



EINIXVISION

ADVANCING AI FOR EVERYONE

Team Norsec

CONTENTS.



- Team.
- QR-codes (quick links).
- Problems.
- A little bit of history.
- In simple terms about technology.
- From hypothesis to result.
- Solutions.
- Recognition of people and faces.
- Vehicle recognition.
- Safety compliance.
- Assistant for all types of industries.
- Data analytics.
- User-friendliness.
- EINIX VISION Learning Tool (EVLTL).
- Monetization Model.
- Market size evaluation.
- Canvas-map of business model.
- Roadmap.
- Usage of technology.
- Conclusion.
- Contacts.

TEAM.



Al-Farabi Rakhinzhanov

ARCHITECT (CHIEF ENGINEER)

Responsible for the used technologies and software development.



Duman Daulbekov

FRONTEND DEVELOPER

UI / UX expert. Makes the site as convenient and understandable as possible in interaction with users.



Meirambek Abenov

DATA ANALYST

Structures data, formulates and tests hypotheses, summarizes conclusions.

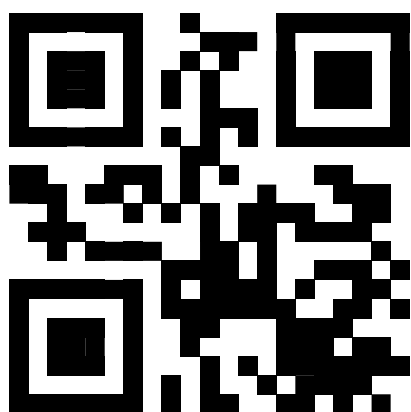


Nurzhan Mukhamedkali

PRODUCT MANAGER

Responsible for creating, pricing, forming requirements, determining the purpose of the product.

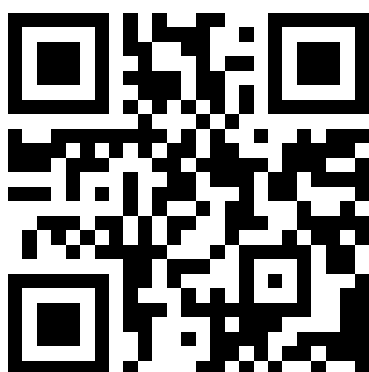
SCAN ME. (QR-CODE)



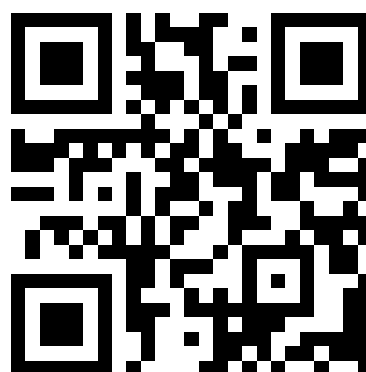
Site einx.kz.



LIVE DEMO.



Video presentation.



Online documentation.

PROBLEMS.

1. Safety Compliance.
2. Extensive control and monitoring.
3. Quick response to unsafe work situations.
4. Problems with processing video stream and receiving data analysis.
5. Availability and Mobility.

A LITTLE BIT OF HISTORY.

* In fact, Artificial Intelligence is not new at all. It started back in the 1950s, when even the principles on which the Internet was built were not yet applied on the network.

From 1950

To 1980

ARTIFICIAL INTELLIGENCE

Any technique that allows computers to imitate human behavior.

From 1980

To 2010

MACHINE LEARNING

Artificial intelligence methods that enable computers to learn without explicit programming.

From **2010**

DEEP LEARNING

A subset of machine learning that makes it possible to compute multilayer neural networks.

IN SIMPLE TERMS ABOUT TECHNOLOGY.



ARTIFICIAL INTELLIGENCE

In the global universal sense, AI is the term as broad as possible. It includes both scientific theories and specific technological practices for creating programs close to human intelligence.



MACHINE LEARNING

Section AI actively applied in practice. Today, when it comes to using AI in business or manufacturing, we mean Machine Learning.

ML-algorithm, as a rule, works on the principle of a learning mathematical model that performs analysis based on a large amount of data, while conclusions are drawn without following rigidly defined rules. The most common type of task in machine learning is learning with a teacher. To solve such problems, training is used on an array of data, for which the answer is known in advance.



COMPUTER VISION

Computer vision is the theory and technology of creating machines that can detect, track, and classify objects. As a scientific discipline, computer vision refers to the theory and technology of creating artificial systems that receive information from images. Video data

can be represented in many forms, such as a video sequence, images from various cameras or three-dimensional data, for example, from a medical scanner device.



DATA SCIENCE

The science and practice of analyzing large amounts of data using all kinds of mathematical methods, including machine learning, as well as solving associated tasks related to the collection, storage and processing of data arrays.

Data Scientists — Data specialists, particularly those who analyze using machine learning.

FROM HYPOTHESIS TO RESULT.

1. ALL STARTS FROM HYPOTHESIS

A hypothesis appears while analyzing a problematic process, employee experience, or with a fresh look at production. Typically, a hypothesis affects a process where a person physically cannot consider many factors and uses rounding, assumptions, or simply does as he always did.

In this process, the use of machine learning allows you to use significantly more information in making decisions, therefore, it is possible to achieve significantly better results. In addition, the automation of processes using ML and the reduction of dependence on a specific person significantly minimize the human factor (disease, low concentration, etc.).

2. HYPOTHESIS EVALUATION

Based on the formulated hypothesis, the data necessary for the development of a machine learning model is selected. A search is made for the relevant data and an assessment of their suitability for embedding the model in the current processes is

determined who will be its users and due to which the effect is achieved. If necessary, administrative changes are made.

3. RETURN OF INVESTMENTS

Evaluation of the economic effect of the implemented solution is carried out by specialists in conjunction with the relevant departments: efficiency, finance, etc.

At this stage, it is necessary to understand what exactly the metric is (the number of correctly identified customers / increase in output / saving of consumables, etc.) and clearly formulate the measured goal.

4. MATHEMATICAL FORMULATION OF THE PROBLEM

After understanding the business result, it is necessary to shift it to the mathematical plane - to define measurement metrics and restrictions that cannot be violated. The data scientist performs these steps together with the business customer.

5. DATA COLLECTION AND ANALYSIS

It is necessary to collect data in one place, analyze them, considering various statistics, understand the structure and hidden relationships of these data to form signs.

6. CREATING A PROTOTYPE

It is a hypothesis test. This is an opportunity to build a model on current data and initially verify the results of its work. Typically, a prototype is made on existing data without developing integrations and working with a stream in real time.

Prototyping is a quick and inexpensive way to check if a problem is being solved. This is very useful when it is impossible to understand in advance whether it will be possible to achieve the desired economic effect. In addition, the process of creating a prototype allows you to better assess the scope and details of the project for the implementation of the solution, to prepare an economic justification for such an implementation.

7. CREATING A SOLUTION

At that moment, when the results of the prototype work demonstrate confident achievement of indicators, a complete solution is created where the machine learning model is only a component of the studied processes. Next, integration, installation of the necessary equipment, staff training, changing decision-making processes, etc.

8. EXPERIENCED AND INDUSTRIAL OPERATION

During the trial operation, the system works in the mode of advice, while the specialist still repeats the usual actions, each time giving feedback on the necessary improvements to the system and increasing the accuracy of forecasts.

The final part is industrial operation, when the established processes switch to fully automatic maintenance.

SOLUTION.

Artificial intelligence is gradually entering our lives. For most people, artificial intelligence or machine learning may seem like something out of the fantasy, but you may be surprised to find out that you already use artificial intelligence devices every day. It has a huge impact on our lives and its influence is growing every day!

- Recognition and Identification;
- Protection;
- Help;
- Health and Medicine;
- Analysis of data of any scale;
- Self-taught system.

We are developing a multifunctional, fast, simple and self-learning system with artificial intelligence (AI) using image processing (CV) with machine and deep learning (ML & DL), which can work with any data and analyze data of any size.

One system for all: recognition, security verification, control and monitoring of objects and protected areas for any industry.

Providing a cloud solution to save user and customer resources with broad integration capabilities.

RECOGNITION PEOPLE AND FACES.

You go up the stairs and go into the elevator. It knows which floor you need. The doors to the apartment themselves open in front of you. The computer and the phone “recognize” you and do not require a password. Cars, social networks, shops - everyone greets you, having barely seen you, they will turn to you by name and predict your every move. This is how face recognition works.

Recognition of staff and their personality is an integral part of the development of artificial intelligence. You can't even imagine how widely facial recognition technologies have spread around the world and what powerful prospects promise.

The face recognition system allows you to do such simple and complex things as:



Verification of identity.



Search and definition of people according to certain criteria.



Control and access to protected areas.



Unlock your phone or computer.



Payment and receipt of parcels.

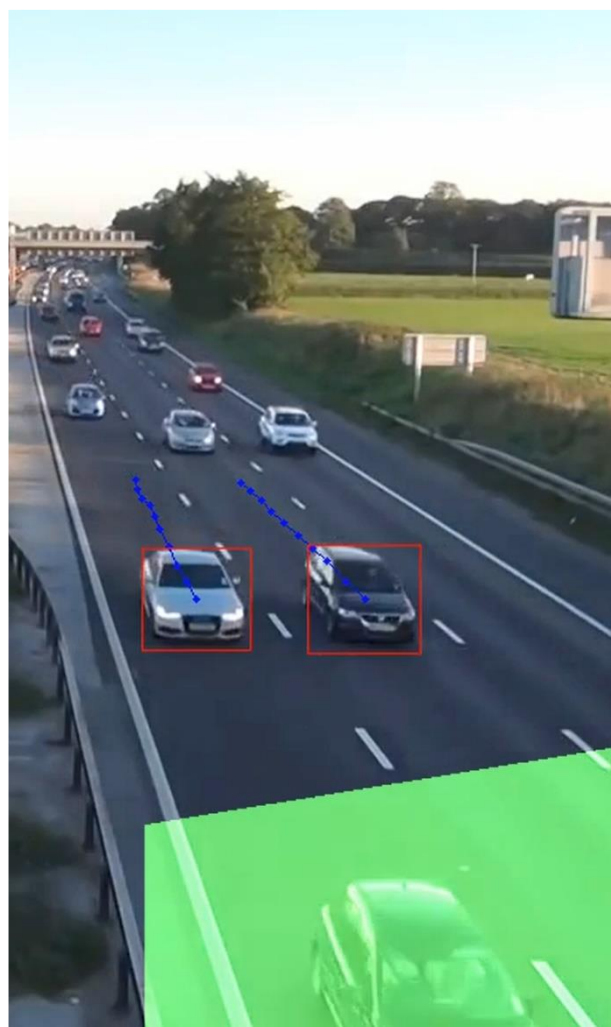
VEHICLE RECOGNITION.

The performance, cost and maintenance of vehicle recognition in various real-world conditions is still a problem for practical use.

Using computer vision (CV) and deep learning (DL), the system saves users' time and resources by using a single camera without additional equipment, such as radars, sensors and electrical pulses. We hope that the system will become widespread due to low cost and multi-functionality.

The recognition of vehicles on the road is used to solve various problems, including logistics, with the aim of determining traffic flows on road sections.

The vehicle recognition system allows you to do such simple and complex things as:



Identification of the complete transport model



Number recognition



Speed limit check



Vehicle size



Vehicle type classification.

SAFETY COMPLIANCE.

Performance of labor protection requirements is the most important factor affecting the proper organization of production and the successful existence of any enterprise. Productivity depends on labor safety, and conducting briefings is a guarantee of workers observing technological discipline.

Some industries, such as mining or dealing with mineral resources, are covered by separate legislation regarding the safety and health of workers.

The main objective of the system is to provide safe working conditions for all workers, including workers with disabilities.

The system for recognizing threats and safety problems at the workplace allows you to check the personal protective equipment (PPE) of an employee:



Helmet



Glasses



Gloves



Uniform



Boots

*** Personal protective equipment** – means used by the employee to prevent or reduce exposure to harmful and dangerous factors, as well as to protection against pollution. They are used in cases where the safety of work cannot be ensured by the design of equipment, the organization of production processes, architectural and planning decisions and collective protective equipment

Also, to avoid and prevent the risks of industrial incidents, associated with hazardous facilities and unsafe situations, the system can send reports with photos to the security department for further action.

1

Take a photo of a place with an object that poses a threat to security.

2

Mark the object in the photo and add a description.

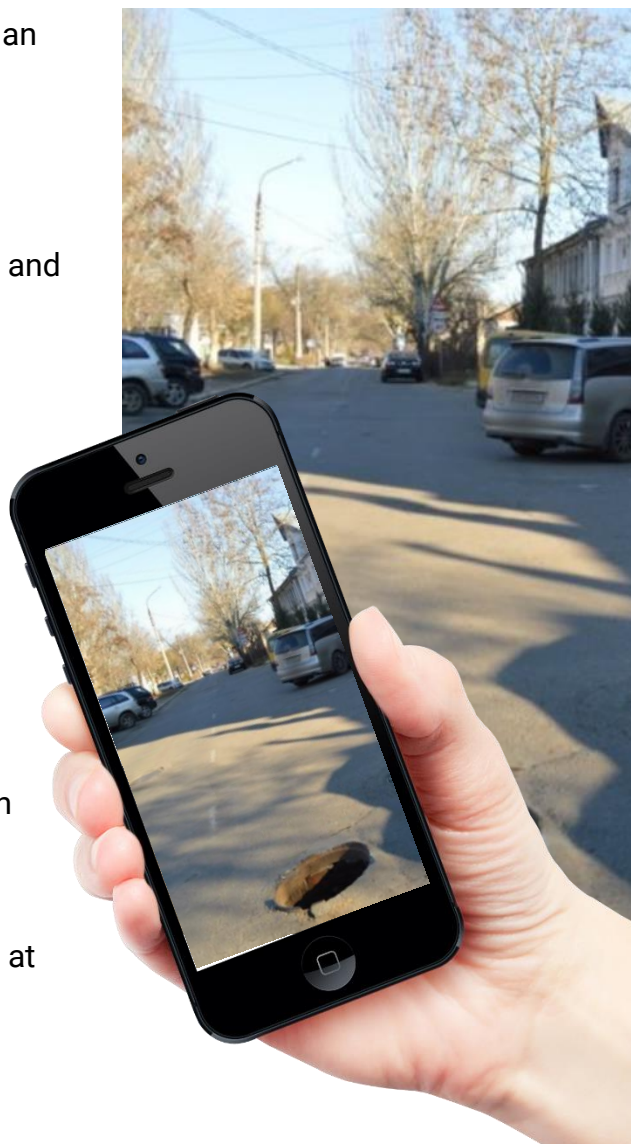
3

Send an unsafe situation report to the Department of Health and Safety.

4

Get data analysis with the ability to get all the actions that occurred at the site of an unsafe object.

Data analysis also can show the time the object appeared at the scene of the incident.



ASSISTANT FOR ALL TYPES OF INDUSTRIES.

View the current status in real time and get data analysis in the form of reports at any time.

Location of objects

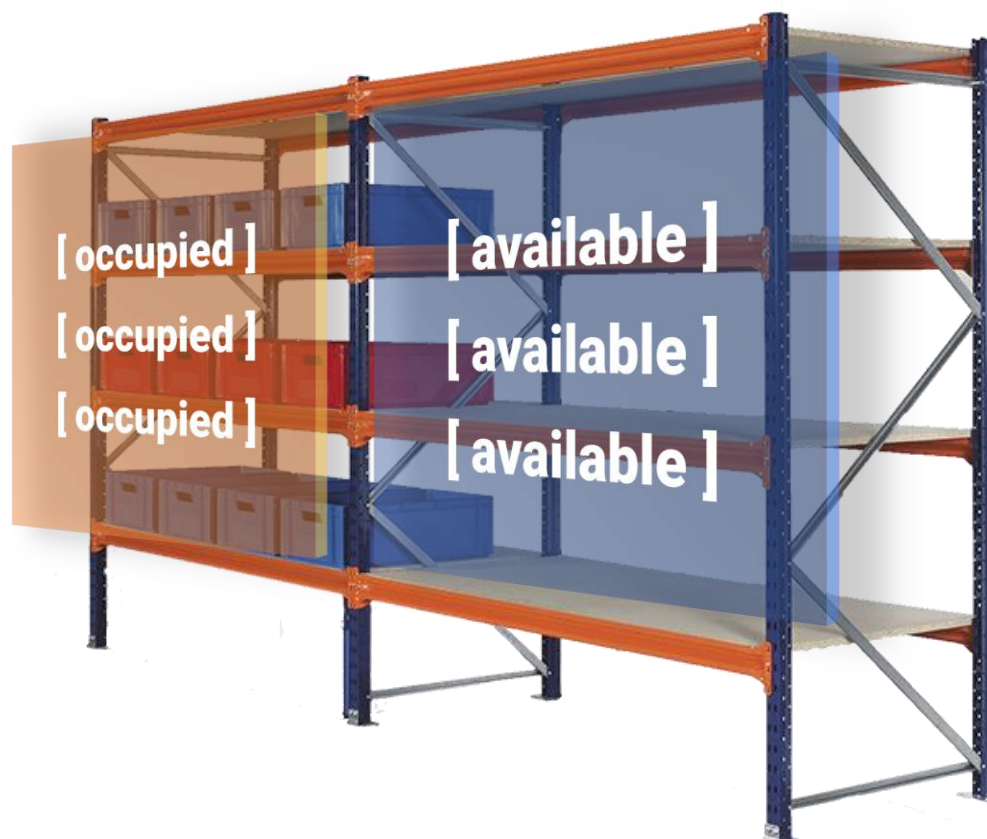
Warehouse: 3
Row: 13
Shelving: 5

Busy slot analysis

Red boxes: 4
Blue boxes: 8

Slots Statuses

Occupied: 12
Available: 12



DATA ANALYTICS.

COUNT

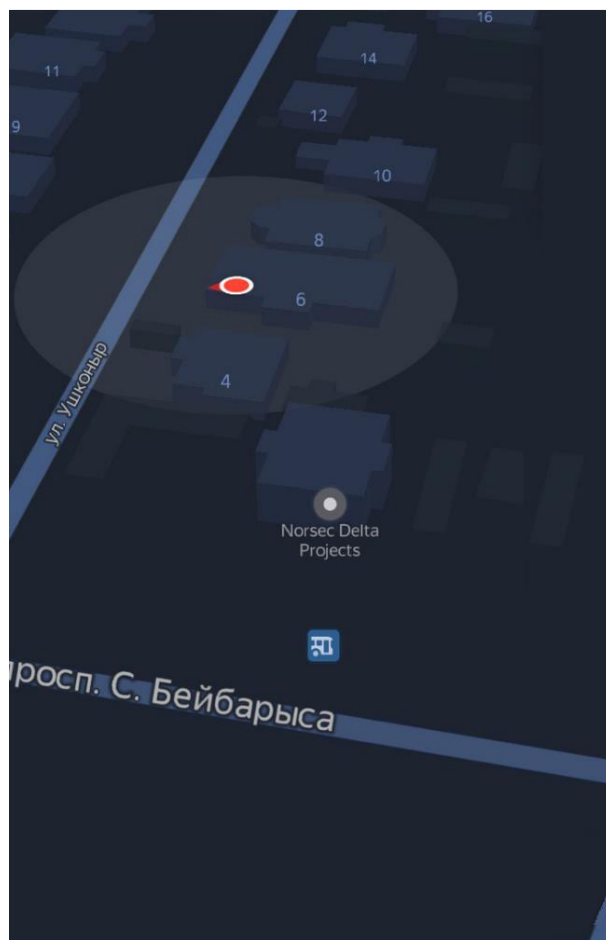
Recognition of cars, people and other objects for the preparation of reports with analyzed data on the number of incoming or outgoing objects. Daily, monthly, annual count in real time.

TRACKING

Tracking people (trajectory, direction, color of clothes, speed). Notifications of forgotten items. Perimeter security (line crossing, penetration into a zone, disappearance in a zone). Vehicle tracking (stop, parking, trajectory, direction, size).

REPORTS

Get any report with full and self-learning data analytics, multi-dimensional statistics and informative graphs.



USER-FRIENDLINESS.

Simple, fast and flexible calculations. Pay only for the resources you used, with the option to stop subscriptions at any time.

Meet your organization's business needs and budgets with competitive pay-as-you-go pricing. Provide cost savings, with the ability to manage the allocated amount of resources.

Connecting only the modules you need will significantly reduce your cloud costs:

- Vehicle Recognition;
- Recognition of people;
- Count;
- Reports
- Other modules.



MOBILITY

The platform provides work regardless of the type of user devices - even if it is a laptop, tablet or smartphone.



CLOUD

Data storage is available both in the cloud and on your server.

It is enough to purchase a surveillance camera and configure the connection to our / your server.



EASY AND CHEAP

Easy setup, low cost and hourly pay will help you stay in the new era of technology.

EINIX VISION LEARNING TOOL (EVLTL).

Development of a scalable and universal platform that automates ML cycles to enable users to train or retrain recognition models themselves.

It has an intuitive interface, for the use of which there is no need for in-depth knowledge of machine learning. The platform can be used by any person who understands the subject area of the problem being solved.

Platform requires several steps:

- Download a set of images or videos,
- Circle the desired objects on each image,
- In one click, start the learning process,
- Use the API to recognize images and videos after finishing learning.

* The system already contains prepared models that can be used for training.

Also, IVLT cloud solutions allow you to **earn money on the Internet**, by providing users ability to perform simple tasks. This will save resources and time on recognition and image processing.

And referral reward systems will attract more people to the platform.

MONETIZATION MODEL.

Simple, fast and flexible calculations.

1

Buying a license to use the system in your own infrastructure solutions.



2

Subscription to use the system in cloud infrastructure solutions.



3

Purchase of cloud storage to store processed data.



4

Individual development of additional modules.



MARKET SIZE EVALUATION.

Market Size Evaluation – forecasting approach used to determine the size of the current market for a product and growth potential in this market, amount of competitors part, and so on.

* Businesses are guided by group of indicators when making decisions, for example, on launching a new product in the product line (for example: “Is the target market too small?”). As part of the study, you will be able to look more broadly at the problem and most likely offer more well-designed solutions.

To assess market capacity, the PAM-TAM-SAM-SOM approach is used.

PAM	Potential available market. Global market, unlimited by geography and other factors.
TAM	Total addressable market. How many customers in the target market need products / services located in the same category of products / services that you sell.
SAM	Served available market. The client segment or market size (part of TAM), within which the consumer is ready to buy products / services, is the same as you sell.
SOM	Serviceable & Obtainable market. The volume of the market (part from SAM) that your company intends and is able to occupy, given its development strategy and the actions of competitors.

The market for artificial intelligence (AI) software is expanding at breakneck speed: for example, the latest forecasts of the artificial intelligence market show that the industry is

driving growth when this category is used. However, growth is not limited to the software industry, as AI is also expected to leave a positive economic footprint.

Below you can find the statistics for estimating market capacity.



PAM (Potential available market)

By 2025, the global market for artificial intelligence is expected to reach almost \$ 180 billion. Including object recognition, also supported by AI, will increase annual revenue growth by more than 20% in 2020.

[Source 1](#), [Source 2](#)



TAM (Total addressable market)

According to studies by the National Safety Council, companies annually spend between \$ 7 billion on organizing safety and health activities.

[Source 1](#)



SAM (Served available market)

\$ 2.3 million for 2019.

The data of existing projects in the labor protection and safety market were used.

[Source 1](#)



SOM (Serviceable & Obtainable market)

1st year

1381400* - 68910 (3% of SAM) = \$1,312,490

2nd year

1555700* - 114850 (5% of SAM) = \$1,440,850

3rd year

2022410* - 183760 (8% of SAM) = \$1,838,650

4th year

2629133* - 229700 (10% of SAM) = \$2,399,433

* annual users amount growth for 30%



[Source](#) AI Market Statistics

CANVAS-MAP OF BUSINESS MODEL.

PROBLEMS <ul style="list-style-type: none"> ▪ Enforcement of safety regulations. ▪ Large-scale control and monitoring. ▪ Availability and mobility. 	SOLUTIONS <p>Development of a self-learning system with artificial intelligence using image processing on machine learning.</p>	ESTIMATION METRICS <ul style="list-style-type: none"> ▪ Autonomy through a cloud solution. ▪ Self-learning at the level of neural networks.
UNIQUE OFFERS <ul style="list-style-type: none"> ▪ One system for recognition, security verification, control and monitoring of objects and protected areas for any industry. ▪ Providing a cloud solution to save user resources with broad integration capabilities. 		SALES CHANNELS <ul style="list-style-type: none"> ▪ Advertising. ▪ Reviews and recommendations.
CUSTOMER SEGMENTS <p>Medium and large type of business requiring increased security checks and large-scale control and monitoring.</p>	ADVANTAGE <p>Development of a scalable and universal platform that automates ML cycles to enable users to train or retrain recognition models themselves.</p>	
STRUCTURE OF COSTS <ul style="list-style-type: none"> ▪ Employees. ▪ Infrastructure. ▪ Domain research. 	STREAMS OF PROFIT <ul style="list-style-type: none"> ▪ Buying a license to use the system in your own infrastructure solutions. ▪ Subscription to use the system in cloud infrastructure solutions. ▪ Acquisition of cloud storage to store processed data. ▪ Individual development of additional modules. 	

ROADMAP.

Roadmap — is a graphical overview of the goals and outcomes of a project, presented on a timeline. Unlike the project plan, where the details are outlined, the roadmap looks quite simple and does not contain all the details.

2019 OCTOBER	Started a subject are survey, collection and analysis of requirements. Development of technical specifications, specifications, technical and design engineering.
2019 NOVEMBER	Development of program code, program architecture, and component interaction schemes. Preparation of a minimum vibrant product.
2019 NOVEMBER	Attract investment for the further development of the project.
2019 DECEMBER	In-depth study of artificial intelligence technology and computer vision.
2020 FEBRUARY	Ensuring work regardless of the type of user devices - be it a laptop, tablet or smartphone.
2020 MAY	The first «box version» of solution for users.

2020 JULY	Providing a cloud solution.
2020 SEPTEMBER	Develop a scalable and versatile IVLT system to enable users to train or retrain recognition models themselves.
2020 OCTOBER	IVLT cloud solution for users with the ability to earn money on the Internet by completing simple tasks.
2020 OCTOBER	Wide integration capabilities.
2021 JANUARY	Creating own blockchain network based on existing technologies.
2021 AUGUST	Reach to ICO.

USED TECHNOLOGIES.

For the implementation of the project, modern open-source cross-platform technologies were chosen, which allows you to create a minimum viable product without problems at an early stage.

Server part for object recognition, object detection, image processing:



TensorFlow

Free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library and is also used for machine learning applications such as neural networks.[4] It is used for both research and production at Google.



Python

General purpose high-level programming language.



OpenCV

A library of programming functions mainly aimed at real-time computer vision.

The server part for a web application, reporting, setting up a video stream, real-time data processing:



.NET Core

Open Source Modular Software Development Platform.



PostgreSQL

Free Object Relational Database Management System.

The client part for displaying the graphical interface:

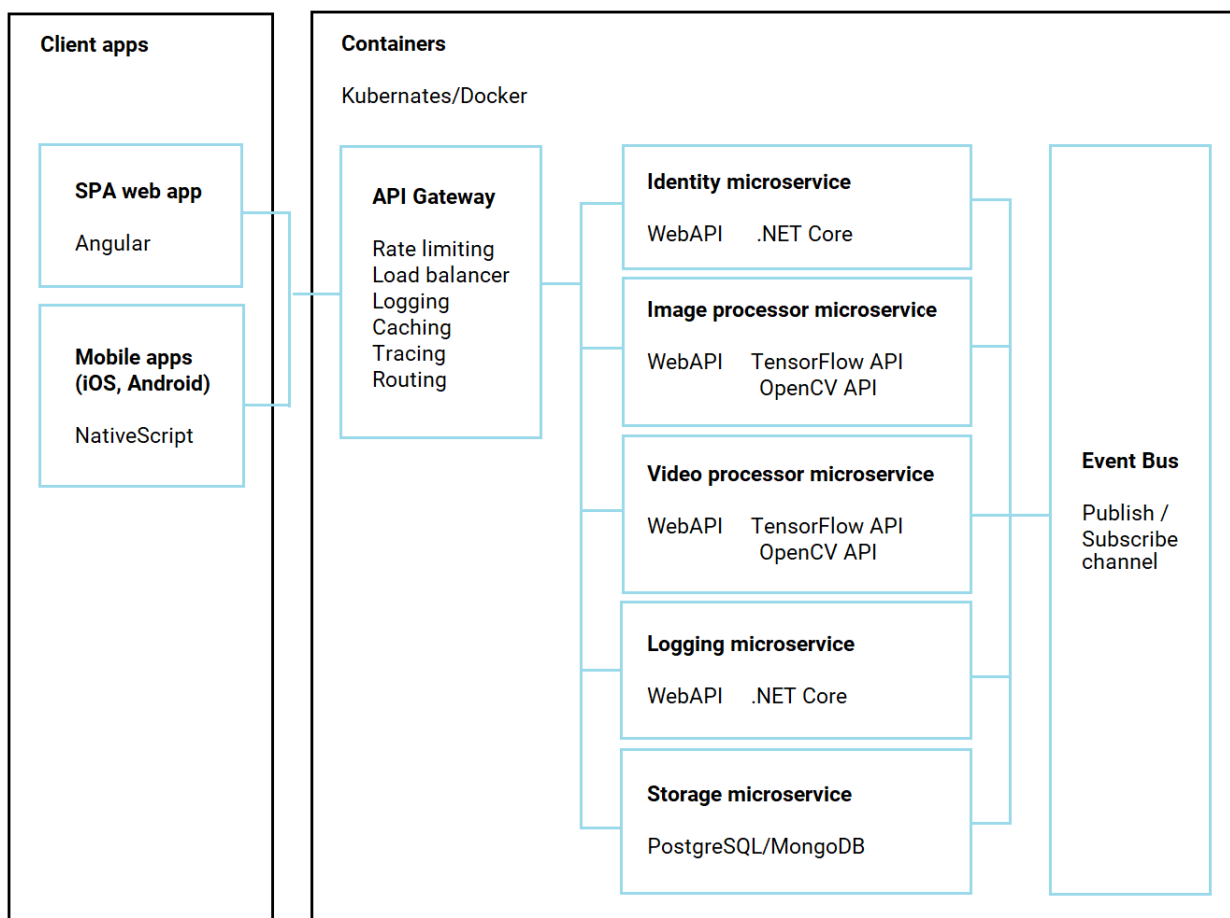


Angular

JavaScript- open source framework.

This reference application is cross-platform at the server and client side, thanks to .NET Core services capable of running on Linux or Windows containers depending on your Docker host, and to Xamarin for mobile apps running on Android, iOS or Windows/UWP plus any browser for the client web apps.

The architecture proposes a microservice oriented architecture implementation with multiple autonomous microservices (each one owning its own data/db) and implementing different approaches within each microservice (simple CRUD vs. DDD/CQRS patterns) using Http as the communication protocol between the client apps and the microservices and supports asynchronous communication for data updates propagation across multiple services based on Integration Events and an Event Bus (a light message broker, RabbitMQ) plus other features.



CONCLUSION.

EINIXVISION - very flexible system that can be useful in many areas and can help make decisions, control the flow of objects, eliminate the risks of incidents, manage resources and optimize production for global business.

Using a system in tandem with the IoT platform allows you to create an intelligent solution with great potential. You can use the system to ensure security, for example, recognize the sound of a shot or notify about suspicious objects in order to increase security.

Even in forests, such solution could be used to detect illegal deforestation, to track the routes of wild animals or birds, analyzing their trajectory or to monitor the quality of the crop. The IoT platform can be configured to send notifications of sounds within the microphone range.

Such a solution can be installed on local devices (at the same time, it can be deployed as a cloud system) to minimize the cost of traffic and cloud computing, configure it to send only notifications, without attachments with raw data.

And everyone can use the IVLT platform to create their own models of object recognition.

And do not forget that artificial intelligence is part of human evolution, and these technologies are of great benefit to humanity.



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