



Installation instructions for the "HorseCare" mobile Application

Table of contents

1.	General Information	2
2.	Application Installation	2
2.1.	Downloading	2
2.2.	Launching and Registering an Account	2
2.3.	Deleting an Account	5
3.	Adding a New Horse	5
4.	Attaching Sensors	8
4.1.	General Information	8
4.2.	Group Attachment of Sensors	10
4.3.	Attaching a Single Sensor (necessary in case of sensor replacement)	12
4.4.	Selective Attachment of Sensors	13
4.5.	Sensor Firmware Update	15
5.	Installing Sensors on the Horse	18
6.	Training	20
6.1.	Checking Sensor Connection	20
6.2.	Starting the Training	21
6.3.	Ending the Training	22
7.	Training Analysis	23
7.1.	Analysis of the Last Training	23
7.2.	Analysis of Multiple Trainings	24
8.	Statistics of Conducted Trainings	26
9.	Sharing Training Data	27
9.1.	Providing Shared Access	27
9.2.	Terminating Shared	29
10.	Service Information and Application Settings	30
11.	News Feed	31
12.	Paid Options	33

1. General information

The "HorseCare" mobile application is designed for everyone who regularly deals with horses in their line of work: horse owners, sportsmen, service staff, etc.

The early lameness detection system is intended to identify lameness at early stages when it is not visible yet to the naked eye. This allows for timely measures to be taken to treat lameness and prevent its progression.

Lameness is a disturbance in a horse's gait that can be caused by various reasons, such as injury, illness, or developmental disorders. Lameness can lead to a decrease in the horse's performance ability, as well as more serious health problems.

The horse lameness early detection system works by measuring various horse's gait parameters and processing them using Neural Networks and Artificial Intelligence. A set of sensors is used to collect data from the horse, which are connected to a mobile phone and transmit the necessary data for analysis.

2. Application installation

2.1. Downloading

The application is available for mobile phones running Android operating systems (version 4.5 or higher) and iOS (version ___ or higher).

To download the application, go to the link:

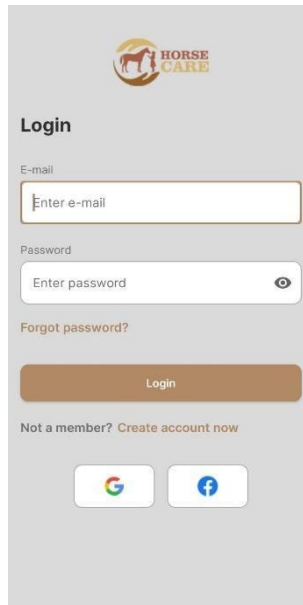
<https://play.google.com/store/apps/details?id=com.horsehealthdatareceiver>



Alternatively, find the application in the App Store by searching for 'HorseCare'

2.2. Launching and registering an account

After installing and launching the application for the first time, a login window appears:



You should use your email address as the username and a personal password created during registration as the password.

If you are launching the application for the first time, you first need to create a personal account in the system. To do this, click on the "Create account now" link and proceed to the account creation page.

When creating an account, you need to fill in the mandatory fields:

- **"Full name"** - the name of the rider who will be working with the horse;
- **"Rider weight (kg)"** - the weight of the rider in kilograms (this parameter will be used later in calculating the dynamics of the center of gravity);
- **"Email"** - email address as the username. The email can be used to contact the user in case of password recovery.
- **"Password"** - a password for account access. The password must meet security requirements – contain letters, numbers, and special characters.

After filling in all the fields, please read the software license agreement and accept the user agreement by checking the appropriate checkbox. Then, the user should click the "Create Account" button to complete the account creation.

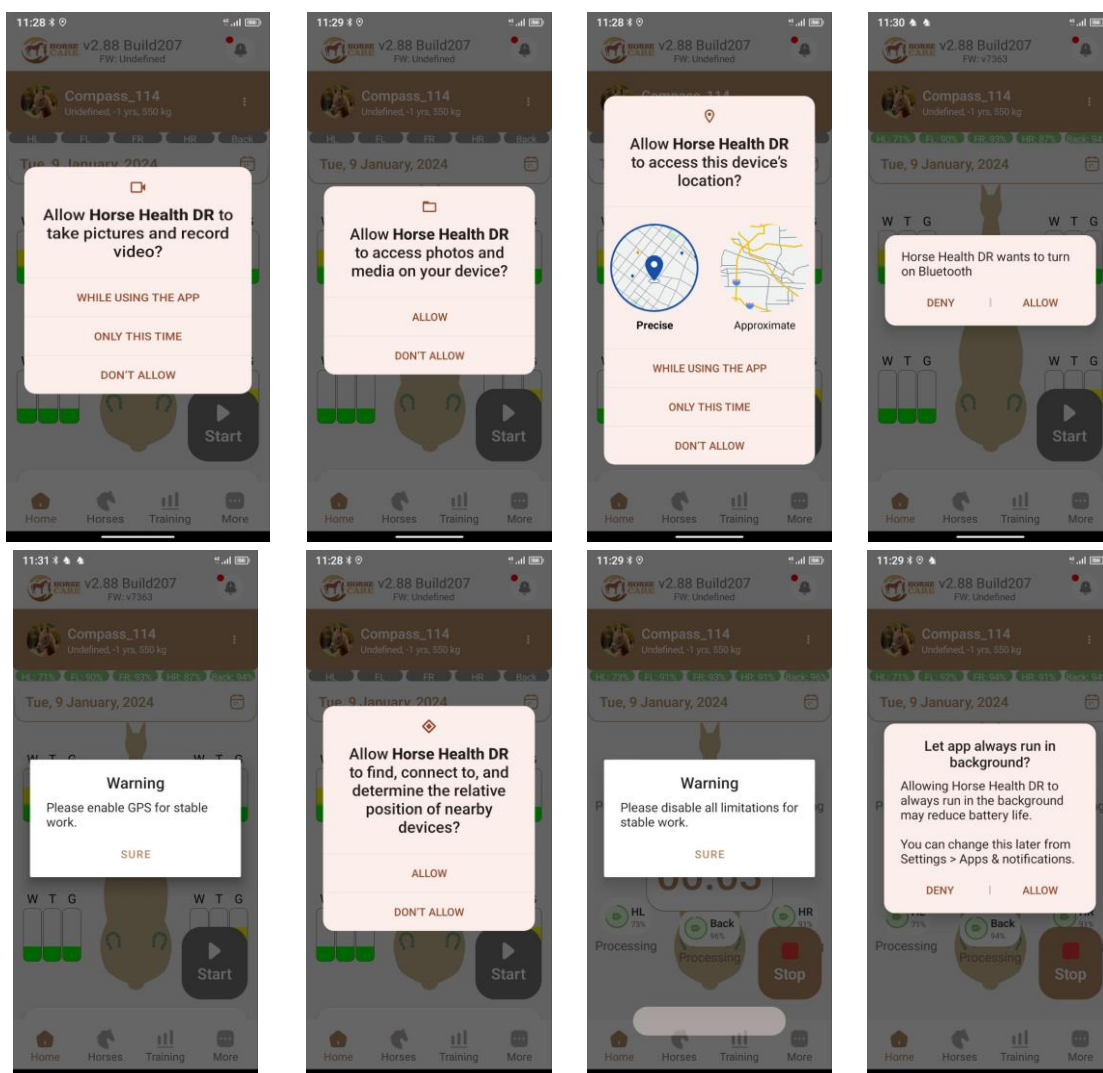
If the profile is successfully created, the user will receive an email at the address provided during registration, notifying them of the account creation.

Concurrently with the account creation, a personal account will be created for you on the website www.horsecare.si, which you can access using the login and password previously used when creating the account.

To simplify the account registration process, users are given the option to link their account details from their Google or Facebook profiles. To do this, they can click on the corresponding buttons.

Depending on the specifics of the mobile phone and the operating system installed on it, the application may request additional permissions upon first launch. Since the application significantly utilizes the phone's resources for its operation, the following requested permissions are necessary for the application to function correctly:

- Permission to access the camera to take photos and record videos;
- Permission to access the photo and media data storage on the device;
- Permission for geolocation access to determine the device's location;
- Permission to work with Bluetooth for connecting to sensors;
- Permission to enable GPS (if it is turned off);
- Permission to search for and connect to nearby devices;
- Permission to disable power-saving mode for continuous operation of the application.

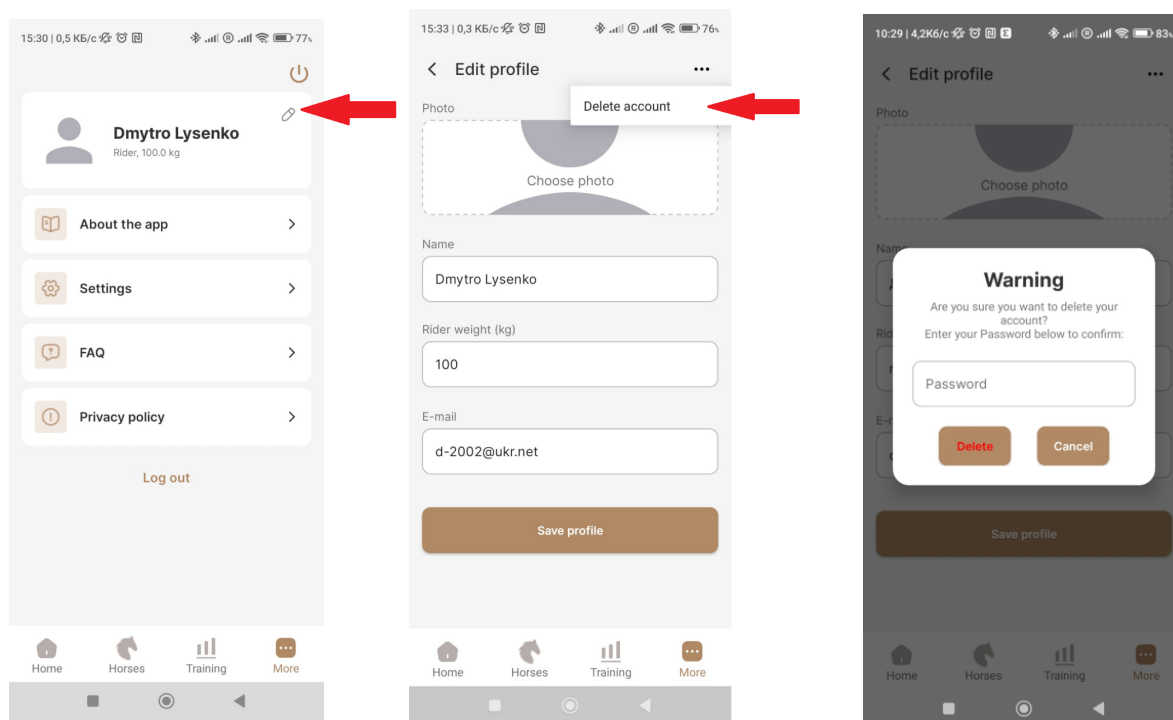


After granting all the permissions, the user gains access to the main screen.

2.3. Deleting an account

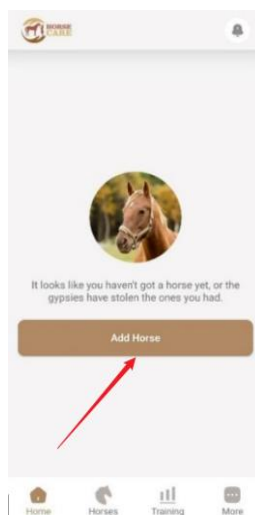
If necessary, a user can delete his account and stop using the application.

To delete an account, go to the **'More'** section and select Edit account (click on the pencil icon). This will open the user's profile card. In the card, click on the three dots in the upper right corner and then select **'Delete account'**. After this, the application will request the password to confirm the account deletion.



3. Adding a new Horse

To be able to use the «HorseCare» system upon first launch, it's necessary to add the data of the horse (or horses) you will be working with into the system. To do this, press the **'Add Horse'** button.



After pressing the add horse button, a window for entering the horse's main parameters will become available:

The screenshot shows a mobile application interface for adding a horse. The form is titled 'Add Horse' and contains the following fields and options:

- Photo:** A dashed box with a camera icon and the text 'Choose photo'.
- Name:** A text input field containing the word 'Spirit'.
- Age:** A text input field containing the number '5'.
- Horse weight (kg):** A text input field containing the number '500'.
- RFID:** A text input field containing the placeholder text 'Enter RFID'.
- Gender:** Three radio buttons labeled 'Female', 'Male', and 'Gelding'.
- Disciplines:** A grid of buttons for 'Dressage', 'Jump', 'Horse racing', 'Western', 'Triathlon', 'Vaulting', 'Driving', and 'Hobby'.
- Add Horse:** A large brown button at the bottom of the form.

'**Photo**' - choose a photo from the gallery. ATTENTION: Real-time photography is not provided!

'**Name**' - enter the horse's name;

'**Age**' - enter the horse's age;

'**Horse weight (kg)**' - preferably the most accurate weight of the horse;

'**RFID**' - the unique RFID number of the horse

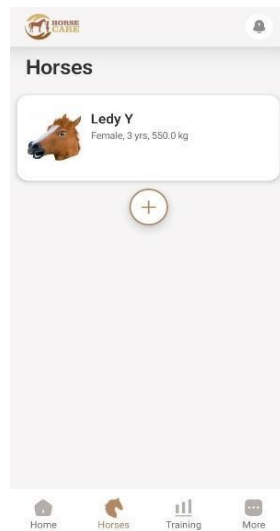
(MUST ENTER THE REAL HORSE'S RFID. IT CAN BE FOUND IN THE HORSE'S PASSPORT)

'**Gender**' - the gender of the horse (mare, stallion, gelding);

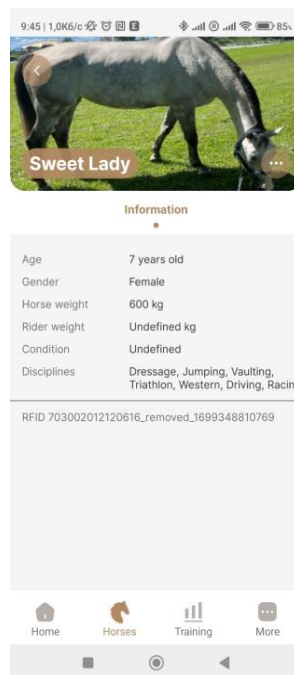
'**Disciplines**' - the sports disciplines in which the horse can participate. Multiple disciplines can be selected simultaneously.

- Dressage;
- Jump – show jumping;
- Horse racing;
- Western – western riding;
- Triathlon;
- Vaulting;
- Driving – carriage driving;
- Hobby - if the horse does not participate in professional sports disciplines and is simply a hobby for its owner.

After correctly filling in all the fields, press the '**Add Horse**' button, after which the horse will appear in the list of registered horses in the application (in the '**Horses**' section of the application). If desired, the user can add several horses to the application, and for each of them, the entire list of parameters must be re-entered.



When clicking on the horse's account, a card with information is displayed.

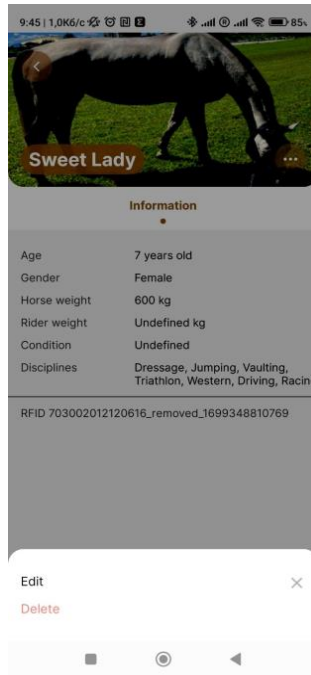


The card contains three tabs: '**Information**', '**Sensors**', '**Share**'.

The '**Information**' tab displays the horse's main parameters saved during the registration stage;

The '**Sensors**' tab allows for attaching and editing sensors for the horse;" The '**Share**' tab allows sharing the training results of this horse with other system users – for example, with a coach, veterinarian, or someone else you would like to provide this information to.

Clicking on the three dots to the right of the horse's name will give the option to edit information about the selected horse or completely delete the horse's account you created.



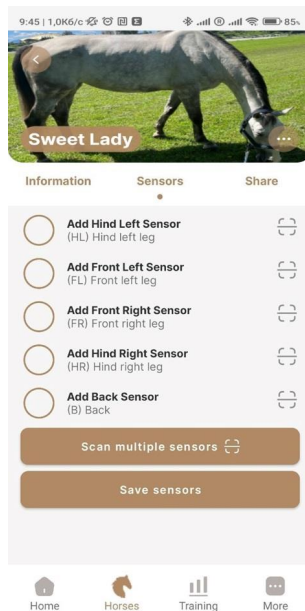
In the '**Home**' section of the application, the registered horse will appear, which does not have any recorded training sessions yet.



4. Attaching Sensors

4.1. General information

For the full functionality of the system, each horse needs to be assigned a set of sensors. A sensor set can be matched to only one horse with its unique RFID code. This code must be taken very carefully from the horse's passport. To assign sensors, go to the 'Sensors' tab in the '**Horses**' section.



For each horse in the system, there are 5 sensors provided:

'HL' - Hind left leg - sensor for the hind left leg;

'FL' - Front left leg - sensor for the front left leg;

'FR' - Front right leg - sensor for the front right leg;

'HR' - Hind right leg - sensor for the hind right leg;

'B' - Back - sensor for the back.

The sensor casings look identical, and each sensor has a marking consisting of the placement designation of the sensor and a unique QR code.

**ATTENTION!!! Each set of sensors can be attached
ONLY TO ONE horse!!!!**



The QR code is used for the automatic attachment of a specific sensor to a horse. The set of sensors for one horse is delivered in a special cradle.



Inside the cradle are 5 sensors. On the bottom surface, there is a QR code for the group attachment of sensors. On the side surface of the cradle, there is a connector for charging the sensors' batteries.

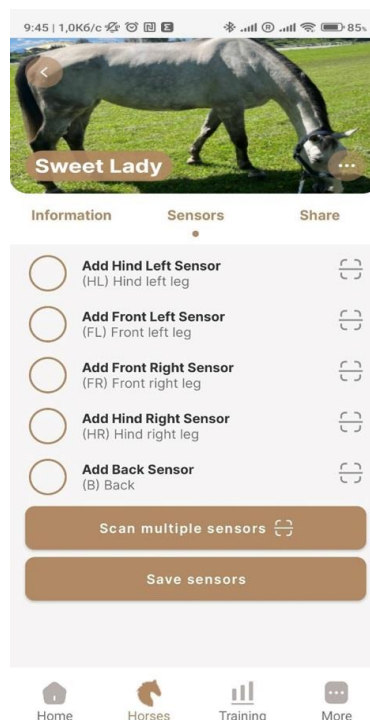
ATTENTION!!! For attachment, the sensors must be removed from the cradle and laid out on a table!!!

After successful scanning, the application automatically captures the information from the QR code, connects with the sensor, reads its unique number recorded in the Bluetooth communication interface, and if the numbers are correct, fills in the sensor ID input field.

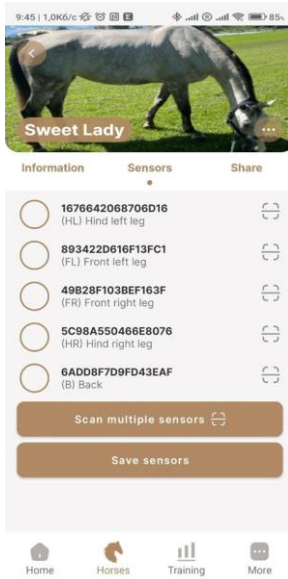
This procedure helps to eliminate inherently faulty sensors and avoid swapping stickers between sensors.

4.2. Group attachment of sensors

To speed up the process and to avoid errors in attaching sensors, the application provides the ability to attach all sensors simultaneously. For this, the user should go to the 'Horses' section. Then select the horse for which the sensors need to be attached and go to the 'Sensors' tab. For group attachment, press the 'Scan multiple sensors' button.

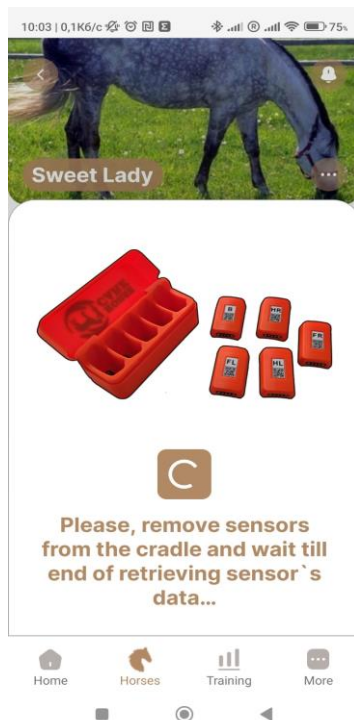


Then, bring the QR code, which is located on the bottom surface of the cradle, close to the camera.



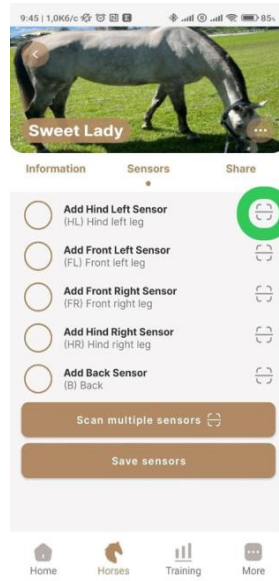
After scanning this code, the application will automatically fill in the ID input fields for each of the five sensors (4 legs and back).

Next, the user needs to press the 'Save sensors' button, after which all sensors will be attached to the selected horse. The application can save the sensors only if they are all removed from the cradle - a corresponding warning is displayed on the screen.

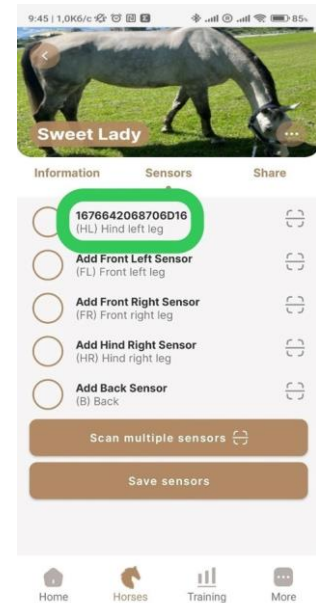


4.3. Attaching a single sensor (necessary in case of sensor replacement)

To attach a sensor, press the button to activate the camera and scan the QR code:



After that, scan the QR code on the back of the sensor.



If necessary, these steps should be repeated for all five sensors: 4 sensors for the legs and 1 sensor for the back.

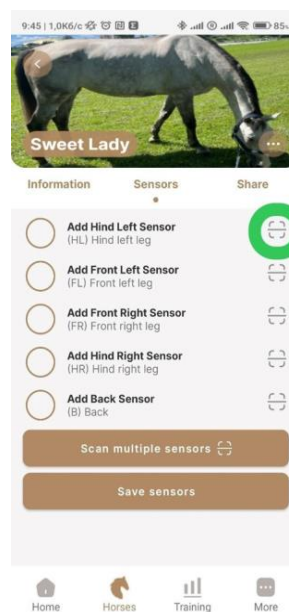
After completing the sequential scanning of all codes, the user needs to press the **'Save sensors'** button, after which all sensors will be attached to the selected horse.



4.4. Selective attachment of sensors

The application also provides the possibility of selectively attaching sensors (for example, if one of them is malfunctioning or lost).

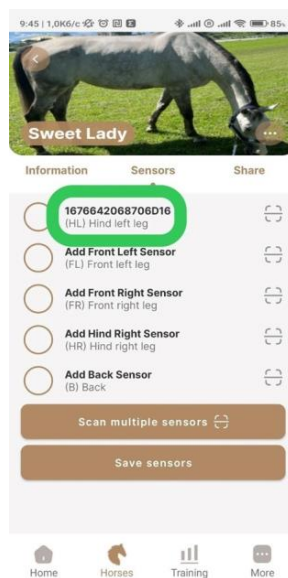
To replace any of the already attached sensors, the user needs to press the scanning button next to the name of the sensor that needs to be replaced (similar to attaching a single sensor in section 4.3).



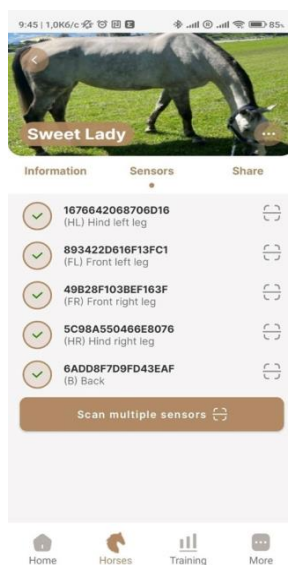
The application activates the phone's camera and indicates which specific sensor needs to be brought to the camera for QR code scanning.



After successfully scanning the code, the application automatically adds the sensor information and fills in the ID field.

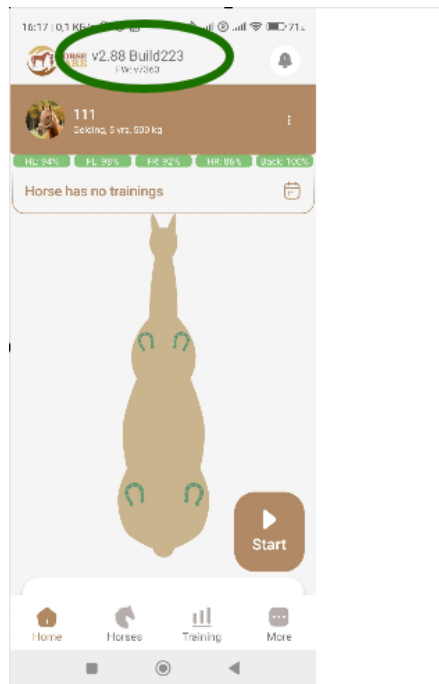


After replacing the necessary sensor, the user needs to press the 'Save sensors' button and confirm the new attachment of all sensors.

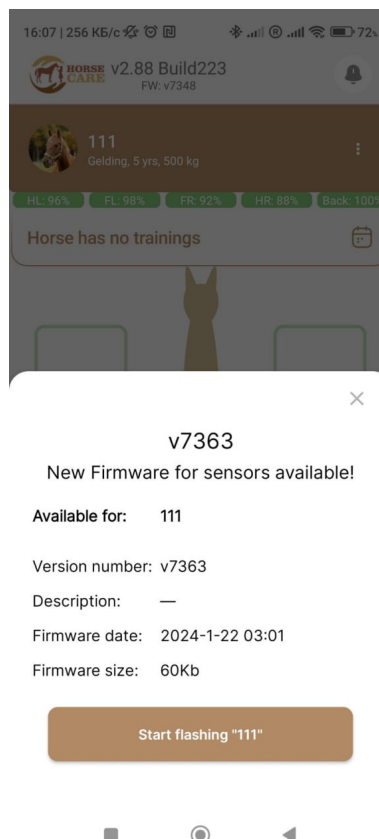


4.5 Sensor firmware update

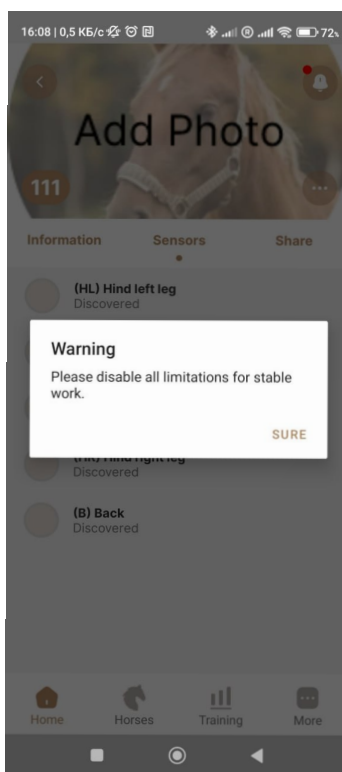
Upon launching the application, the current version of the application and the current firmware version of the sensor are indicated at the top of the title.



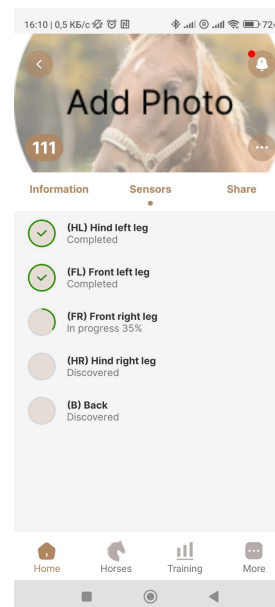
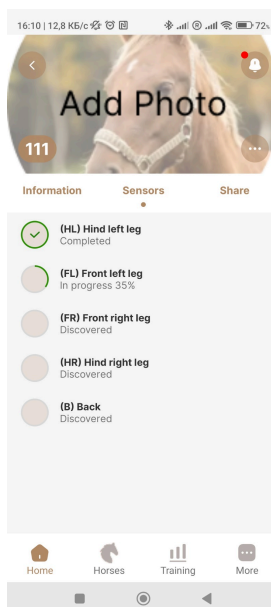
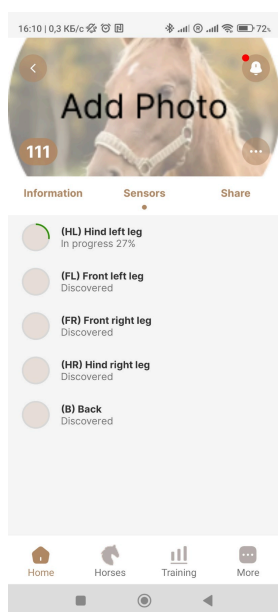
In case a new version of the sensor firmware is detected on the system server, the mobile application will issue a warning about the need to update the sensor software.

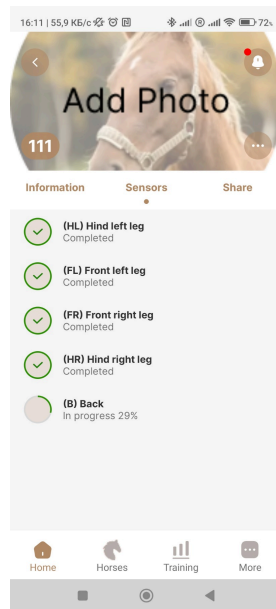
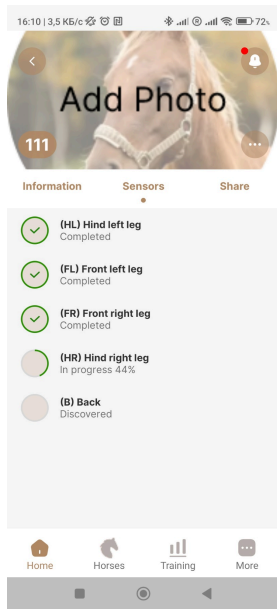


If the user presses the 'Start flashing' button, the mobile application will first request permission from the user to operate without restrictions (to avoid the application going into sleep mode, being unloaded from memory, etc.).



After the user grants the application maximum priority for power saving, the application will first download the current version of the sensor firmware from the server to the phone's memory. Once the current version is saved on the phone, the application will begin the sequential firmware update on all sensors. The progress of the firmware update is displayed on the screen.





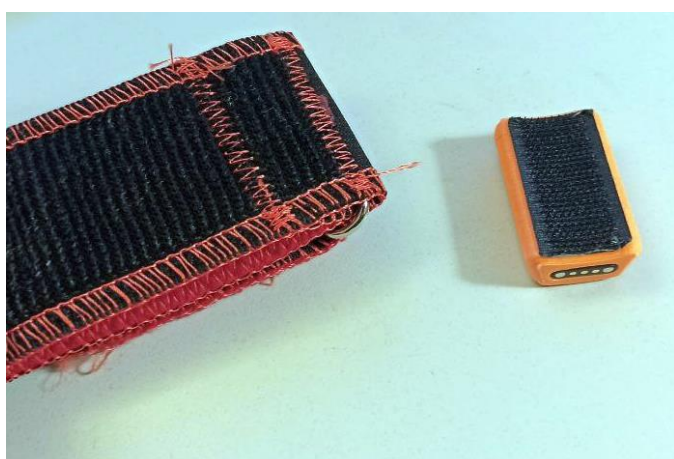
5. Installing sensors on the Horse

The package includes the sensors, installed in the cradle, and a set of special straps. Each strap has a clip for attaching a sensor. The set includes four straps with clips and one additional clip for the back. The user must remove the sensors from the cradle and secure them in the corresponding clips on the straps and the back clip.



After the sensors are securely fastened in the clips, the user must attach the straps to the horse's legs according to the markings on the sensors (HL, FL, FR, HR) and secure the fifth clip with the sensor (B) on the saddle pad.

The user may be provided with another type of sensor attachment - on a plastic Velcro. This design also securely attaches the sensor body to the strap.

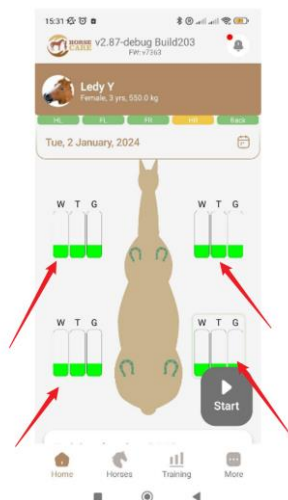




6. Training

6.1. Checking sensor connection

Before starting the training, the user must ensure that the sensors are active and connected to the application. To do this, switch to the main 'Home' section. The screen should display the silhouette of the selected horse around which the sensor symbols are placed.



The letters indicate the horse's gaits that the program can recognize:

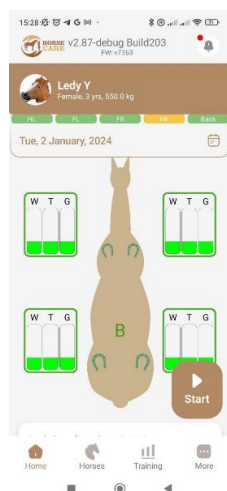
W – Walk, T – Trot, G – Gallop

The color indicates changes in the horse's gait:

GREEN – indicates no changes in gait;

YELLOW – indicates minor, non-critical deviations from the norm in the horse's gait;

RED – indicates serious changes in gait and may be a signal to consult a trainer and veterinarian. Until the sensors are not connected to the application, the 'Start' button is inactive and cannot be pressed. The user must wait until a green frame starts flashing around the sensors, and the 'B' symbol on the horse's back also starts flashing.

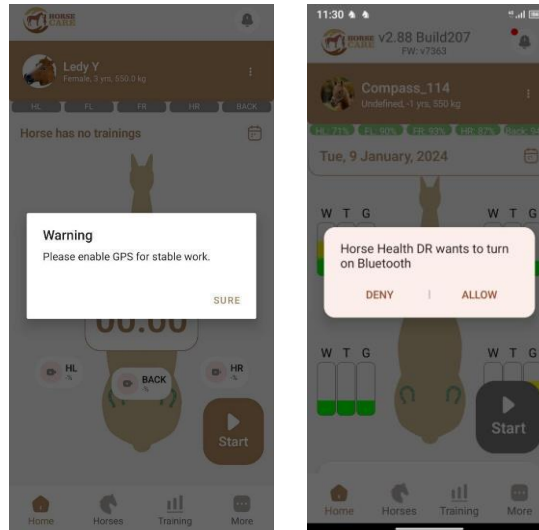


After this, the 'Start' button becomes active.

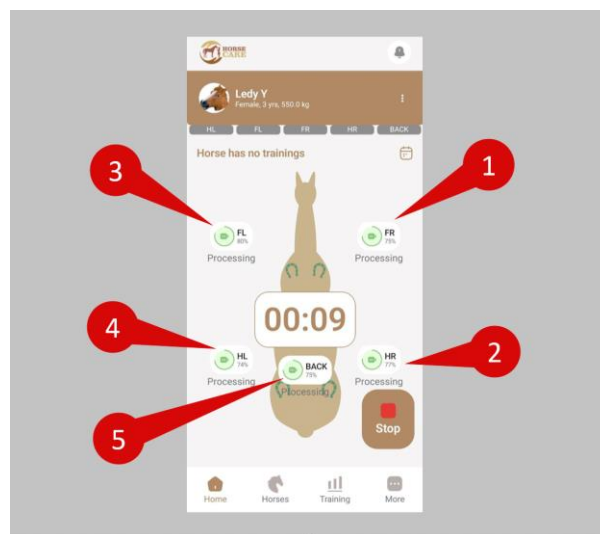
6.2.Starting the training

To start the training, the user must press the 'Start' button.

The application will check again for the activation of Bluetooth and the GPS system. If the user forgot to turn them on their phone, the application will remind them to do so.



Once the training starts, the application screen displays a timer and service information from the sensors.



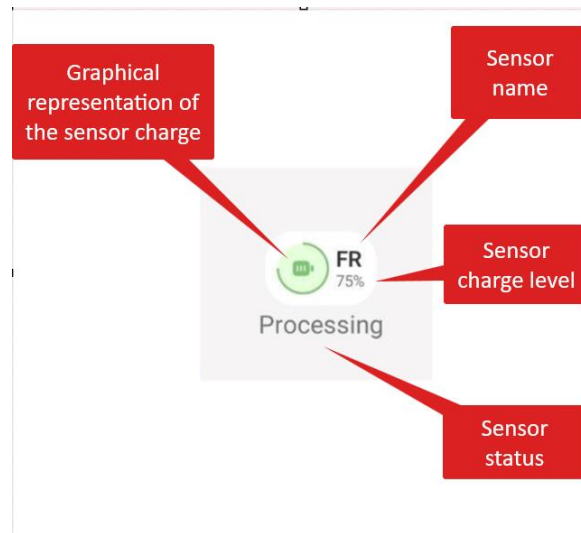
The program checks the connection of each sensor and indicates it as follows: Connection status – Processing/Disconnect – sensor connected/disconnected;

GREEN – battery level approximately 40%-100%, should last about a week in standby mode;

YELLOW – battery level approximately 20%-39%, should last for one training session;

RED – battery level approximately 0%-19%, the sensor needs to be charged immediately;

GRAY – no data on the battery level.

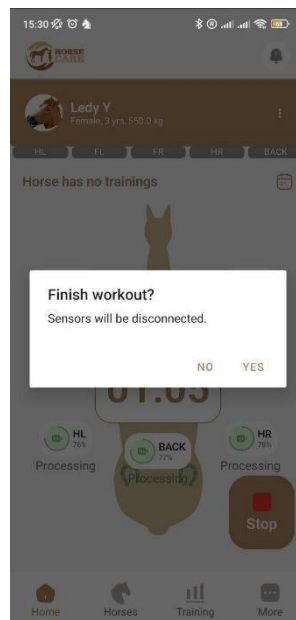


While the training is ongoing, the user can lock their phone. During the training, the phone can be near the sensors in the rider's pocket, or it can be left in any place (e.g., in the locker room, in the car, etc.)

During the training, all data is stored in the internal memory of each sensor and, after the training is completed and the sensors are reconnected to the application, all data will be automatically transferred to the application.

6.3. Ending the Training

To end the training, the user must press the 'Stop' button. The program has a protection against accidental presses, so if the user is sure they want to end the training, they must confirm by pressing again.



After reconfirmation, the application sends a command to stop data collection on the sensors and downloads the full training statistics from the sensors. The training ends with the formation of a complete training dataset in the application and its subsequent automatic upload to the server. No additional actions are required from the user, just ensure that the upload is completed successfully. Data transfer to the server takes some time, as the application needs to transfer a considerable amount of data. The transfer time may depend on the phone's performance, the amount of data in the training, and the quality of the communication channel with the server.



The uploaded data is stored on the server and can be used for subsequent analysis and providing training analysis results to all interested parties.

7. Training Analysis

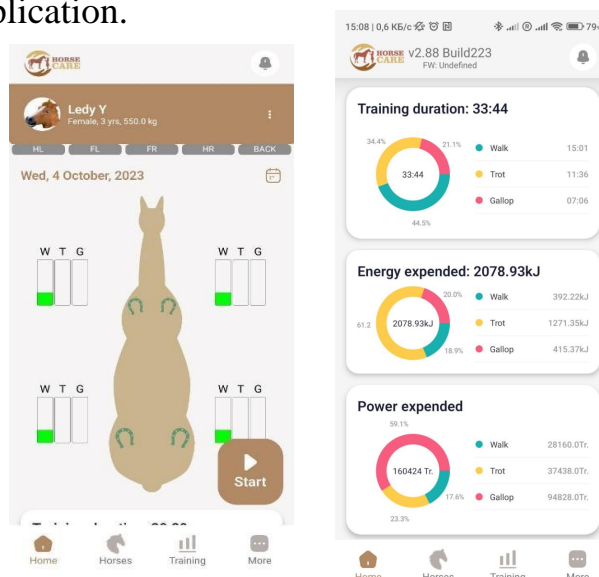
7.1. Analysis of the Last Training

In the mobile application, the user can view only basic, significantly condensed training results. The mobile analysis is intended to draw the user's attention and, in case of diagnosing any problems, prompt the user to a more detailed examination.

A detailed analysis of trainings is much more convenient to conduct not on a phone, but on a personal computer with a larger screen and a much larger number of analyzed parameters.

Access to detailed analysis is provided in the personal account on the website www.horsecare.si

In the mobile application, the results of the last training are displayed on the main 'Home' screen of the application.



On the main screen, the detection of lameness in the selected horse is shown in color (the color decoding is described earlier). If yellow or red colors are among the detection parameters, the user should pay close attention to this horse and consult a trainer or veterinarian.

On the second screen, which can be accessed by scrolling, the user can view the main quantitative parameters of the training.

These parameters are grouped into three circular diagrams:

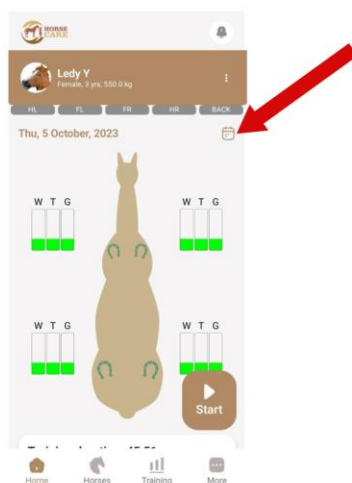
'**Training duration**' - shows the total duration of the training in minutes and the proportional division of the total training time between the three gaits: walk, trot, and gallop.

'**Energy expended**' - shows the total energy expenditure of the horse during the last training and the proportional division of energy expenditure between the three gaits: walk, trot, and gallop.

'**Power expended**' - power expended in the last training session. It shows the total power expenditure in the last training session and the proportional division among the three standard gaits: walk, trot, and gallop.

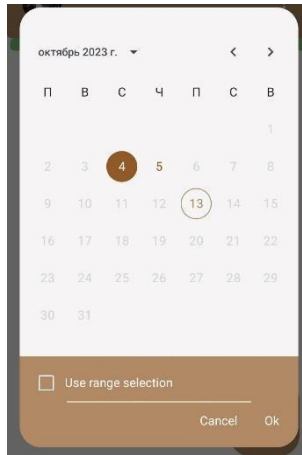
If several horses are registered in the application, the user can select the horse whose training they want to view. To do this, the user should click on the horse's name at the top of the main screen and use the scroll to select the horse of interest.

If the user wants to view a training saved on the server, they can use the calendar.



To access the training calendar, click on the calendar icon below the image of the selected horse. Then a calendar image will appear, where you can select the desired training date.

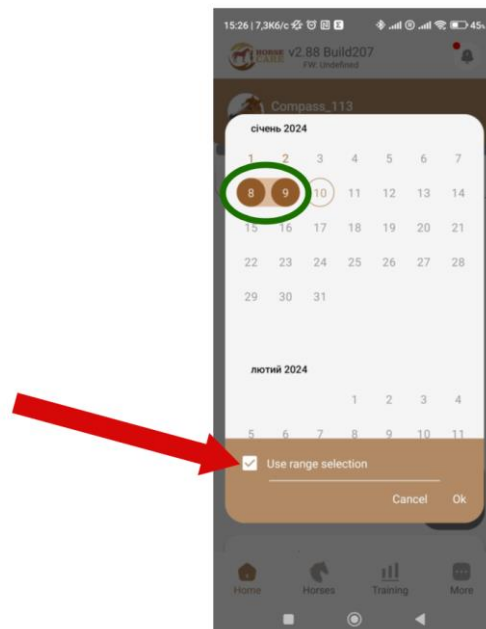
The current date in the calendar is marked with a transparent circle, and dates with information about conducted trainings on the server are marked with a filled circle.

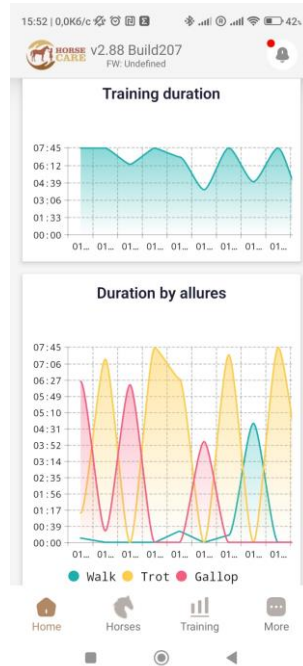


After the user confirms the selection of the desired date, the training data will be downloaded from the server to the application's memory and displayed on the screen.

7.2. Analysis of multiple trainings

The mobile application allows the user to visually see how the horse's loads changed over several trainings. To do this, the user needs to open the calendar and check the box in the field for selecting multiple trainings and press the 'OK' button.





In the resulting window, overall graphs of the conducted trainings for the selected days are displayed. The horizontal axis indicates the days and times of the trainings.

In the current version of the application, two graphs are available for analyzing several trainings simultaneously:

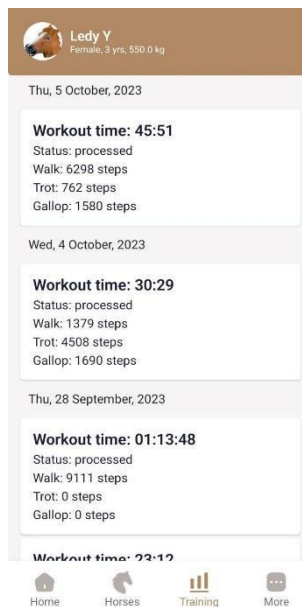
'**Training duration**' - analysis of changes in the duration of several trainings. The vertical axis shows the durations of the trainings, and the horizontal axis shows the time when the training took place.

'**Duration by allures**' - analysis of training times for each gait. The vertical axis shows the durations of each gait within the training, and the horizontal axis shows the time when the training took place.

8. Statistics of Conducted Trainings

In the '**Training**' section of the application, there is cumulative information about the trainings conducted for each horse. By switching to this section, the user can see the date of the training and the trainings grouped for that date.

For each training, the total time, status (successful/unsuccessful), and the number of steps for each gait that the application can recognize are displayed.



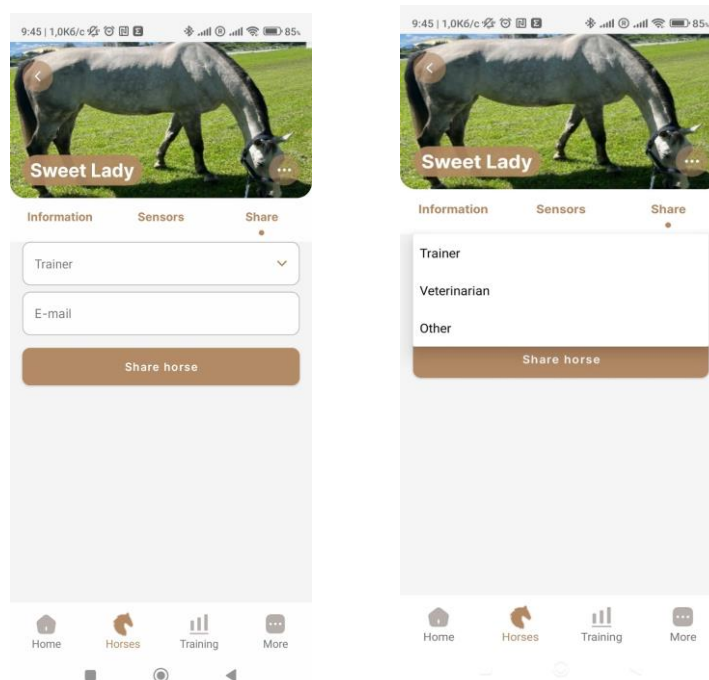
9. Sharing training data

The user of application can share his horse's training data with other registered users of the application.

9.1. Providing shared access

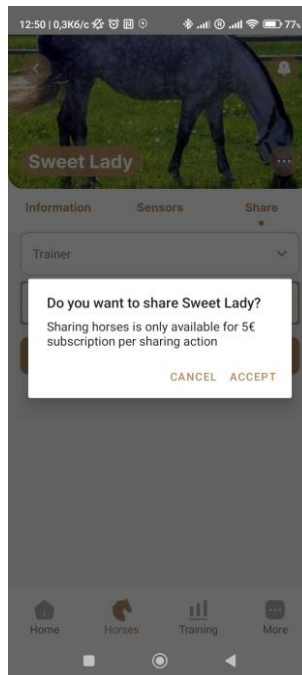
If you want to give access to the training data of your horse to someone, go to the '**Horses**' section, then select the card of the horse whose trainings you want to share, and go to the '**Share**' tab. Next, in the dropdown list, select the role of the person to whom you intend to grant access to the horse (currently available roles are '**Trainer**', '**Veterinarian**', '**Other**'). After selecting the role, enter the email address of the person you would like to give the opportunity to access the trainings of the selected horse.

Typically, this could be a trainer, veterinarian, or someone close to you who is interested in this information.

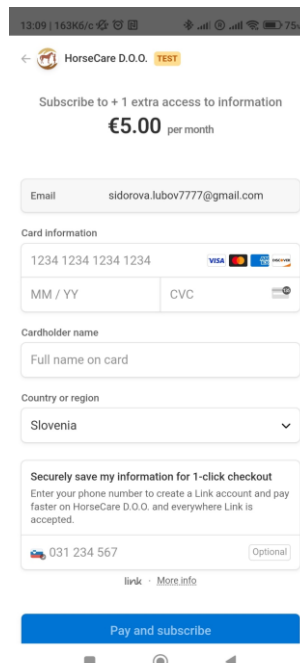


After the user enters the contact details of the person, they need to press the '**Share horse**' button.

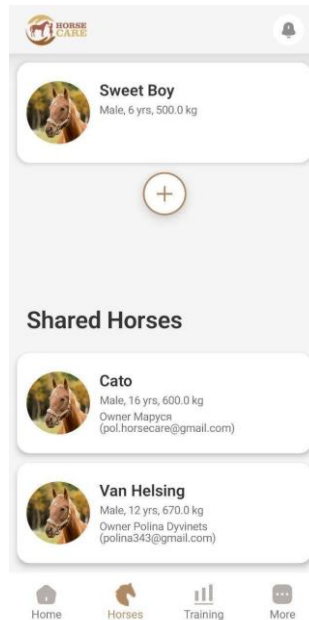
ATTENTION!!! The service of providing access to horse trainings is PAID!!! Adding EACH horse is charged according to the price list of additional services.



If the user agrees that the service needs to be paid for, they should press the 'ACCEPT' button, after which they will be redirected to the credit card payment interface.



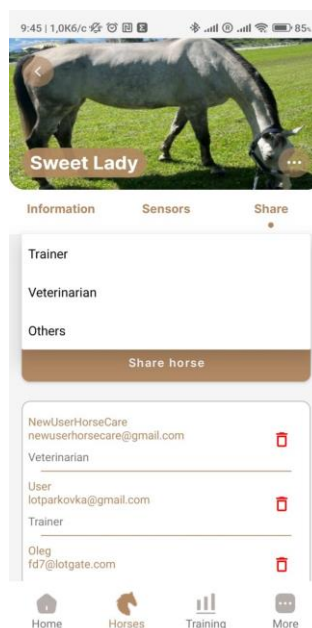
After successful payment, the selected horse will appear in the list of available horses in the interface of the person to whom you have provided access to view the data.



9.2. Terminating shared access

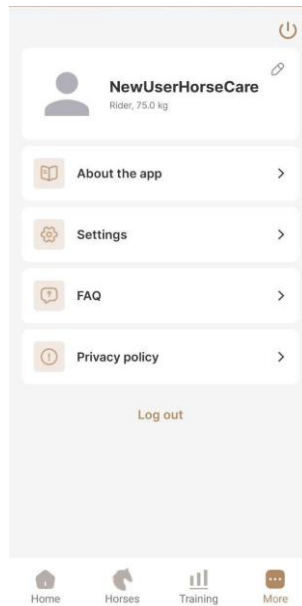
If desired, the user can terminate shared access to the analysis of trainings of the selected horse. In the *'Share'* tab, all accounts that have the ability to jointly analyze the trainings of the selected horse are displayed. Next to each account, there is a trash can icon.

By pressing the trash can icon, the selected account is removed from the list of shared accounts.



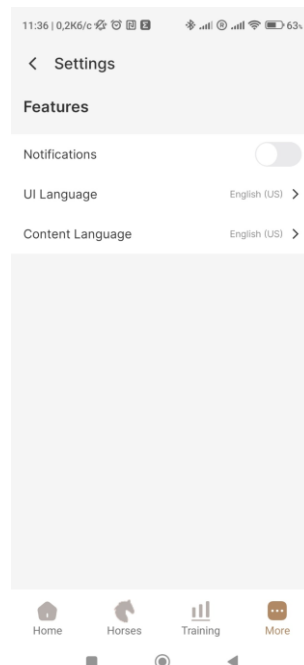
10. Service information and application Settings

In the '**More**' section, there is service information and settings for the mobile application.



'**About the app**' - clicking on this link will take the user to the horsecare.si website where they can read about how the project is structured, its features, and how it differs from similar projects.

'**Settings**' - this section contains options for selecting the application language and toggling the application's notifications on/off.



The list of notifications looks something like this:

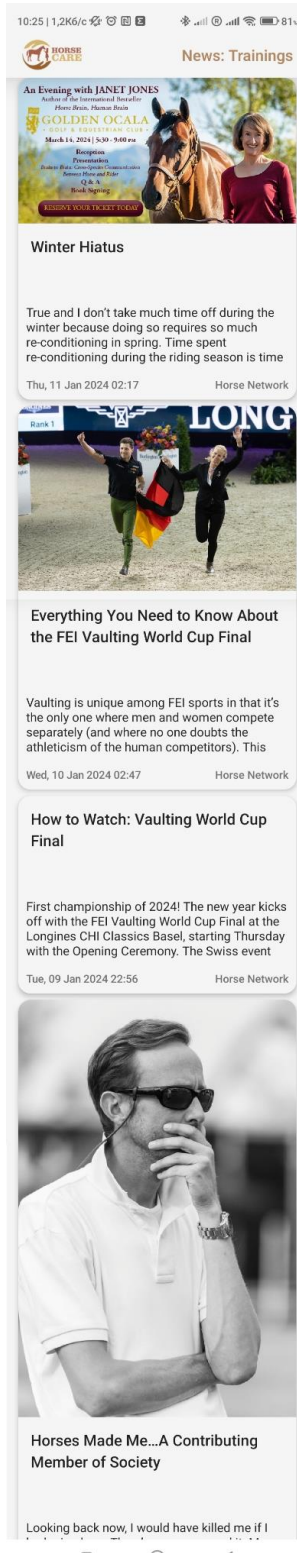
- Training notifications: 'Your training has successfully started', 'Training completed. Data sent to the server';
- Sensor status notifications: 'Back sensor is low on battery. Battery charge: 15%. Charging required';
- Sensor attachment notifications: 'Front right leg sensor successfully attached', 'Successful attachment of sensor set. You are ready for training';
- Settings and privacy notifications: 'Please update your security settings', 'Review our privacy policy';
- System update notifications: 'Application update available. Please install it';
- Recommendations and advice notifications: 'Tip of the day: don't forget to hydrate your horse during hot weather', 'It is recommended to increase the duration of trainings';
- Problem and solution notifications: 'Error occurred while uploading data. Please check your internet connection', 'Data synchronization issue. Please restart the application';
- Special offers and events notifications: '20% discount on the extended data package. Valid until October 31st';
- General notifications and reminders: 'Reminder of the daily training at 3:00 PM', 'New version of the application available for download'.

'FAQ' - a link that leads to the website's section with frequently asked questions.

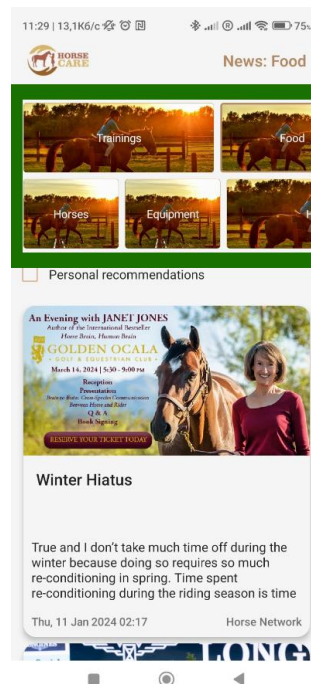
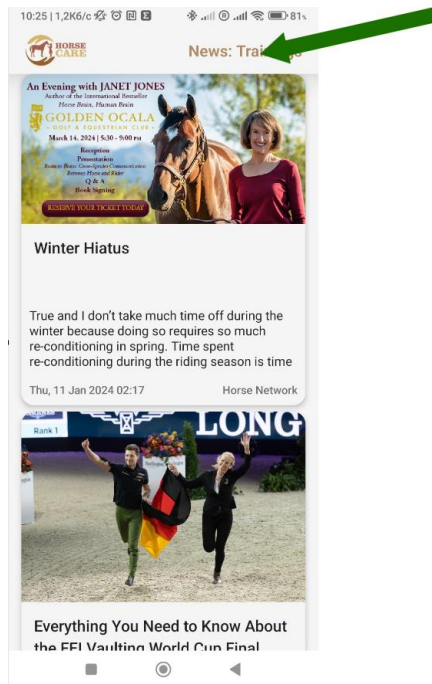
'Privacy policy' - a link that leads to the website's privacy policy section.

11. News feed

Besides tasks related to monitoring horse trainings, the application also serves as a bridge to the community of equestrian enthusiasts and professionals. To engage people and provide them with new and interesting information, a news feed is included in the mobile application. To access the feed, the user should go to the main '*Home*' screen of the application and swipe down from the top of the main screen.



The news feed has several categories. To access the news categories, the user can click on the link '*News: Trainings*'. Categories will appear at the top of the feed, and the user can navigate to the one they find most interesting.



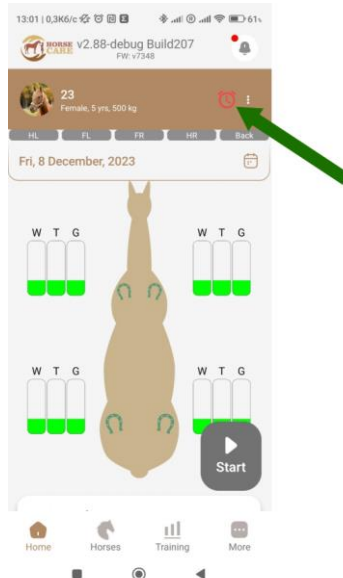
12. Paid options

After installing the application, the user is provided with all the functionalities of the mobile application and the capabilities offered on the website. In this introductory mode, the application can operate for 3 months.

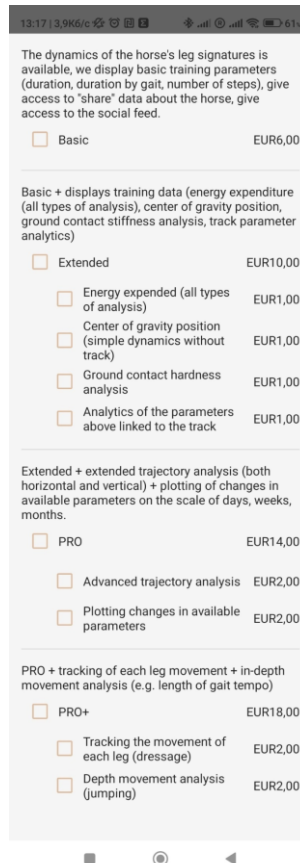
After the 3 months expire, the user must decide which functions they require and choose one of the payment options:

- **Basic;**
- **Extended;**
- **PRO;**
- **PRO+.**

Access to the menu for selecting paid subscriptions is opened in the '*Home*' section on the right side of the active horse's screen. The appearance of the subscription indicator denotes the approximate time until the subscription expires: if there are 30 days or more until the subscription expires, the indicator does not attract the user's attention. The fewer days remaining until the subscription expires, the more contrasting and noticeable the indicator becomes.



By clicking on the indicator, the user enters the menu for selecting paid subscriptions and desired options.



'*Basic*' - this is the standard subscription. The minimum available option for the user. To continue using the program and its basic functions, the user is obliged to pay for such a subscription. This subscription provides the user with the ability to detect lameness, display basic training parameters such as total duration, duration for each gait, and the number of steps within the training. The user can also provide access to one of their horses and gain access to the horsecare.si portal.

'Extended' - an extended subscription. Includes the capabilities of the 'basic' standard subscription and additional features: displaying energy expenditure of the training, position of the center of gravity, analysis of ground contact stiffness, recording, and analytics of the horse's movement track during training.

'PRO' - a subscription aimed at real professionals. In addition to the capabilities of the 'Extended' subscription, the following features are provided: extended analysis of the training track trajectory (both in horizontal and vertical planes), analysis not only of the last training but also of constructing graphs of parameter changes over several days, weeks, months.

'PRO+' - a subscription offering maximum capabilities. The difference from the 'PRO' subscription lies in providing spatial tracking of each horse's leg movement (especially useful for dressage), deeper and more detailed movement analysis with separation by gaits (especially useful for show jumping).

'Share Price' - sharing data about the horse for joint analysis is separately charged. A fixed fee is charged for each horse."