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**«Development of a module for identifying a person by photography to  
improve the quality of the machine-engineering plant in remote mode»**

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# Problem statement

- A machine vision performs a variety of face verification tasks in different infrastructure environments. A facial recognition system is technically implemented as an image recognition program. It serves to automatically identify a face in an image, and then identify the person by comparing and analyzing the biometric data of the human face.
- Cameras are able to capture an image at a distance, which is perfect for building monitoring systems and contactless biometrics. Such software systems are particularly important in the context of remote work of employees of industrial enterprises.
- The purpose of research is to develop and implement a facial recognition web service for the staff department of a machine-engineering enterprise.
- The web service should work in conjunction with the existing data bank.





# Task of research

- the recognition function must be separated from the information system and implemented as a separate web service;
- web service must be implemented on the NodeJS platform;
- the information system should interact with the developed web service using the http protocol;
- information should be exchanged using JSON requests;
- the web service input data must be a user photo from a webcam encoded into a string format Base64;
- in case of successful recognition the output data must be the identification number of the user on photo;
- in case of fail the web service must show the description of error; all necessary information for recognition should be stored on the side of the web service;
- document-oriented database must be used to store information.





# Solution methods

- OpenCV (Open Source Computer Vision) is a library of computer vision algorithms, image processing and general-purpose numerical algorithms with open source code
- The Eigenfaces method is based on principal components analysis (PCA) method.
- Fisherfaces method is based on linear discriminant analysis.
- LBPH method is based on the Local Binary Pattern method. LBPH extracts features from pixel surroundings.
- Dlib is a modern tool of C++, which contains machine learning algorithm and lots of other auxiliary means.

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# Conclusions

## Results, implementation

Thus the tasks of the research were completely solved: algorithms of facial recognition were considered; the most popular facial recognition libraries were analyzed and tested; the subject area of work of the staff department in terms of identification was considered; the architecture of the software providing a function of identification by photo was designed; the software was developed and integrated to the system.

At the moment the developed software meets the requirements of identification of enterprise's employees.



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