

PROJECT DESCRIPTION OF NOVAPARK AUTOMATIC PARKING MANAGEMENT SYSTEM

1. General description of the system

NOVAPARK is a modern automated system for parking space management, control and payment, which operates based on automatic recognition of vehicle license plates.

The system is completely **ticketless**, meaning that when entering the parking lot, the user does not need to take a parking ticket, card, or other physical medium. The vehicle's license plate is a unique identifier for the parking session throughout the entire process - from entry, through payment, to exiting the parking lot.

The basic components of the NOVAPARK system are:

- ANPR camera for automatic number plate recognition at the entrance;
- ANPR camera for automatic license plate recognition at the exit;
- automatic entrance ramp;
- automatic exit ramp;
- NOVAPARK automatic parking meter;
- central NOVAPARK management and record keeping software;
- NOVAPARK WEB platform for monitoring and management;
- database;
- communication and network infrastructure to connect all components.

All components are interconnected and function as a single integrated system.

2. Vehicle entry into the parking lot

When the vehicle arrives at the entrance to the parking lot, **the entrance ANPR camera** automatically detects and reads the vehicle's license plate.

The recognized license plate is automatically sent to the central NOVAPARK software.

A new parking session is created in the system for the specific vehicle and the following are automatically recorded:

- the vehicle registration number;
- the date of entry;
- the exact time of entry;
- the recording obtained from the ANPR camera;
- the status of the active parking session.

After successful recognition and registration of the vehicle, the NOVAPARK system automatically sends a command to **the entrance ramp**.

The ramp opens and allows the vehicle to enter the parking space.

After the vehicle has completely passed, the ramp automatically closes and the system is ready to receive the next vehicle.

The entire entry process takes place automatically, without the need for ticket issuance and without the need for operator intervention.

3. Active parking session

From the moment the vehicle is registered at the entrance, the NOVAPARK system manages its parking session as active.

The start of parking is calculated according to the exact time recorded by the entrance ANPR camera.

For each vehicle, the system has information about:

- license plate;
- date and time of entry;
- duration of stay;
- payment status;
- parking session status.

In this way, at any moment the system has accurate information about the vehicles in the parking lot and the duration of their stay.

4. Calculation and payment of parking

When the user wants to leave the parking lot, before arriving at the exit ramp, he pays at the **NOVAPARK automatic parking meter**.

On the parking meter screen, the user enters the license plate number of their vehicle.

The parking meter communicates with the central NOVAPARK software and automatically searches the database to find the active parking session associated with the entered license plate.

After identifying the vehicle, the system automatically:

1. determines the exact time of entry;
2. calculates the parking duration;
3. applies the defined parking tariff;
4. calculates the total amount to be paid;
5. displays the amount on the parking meter screen.

The user then makes the payment through the available payment methods at the parking meter.

After successful payment, the parking meter automatically sends information to the central NOVAPARK system.

The parking session of the specific vehicle receives the status **"PAID"**, and the payment information is immediately available to the exit part of the system.

5. Arrival of the vehicle at the exit

After payment is made, the user arrives with the vehicle at the exit of the parking lot.

The output ANPR camera automatically reads and recognizes the license plate of the vehicle.

The recognized registration is immediately sent to the central NOVAPARK software.

The system automatically finds the parking session associated with the specific vehicle and checks:

- whether the vehicle is registered as having entered the parking lot;
- whether there is an active parking session;
- whether the parking service has been paid;
- whether the conditions for leaving the parking lot have been met.

If all conditions are met, the NOVAPARK system automatically grants permission for exit.

6. Automatic opening of the exit ramp

After confirming that the parking session is paid and valid, the system automatically sends a command to **the exit ramp**.

The ramp opens when the vehicle stops for an exit and leaves the parking lot.

After the vehicle has completely passed, the ramp automatically closes.

At the same time, the central NOVAPARK system registers the vehicle's exit.

7. Ending the parking session

Upon leaving the parking lot, the active parking session is automatically closed.

The entire parking cycle remains recorded in the system, including:

- vehicle registration number;
- date and exact time of entry;
- date and exact time of exit;
- total duration of parking;

- calculated amount;
- amount charged;
- payment status;
- status of the completed parking session.

This completes the entire process for the specific vehicle in NOVAPARK.
the system.

8. Monthly customers

The NOVAPARK system allows for separate recording and management of **monthly clients and subscribers**.

The system can enter the license plates of vehicles that have the right to use the parking lot during a certain period of time.

For each monthly customer, the validity period of their subscription can be defined.

When a registered monthly customer's vehicle arrives at the entrance, the ANPR camera automatically recognizes its license plate.

The NOVAPARK software automatically checks whether an active subscription exists for the specific registration.

If the subscription is active, the entrance ramp opens automatically and the vehicle gains access without the need to pay through a parking meter.

Upon exit, the exit ANPR camera recognizes the license plate again, the system checks the active subscription and automatically opens the exit ramp.

The system also keeps records of all monthly customer entries and exits.

9. Central NOVAPARK software

The central NOVAPARK software represents the main control part of the system and connects all its components.

It processes and exchanges information between:

**ANPR cameras ÿ automatic ramps ÿ parking meter ÿ database ÿ
NOVAPARK WEB platform**

The central software processes data on entries, exits, duration of stay, billing, monthly users and other information related to the functioning of the parking lot.

The system allows centralized recording of:

- all vehicle entries; • all vehicle exits; • active parking sessions; • completed parking sessions; • dwell time; • payments made; • amounts collected; • monthly customers; • active and expired subscriptions; • status and operation of the parking system.

10. WEB access and LIVE view of the parking lot

The NOVAPARK system allows the client to have constant insight into the current status and operation of the parking lot via a **WEB platform** .

Through an internet browser and their own user profile, the authorized person can access the system from a computer, tablet or other device with internet access, without the need to be physically present at the parking lot location.

Through the WEB interface, the client can monitor **the LIVE status of the parking lot in real time**, including:

- current number of vehicles in the parking lot; • number of vehicles entering; • number of vehicles exiting; • vehicle license plates; • time of entry; • time of exit; • active parking sessions; • completed parking sessions; • current status of the payment; • funds collected; • daily and current financial turnover; • number of monthly customers; • active monthly subscriptions; • expired monthly subscriptions; • validity of subscriptions.

In this way, the client has a central and immediate insight into the current status of the parking lot at all times.

11. WEB management of monthly clients

Through the NOVAPARK WEB platform, the client has the ability to view and manage monthly users.

For each monthly client, the following can be recorded:

- user data;
- vehicle license plate;
- start of subscription;
- subscription expiration date;
- subscription status;
- history of entries;
- history of outputs.

Through the WEB interface, you can clearly see which monthly subscriptions are active, which have expired, and the validity period of each subscription.

The system thus enables centralized management and control of regular monthly parking users.

12. Financial review

Through the NOVAPARK WEB platform, the client also has insight into the financial data generated by the parking system.

The system allows for real-time collection monitoring, as well as an overview of financial results for a selected time period.

The client can have insight into:

- currently collected funds;
- total daily turnover;
- turnover for a selected time period;
- number of payments made;
- paid parking sessions;
- financial data related to the operation of the parking lot.

In this way, the owner or manager of the parking lot can have a clear picture of current operations and turnover at any time.

13. Reports and analytics

The NOVAPARK system allows for the generation of detailed reports on parking operations.

Through the WEB platform, the client can select a specific time period and obtain an overview of relevant operational and financial data.

Reports may contain data on:

- total number of vehicles entered; • total number of vehicles exited; • number of parking sessions completed; • active parking sessions; • completed parking sessions; • payments made; • total financial turnover; • daily turnover; • weekly turnover; • monthly turnover; • number of monthly customers; • active monthly subscriptions; • expired monthly subscriptions; • monthly customer entries and exits; • vehicle movement history; • periods of higher or lower parking usage.

Reports allow the client to have a clear overview of operations for a specific day, month, or other selected time period.

Thus, in addition to the current LIVE status, NOVAPARK also provides a historical overview and analysis of the parking lot's operations.

14. Principle of operation of the entire system

The entire process of functioning of the NOVAPARK system can be presented through the following sequence:

1. The vehicle arrives at the entrance

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2. The entrance ANPR camera automatically recognizes the license plate

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3. NOVAPARK software creates a parking session and records the entry time

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4. The entrance ramp opens automatically.

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5. The vehicle enters the parking lot.

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6. The system records the vehicle as present in the parking lot.

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7. When leaving, the user enters their registration at the parking meter.

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8. The NOVAPARK system calculates the time of stay and the amount to be paid.

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9. The user pays for parking

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10. The parking session gets the status "PAID"

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11. The vehicle arrives at the exit

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12. The output ANPR camera automatically recognizes the license plate

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13. The NOVAPARK system checks whether parking has been paid.

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14. The exit ramp opens automatically

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15. The vehicle leaves the parking lot

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16. The system records the exit time and closes the parking session.

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17. All data is automatically available in the NOVAPARK WEB platform and in the corresponding reports.

For monthly customers, the system automatically recognizes the license plate and checks the validity of the subscription, which allows automatic entry and exit without the need to pay at a parking meter.

15. Conclusion

NOVAPARK is an integrated system for automatic parking management that covers the entire process - from the arrival of the vehicle at the entrance, through automatic license plate recognition, recording the time of stay and payment, to automatic recognition and leaving the parking lot.

The vehicle's license plate is a basic identifier in the entire system, enabling ticketless operation of the parking lot.

The entrance and exit ANPR camera, the automatic ramps, the parking meter, the central NOVAPARK software and the NOVAPARK WEB platform function as a single integrated whole.

In addition to automating entry, exit, and payment, the system provides the client with **a LIVE WEB overview of the current status of the parking lot, vehicles entering and exiting, current number of vehicles, funds collected, financial turnover, monthly customers, and their subscriptions.**

Additionally, detailed reports on entries, exits, parking sessions, billing, financial transactions, and monthly users for a selected time period are available through the system.

In this way, NOVAPARK provides complete control, records and centralized management of all key processes related to the operation of the parking lot.