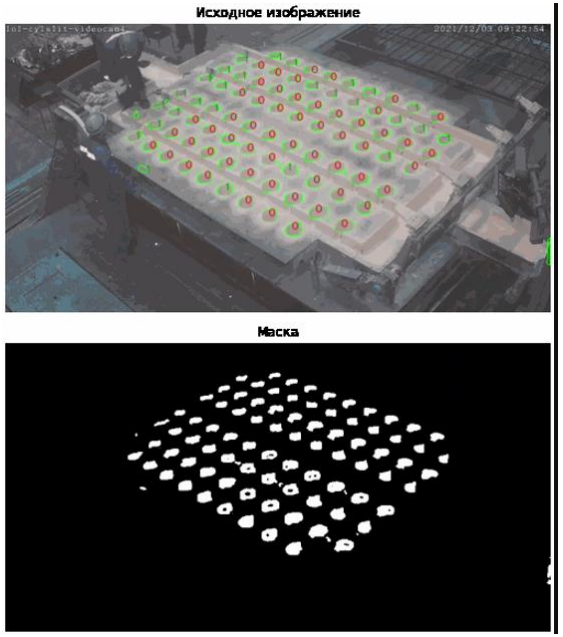
The key analyzed indicators are:

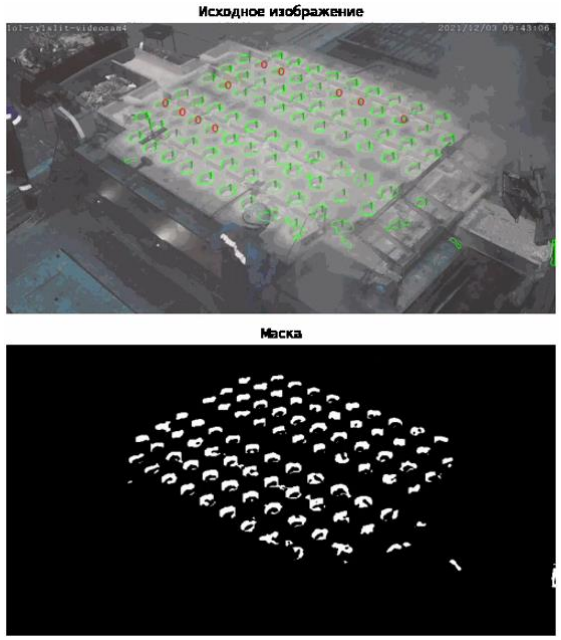
- Foam color
- Bubble diameter (distribution)
- Speed of foam removal

Implementation results: optimization of the process of mineral enrichment by flotation.
Implemented at KGMK

Аналитика







2021-2022

Metal spill detection system for ingot casting

Task:

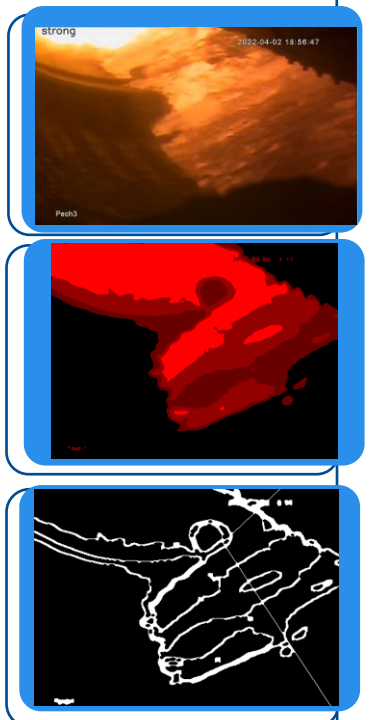
Construction of a system for operational determination of metal spillage during casting of cylindrical ingots based on computer vision algorithms to optimize the company's industrial processes.

РУСАЛ

RESULT

A prototype of a metal spill detection system has been created.

Process and object parameter recognition systems



Project example №1

SPECK QUALITY IMPROVEMENT SYSTEM

Task:

- Implementation of a system for recognizing different quality specks from video from active cameras in real time.
- Assessment of the possibility to supplement the quality of the speck classification with data on the temperature at the outlet of the speck from the furnace, as well as further enrichment of data from the laboratory.

Implementation results: A system has been developed - an assistant agglomerator to increase the yield of high-quality products from the furnace.

Project example №2

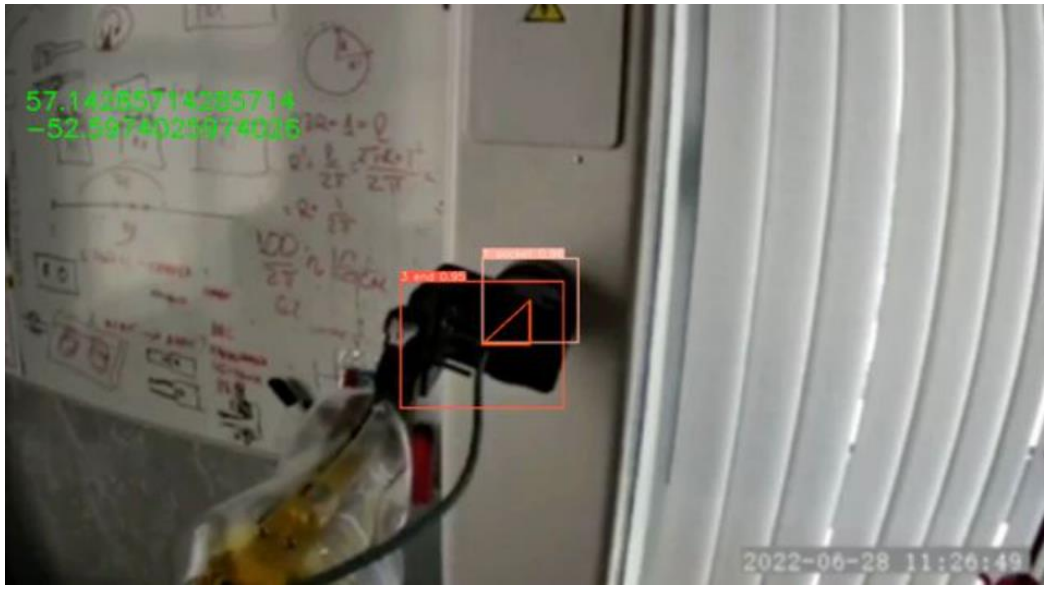
PEDESTRIAN VEHICLE MOVEMENT CONTROL SYSTEM

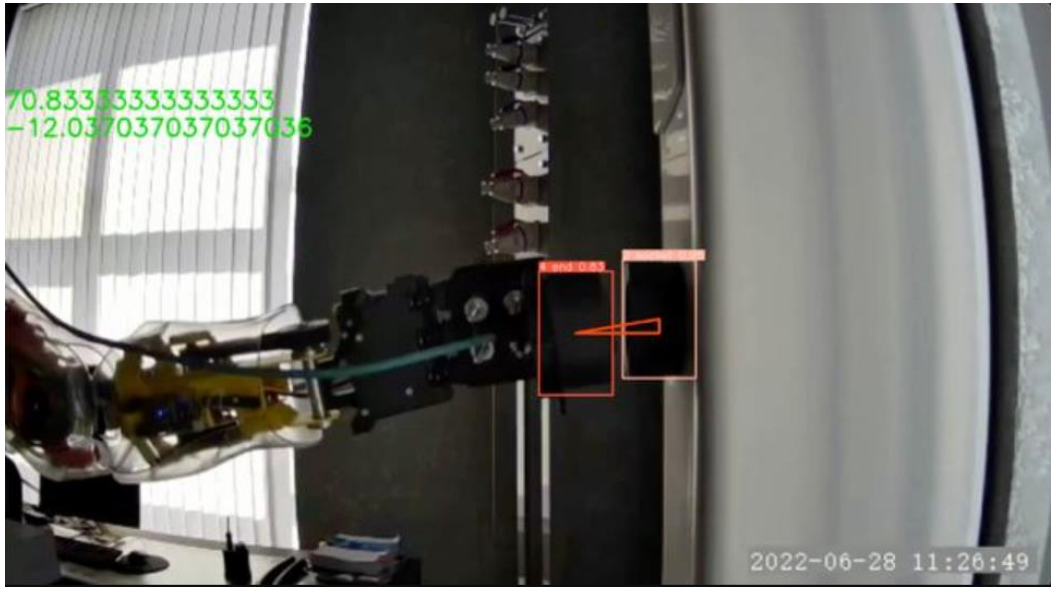
Task:

Development of an operational control system for the movement of motor vehicles - pedestrians based on computer vision algorithms to prevent hazardous accidents at work.

The system determines vehicles and pedestrians and warns in case of dangerous approaches.

Implementation results: the prototype system is being implemented at the plant LLC "LMZ "SKAD"





2022

AUTOMATIC CONNECTOR DOCKING SYSTEM

Task:
Construction of a system for operational determination of part deviations (position adjustment) based on computer vision algorithms for automation of part docking processes.

КОНСТРУКТОРСКОЕ БЮРО PACKAT

RESULT

Prototype automatic part docking system created

EVRAZ

Object parameter recognition systems

Project example N°1

THE SYSTEM FOR RECOGNIZING ARBITRARY NUMBERS OF MOVING TROLLEYS

Task:

- A system for recognizing technical numbers of an arbitrary type of ore trolleys in conditions of increased noise

Project example N°2

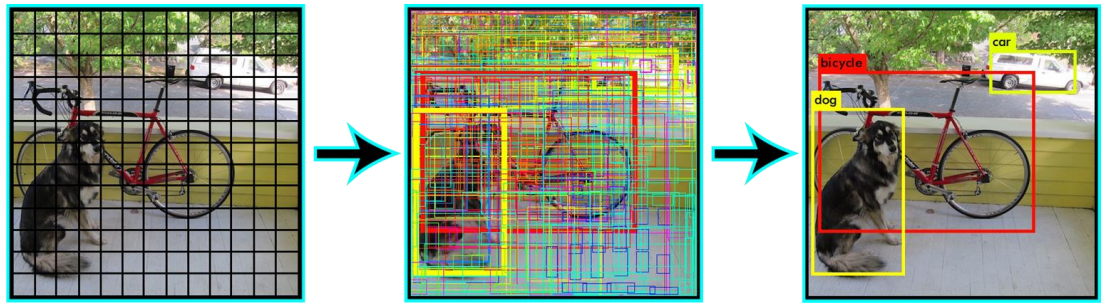
THE SYSTEM OF OPERATIONAL ANALYSIS AND CONTROL OF THE BLAST FURNACE BRAKING SYSTEM

Task:

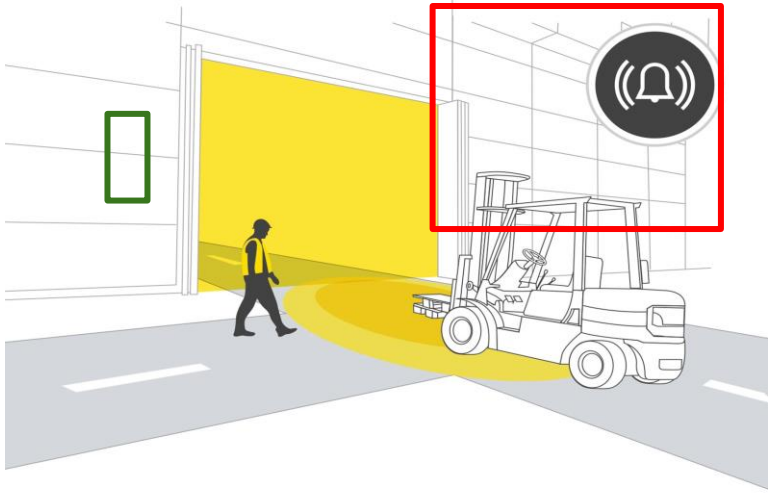
- Implementation of the system of operational analysis and control of the brake system of the main skip lift of the blast furnace and warning of the occurrence of critical deviations

Projects took place in 2020-2021

1 STAGE object detection



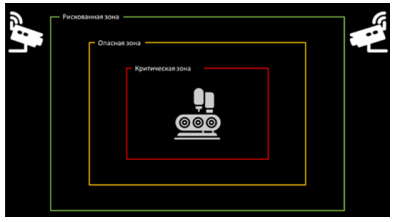
2 STAGE determination of critical distance



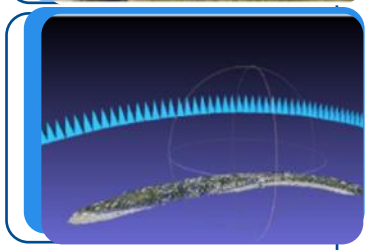
НЛМК

Computer vision-based occupational safety system

Task:
Perimeter control using machine vision - video surveillance of equipment in order to prevent employees from a critically dangerous distance to dangerous moving parts;
If an employee crosses different perimeter boundaries, then there are notifications from the controlling specialists.



Object parameter recognition systems



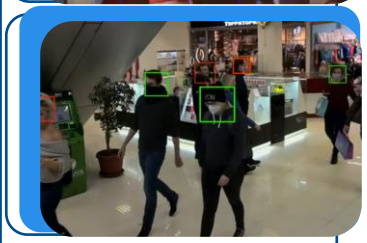
Project example №1

VEHICLE DETECTION AND CLASSIFICATION

Detection and classification of vehicles in images of UAVs (unmanned aerial vehicles)

Tasks:

- Detection and classification of vehicles in UAV images.
- Create a 3D reconstruction from real-time UAV images.

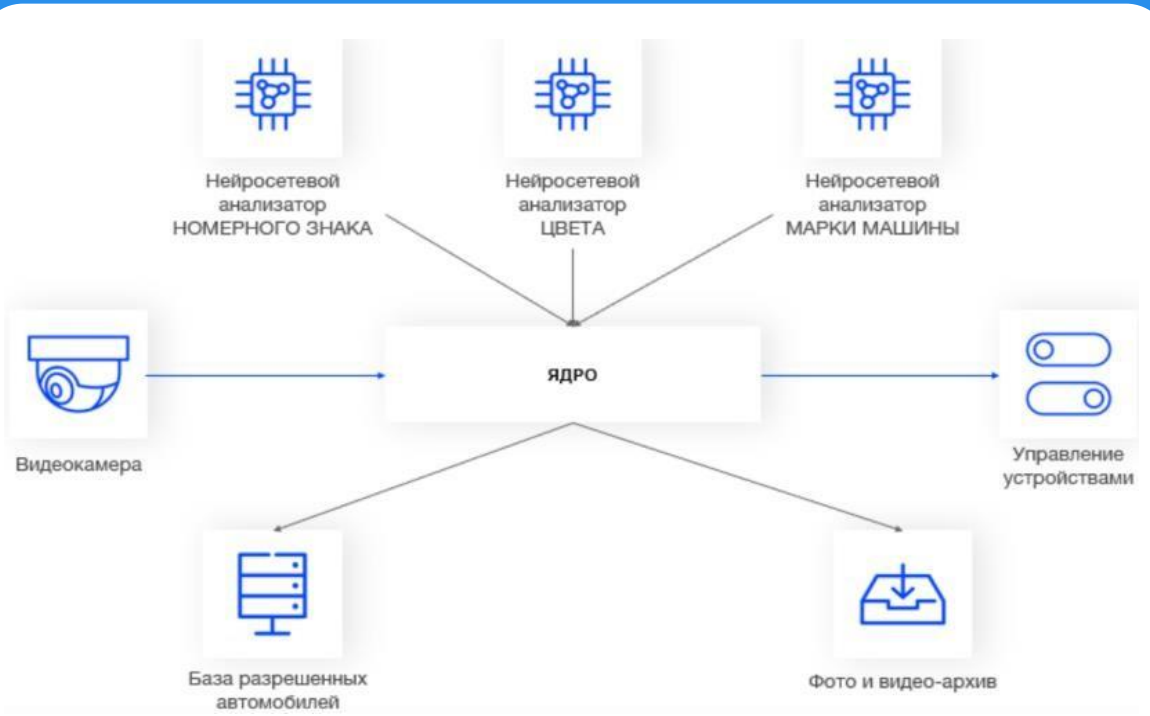


Project example №2

MASK AND HELMET RECOGNITION SYSTEM

- Production
- Shops and supermarkets
- Shopping and Business Centers
- Airports and train stations
- Cafes and restaurants
- Sports halls and fitness centers

Vehicle Recognition System



- Car license plate recognition.
- Car recognition by additional features (brand, model, color, body type) in case of contamination of the license plate. Detection of special vehicles according to the color scheme
- The video camera is a universal sensor.
-

99,3%
number plate recognition accuracy

95%
accuracy of recognition of secondary characters

99,97%
general accuracy of the system operation

Text recognition systems

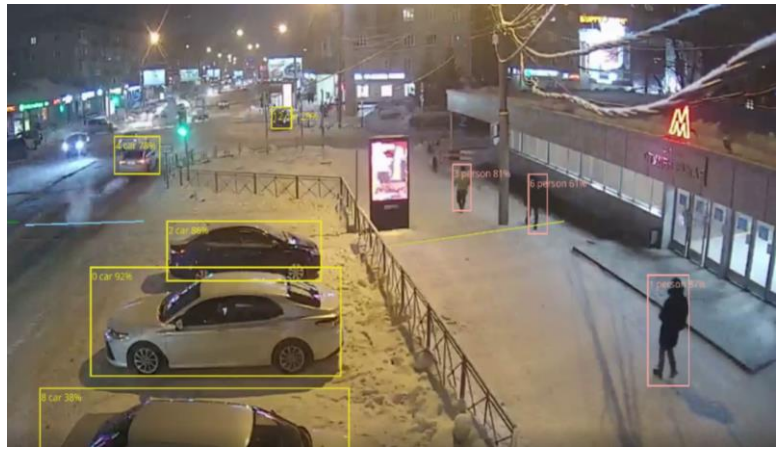
Project example №1

SYSTEM FOR RECOGNIZING TEXTS OF DIFFERENT ALPHABETS IN CONDITIONS OF EXTREME NOISE

Project example №2

MARKED WORKPIECE RECOGNITION SYSTEM

Marking recognition systems on workpieces based on machine vision algorithms in order to optimize the distribution process of workpieces processing in the workshop. Within the framework of this project, it is necessary to develop algorithms for recognizing marked plates, a numerical code, and the container number in which the workpiece is located.



Vehicle characterization system

- Control of vehicle dimensions (by height) and fixing of dry contact with the bridge.
- Remove characteristics (body type, mark, color, etc.) of the traffic flow to create a digital intersection.
- Counting objects.

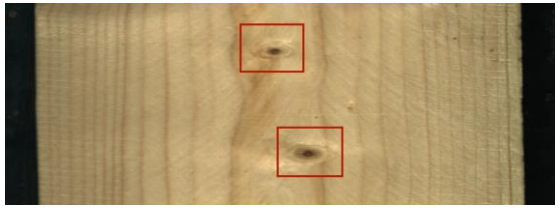
Транспортные инновации Москвы

RESULT

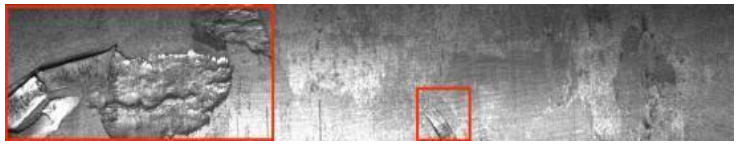
System prototype developed

DEFECT RECOGNITION SYSTEM

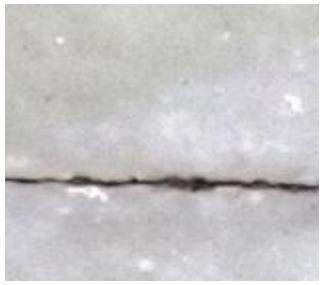
Development and training of algorithms for determining defects in various surfaces and parts. The algorithms have been implemented in a number of enterprises.



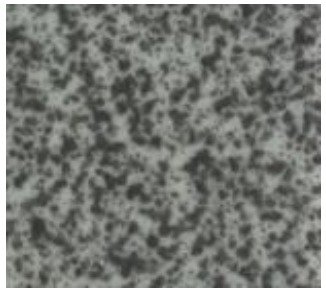
Wood



Steel



Marble



Tile

Pills

Capsule

Transistor

Details

RESULT

A library of algorithms for determining various defects has been developed

PROJECTS

Forecast and recommendation systems

Prediction for operating time to failure

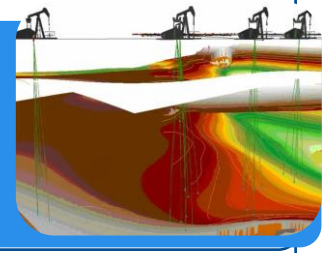
Project example №1

PRODUCTION EQUIPMENT FAILURE PREDICTION SYSTEM

Task:

Develop a procedure for forecasting the mean time between failures (MTBF) of downhole equipment and planning the inter-repair period (MCI)
Well operation, as well as a system for determining the technical limit of equipment operation in the well.
General task: Creation of a system for forecasting mean time between failures (MTBF) of equipment by a group of specified parameters.

Project results: as part of the development tender, Statanly Technologies took first place in the accuracy o interpreted models



Project example №2

DECISION-MAKING SYSTEM FOR SELECTION OF EQUIPMENT BASED ON FORECAST MODELS

Task:

Develop a recommended system for selecting downhole equipment and components for repair
The general task is to create a decision-making system for selecting equipment and components based on predictive models for predicting the time of failure and breakage of equipment.

Project results: the company was the organizer of the competition of PJSC "Gazprom Neft" to create forecast models of equipment failure.

2019-2020

Peroxide production shutdown prediction system

Task:
In the production of peroxide grade polypropylene, the last step is to cut the granulate. It happens that agglomerates begin to adhere to knives as a result of knives begin to move away from the die, the process degrades and the equipment stops. These are big losses for production.
The degradation process can be indirectly tracked by the presence of agglomerates on the shaker. Based on telemetry data (per year), as well as extruder shutdown data, develop a predictive shutdown system.

СИБУР

RESULT

As part of the project, the LSTM and GRU algorithms are implemented:

LSTM: Training Accuracy = 0.960, Test Accuracy= 0.867

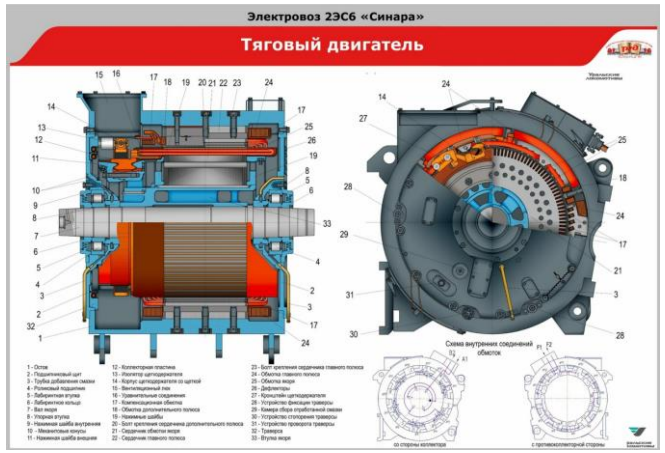
GRU: Accuracy= 1.000, Test Accuracy= 0.849.

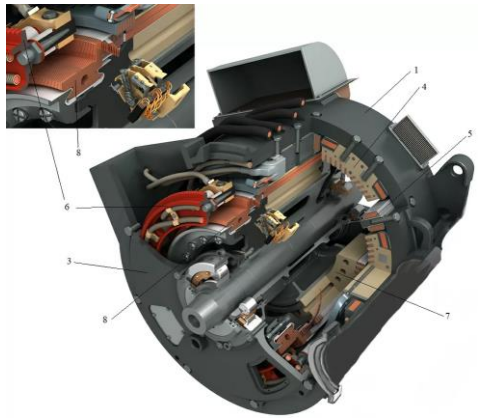
2019-2020

Predictive failure system of traction electric motors of electric locomotives 2ЭС6

Task: Based on the statistics collected during the operation of electric locomotives, predict the failure and identify the factors affecting the failure of electric motors 2ЭС6 and develop a forecast system for the failure of electric locomotives.

Results: A software library has been developed for analyzing and processing "raw" data. Predictive algorithms for the failure of 2ЭС6 electric locomotives have been developed. Created a web server for working with predictive algorithms. A test web service has been published to demonstrate the operation of algorithms: http://stm.statanly.com.





СТМ СЕРВИС
СИНАРАТРАНСПОРТНЫЕМАШИНЫ

RESULT

Several models have been implemented and trained within the project:
ROC AUC= 0.70

City.Travel

Sales conversion prediction

Project example №1

Forecasts of air ticket sales conversion

Description: Historical data on the shows of offers for requests for flights, their parameters (time, airports of departure and arrival, number of transfers, time of transfers, ticket class, number of passengers, etc.), as well as information on whether the ticket was purchased. Based on this data it is necessary to build machine learning models to predict the conversion of air ticket sales.
General task: Create a system for predicting requests with the highest conversions. However, from the point of view of increasing revenue (minimizing impressions that will not lead to a purchase), the forecast system can be used to find requests that deliberately do not lead to a purchase.

Project example №2

Forecast of air ticket price change (pricing)

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 (dynamic pricing problem)
General task: Creating a system for predicting the mark-up on the cost of air tickets, maximizing their conversion of sales.

Project results: The project took place in 2017 and was successfully completed, forecast models were implemented in the company

БАНК САНКТ-ПЕТЕРБУРГ

Banks, Fintech, Insurance Companies

Project example №1

CREDIT SCORING BASED ON UNBALANCED DATA

Impersonal characteristics of potential borrowers are given (gender, age, products used, transactional operations, etc.)

Project example №2

IMPROVING CREDIT SCORING MODELS

A method of filtering customers based on subject-oriented regularization of auto-encoders to improve the accuracy of credit scoring.

RESULT

AUC 0,837

точка
банк для предпринимателей

Banks, Fintech, Insurance Companies

Project example №1

Analysis of transactions of legal entities

Analysis of transactions of legal entities and identification of anomalies by modern machine learning methods.

Project example №2

NLP analysis

Refinement of various scoring and analytical models by analyzing text information of documents.

Banks, Fintech, Insurance Companies

Project example №1

Investment recommendation system

Impersonal parameters and characteristics of the bank's customers (gender, age, transactions made, used produc of the bank) are given.
Overall challenge: Creating various recommendations on investment data, retail data and social media.

Project example №2

Fraud detection system

Based on customer data and used insurance products, it is necessary to build models to identify fraudsters in t field of motor vehicle insurance.
General task: Creating a system to identify fraudsters in the field of car insurance.
The final results showed an accuracy of about 75%.

Segmento

Marketing, Media, Telecom

Project example №1

Look-alike audience

Clustering customers according to different characteristics to optimize advertising companies. Based on text information, classify/index websites. Site analysis is carried out on the basis of the latest methods and research in the field of NLP.

Project example №2

Website classification

Based on the data of various sites, the system classifies the resource, assigning it to one or more classes, which allows you to significantly optimize marketing companies.

Project example №3

Generating Domain Names

Based on the text description of the site, generate a unique domain name specific to the website.

Marketing, Media, Telecom

Project example №1

Optimizing marketing campaigns

Based on data from marketing companies and impersonal data from the target audience, the system optimizes companies to maximize/minimize the target characteristics (budget, reach, target audience, etc.)

Project example №2

Predictive publishing system

Based on the parameters of publications (name, category, text, etc.), the system predicts such characteristics of publications as the number of views, likes, etc. Based on this information, you can optimize advertising budgets and the number of views.

Project example №3

Прогнозирование телевизионного смотрения

Based on machine learning algorithms, it is necessary to develop algorithms for predicting the viewing of respondents of a certain advertising unit. Input data - on-air characteristics of the advertising unit (date, time of release, volume of the unit, schedule of programs, characteristics of programs, genre, leading, etc.), data on respondents (social and demographic profiles of respondents.

INSILICO MEDICINE

Medicine

Project example №1

Predicting age on a blood model

More than 60,000 total blood biochemistry samples and cell counts from standard medical examinations conducted by a single laboratory and related to chronological age and sex were given.
General task: a system predicting human chronological age using a baseline blood test

Project example №2

Detection and classification of possible cancers by DNA microarrays

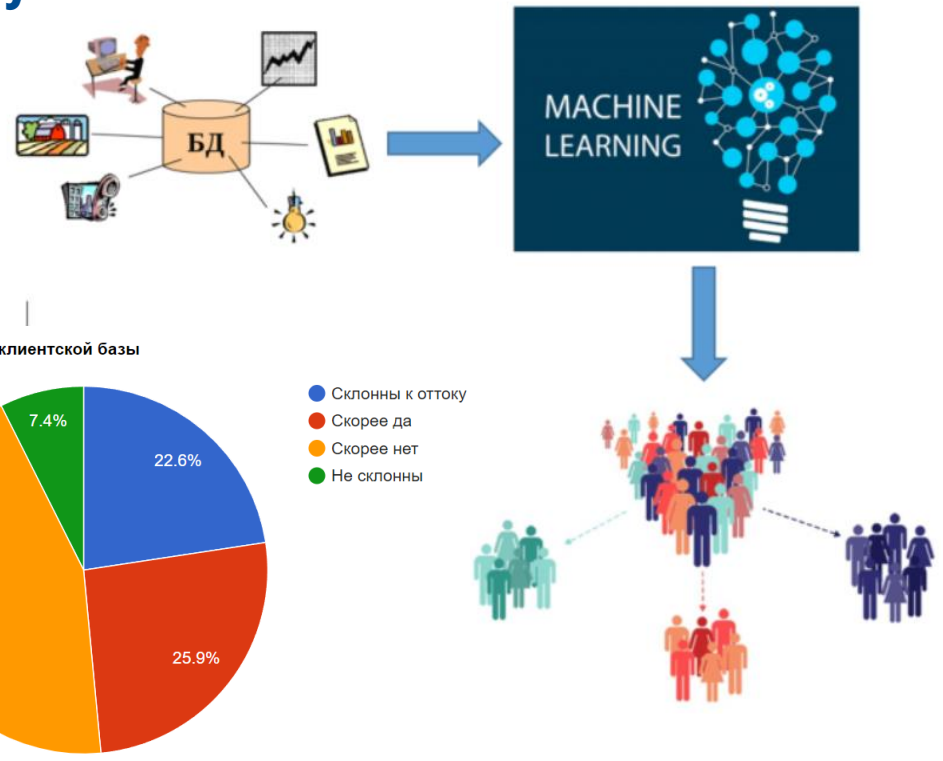
More than 60,000 total blood biochemistry samples and cell counts from standard medical examinations conducted by a single laboratory and related to chronological age and sex were given.
General task: system of detection and classification of possible cancers

CusFlow.

Subscription services

Forecast customer outflow system

Description: Development of a forecast customer outflow system built on the basis of a client database. General task: CusFlow algorithms allow you to divide the entire client base into clusters and allocate segments of customers most prone to outflow. Our services are precisely configured for each client base of our users, which allows you to get the maximum prediction accuracy and, at an early stage, prevent the outflow of customers. Read more: https://churn.statanly.com/

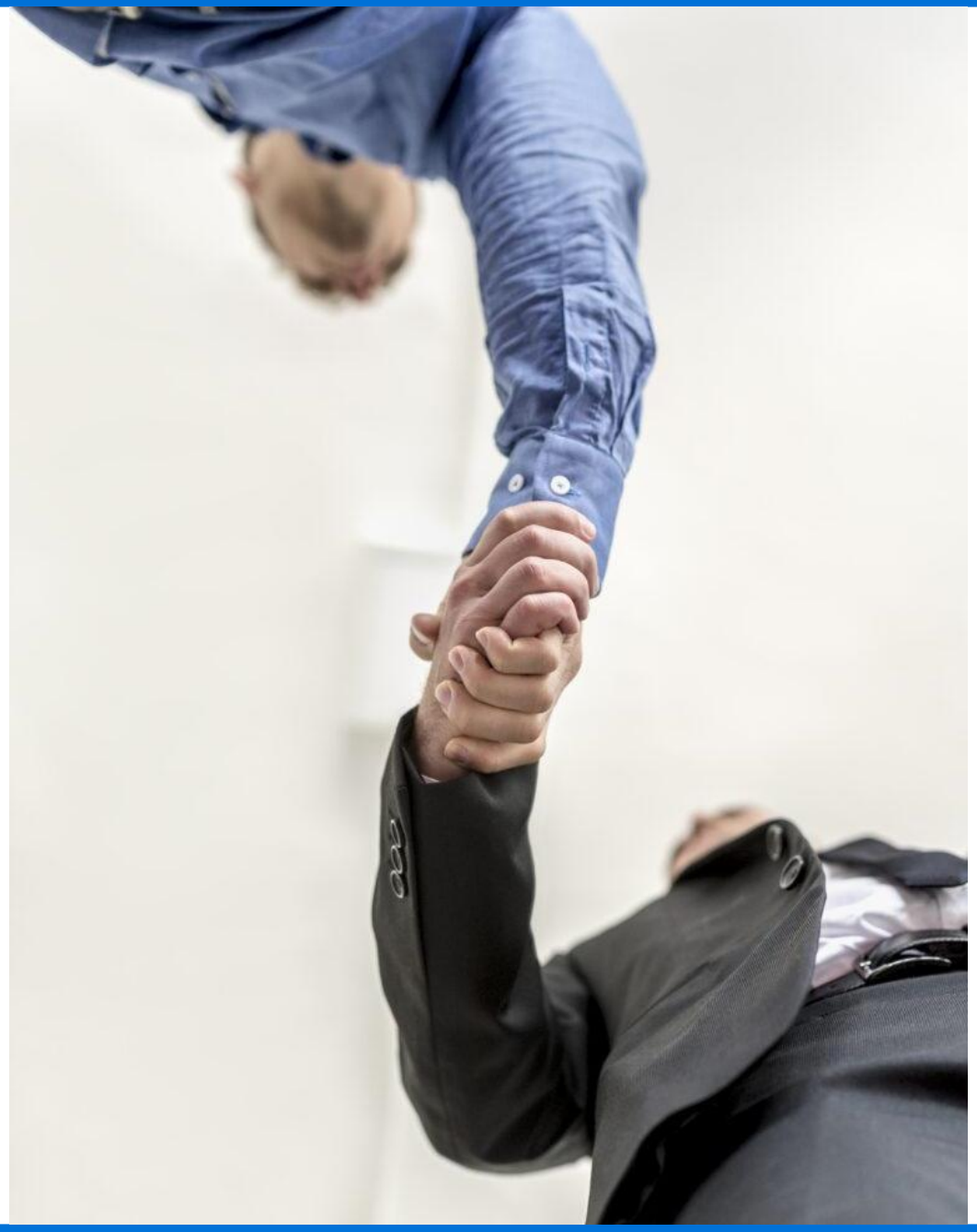


Partners and customers

COMPETITIVE ENVIRONMENT

Software delivery options

- Cloud SaaS service, subscription model
- Boxed product, license sale
- Open source solution, task-specific refinement
- Individual development based on developed technologies



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