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на тему:

«Інновації в кінному бізнесі і їх комерційна складова, Innovations in Equestrian business and their commercial input»

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INTRODUCTION

The work is about innovations in equestrian business and how these innovations help to earn money. I do a brief review of market in Germany to describe primary customer profiles. Also main equestrian product competitors are identified as a reference of innovation, reference of data collection tool or a software that might be extended with my product concept.

I do identify schemas of money earning based on initial understanding of the product and product evolvement in German market. The engineering team was located in Ukraine and we managed to design a data collection approach, that we are going to apply in the next stages of the product evolution.

Available statistics of users' behavior allows us to understand customers preferences and do assumptions what makes people want to use the app regularly.

The diploma work describes the next stage of applying equestrian innovations to make competitive product and cover wider market, go international, focus not only on Germany, but try also worldwide including Ukraine.

1. THEORY ANALYSIS

The product is designed with the help of Lemberg Solutions Ltd. The core vital competence is data science that helps to utilize collected equestrian data and get a value of it.

1.1 Company Description. Capabilities

Lemberg is a technology consulting, software & hardware engineering company. Established in 2007, Lemberg is a team of over 100+ professionals with the head office in Lviv, Ukraine and clients across the European and American markets.

Startups and established businesses work with Lemberg to build new products and deliver digital transformation. Lemberg's clients appreciate complete engineering services suite, empowered by expertise in consumer electronics, automotive, sports tech, digital media, industrial IoT and healthcare.

Engineering services:

- Mobile development
- Web/Cloud solutions
- Embedded software and hardware for IoT
- Data science, machine learning, AI

Why Lemberg?

- Collaborate intensely with our team throughout all project stages
- Go product thinking challenge your idea by exploring industry insights
- Rely on end-to-end service and watch how your idea evolves from a concept into a complete product

Short description

- IoT, Mobile and Web development
- Lemberg is a technology consulting, software & hardware engineering company.

- Startups and established businesses rely on our industry expertise to build new products and deliver digital transformation.

Key facts:

- 100+ professionals: Engineers, Product and Project Managers, Architects, Designers, Testers
- Head office in Lviv, Ukraine. Lviv is one of the biggest East European tech hubs
- 10+ years on the market. Our journey started in 2007
- Serving European and American markets. Our customers are located in the US, Germany, the Netherlands, UK, Ireland, France, Norway

Lemberg as a company got a request to assist with Equestrian startup development.

Together with the product owner, we decided to start with a lean development approach. So instead of jumping straight into hardware development, we decided to build an emulator app first. This app would run on regular mobile phones located on the horse and collect movement data.

From here, we started getting a real taste of what data science really is in practice, including things like which data to collect and which data should be considered as noise, how to store it and in which format, etc. Obviously, raw data collection and processing is the most critical phase when you are about to build your own neural network.

For the emulator app, we decided to collect data on Google Firebase, which ideally suited our initial requirements. To ensure we were collecting the right data of the horse movements, we decided to build a voice assistant that would talk to the horse rider via an earpiece and dictate which exercise they have to perform next. Meanwhile, we have been busy implementing the UI elements for the mobile app and ensuring sleek UX design.

Moving forward, we set up a cloud environment on MS Azure IoT to improve our data storage and streamline the work of our neural network. When the first app was

launched, it could detect 4 main horse activities: standing, walking, trotting and galloping.

In the next releases, we focused on polishing our machine learning algorithm and adding new app features. It's interesting to mention the unique QA testing process on this project that brought our office employees closer to these noble animals out in the field [7].

1.2 Competitor Analysis

Competitors review will cover two types of players that do engineer stable management systems and hardware products, that make innovations in Equestrian business.

iStable

Table 1.1

iStable Startup Summary [1]

Logo	
	DEAD ALREADY
Name	iStable [LINK]
Is Competitor?	NO
Founded	USA, 2013
Main Goal	Horse management software for trainers, managers & owners
Is Stable Management Software?	YES
Hardware Dependable	YES
Provides Analytics	YES
Free software	YES
Subscription	YES (Lite and Pro versions) Pro version - multimedia, notes, and billing functionality Last updates - 22/08/2017
Installs	1k+

Features	1) Horse Management 2) Thoroughbred Real Time Racing Data: - Workouts - Race Entries - Race Results - Family Pedigree Updates 3) Training activities 4) Multimedia 5) Documents and notes 6) Horses locations 7) Billing functionality

Equicty

Table 1.2

Equicty Startup Summary [12]

Logo	
Name	Equicty https://www.equicty.com
Is Competitor?	NO
Founded	Belgium, 2014
Main Goal	Coordinate and communicate all activities at the stable or on the road with our ready-to-use platform
Products	Smart Stable Board (32" intelligent touchscreen, all info regarding training, horses etc., info synchronization, log in)
Is Stable Management Software?	YES
Hardware Dependable	NO
Provides Analytics	NO
Free software	YES Last updates 4/04/2019 Available web app
Subscription	NO (need to check via app)
Installs	1k+

Features	Key functionality and features ● Billing & Invoicing ● Breeding Management ● Client Database ● Expense Tracking ● Feed Management ● Horse Database ● Horse Records (health, planning, photos, videos, competitions) ● Income Statements ● Medical Records (notes, examinations from vets) ● Competitions scheduling ● HorseTelex database integration

Equisense

Table 1.3

Equisense Startup Summary [13]

Logo	
Name	Equisense https://equisense.com/
Is Competitor?	**NO**
Founded	Compiegne, France, 2014
Main Goal	*The companion of riders who ride alone*
Products	Motion S Sensor (health, heart rates+training intensity, time per zone of effort), needed an additional strap with electrode Motion Sensor (activity) Smart Girths Accessories
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	YES
Subscription	NO
Installs	50k+

Features	Motion Sensor The sensor measures in real-time: - the time spent at each gait: halt, walk, trot, canter - the number of jumps and transitions - the trot symmetry of the horse - the elevation of the horse at walk, trot and canter - the cadence and regularity at walk, trot and canter Available Motion S Sensor The same features as above + Heart rate Training intensity Energetic cost (to come) Recovery time (to come) Longer battery life

EquiLab

Table 1.4

EquiLab Startup Summary [14]

Logo	
Name	EquiLab https://equilab.horse/
Is Competitor?	**YES**
Founded	Gothenburg, Vastra Gotaland, Sweden, May 15, 2016
Main Goal	Equilab is every rider digital horse coach
Products	NO
Is Stable Management Software?	NO
Hardware Dependable	NO
Provides Analytics	YES
Free software	YES
Subscription	YES Equilab Premium Monthly USD 9.99

	Equilab Premium 6 months USD 49.99 Equilab Premium 12 months USD 79.99
Installs	100k+
Features	Equilab automatically measures your trainings with the help of your phone's sensors and shows: - Gait distribution during your trainings - Percentage distribution between right and left turns during the exercise - Beat, stride and speed - Time and distance - Map of your riding tracks - Energy consumption for the rider and horse - Compilation of your training history - Horse diary of your trainings App available for Android Wear 2.0

HorseTeq

Table 1.5

HorseTeq Startup Summary [15]

Logo	
Name	HorseTeq http://www.horseteq.com/en/frontpage/
Is a Competitor?	NO
Founded	Lappeenranta, Finland, 2015
Main Goal	Using Horseteq's sensors regularly gives a baseline of the horse's movement against which its current performance can be compared. This helps determine whether the horse is meeting its training targets.
Products	Sensor for collecting data: • Movement tracking with 9-axis motion sensor • Weight less than 40 grams • Waterproof and shockproof • Data transfer via Bluetooth Smart 4.2 (Low-Energy) • Location data via GPS on the paired mobile device • Updates via Over-the-Air (OTA) technology • Wireless charging with the included charging pad • Sensors reach a full charge in two hours • The battery allows 24 hours of active measuring • Months of battery life in standby mode

	• LEDs for Bluetooth, battery and system status Polar Equine H3 heart rate sensor belt
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	YES
Subscription	PREORDER
Installs	1+
Features	• Training diary • Saves the rider's/driver's name, the horse's heart rate (if a heart rate belt is used) and even the type of shoe the horse was wearing • Tracking location and prevailing weather conditions are recorded automatically • The profiles of several horses Technology enables the following features of your horse's gait to be measured: • Step length • Step rate • Strike impact • Swing time • Stance time • Symmetry • Speed

Seaver

Table 1.6

Seaver Startup Summary[16]

Logo	
Name	Seaver https://seaverhorse.com/en/
Is a Competitor?	NO
Founded	France, Paris, 2016
Main Goal	The connected girth, allows riders to monitor their horse's physical condition and health during training and competitions.
Products	Girth (329 EUR) And 4 more additional products - girth in different configurations
Is Stable Management Software?	NO
Hardware Dependable	NO
Provides Analytics	YES
Free software	YES
Subscription	NO
Installs	1k+
Features	Collects information on your training and your horse's physical condition in real time: - horse speed - heart rate - distance traveled - calories burned - duration of the training Analytics: - time spent on each hand and pace - locomotion analysis (trotting symmetry, cadence, and rebound at each pace) - abnormality detection (to detect lameness even before it occurs) - analysis of the effort (distinction of the different phases of the session: fat burning, cardio training, and overtraining)

	- analysis of the work on the obstacle (heights, routes, strides, strike force ...)

Estride

Table 1.7

Estride Startup Summary[17]

Logo	
Name	Estride https://www.estride.store/Home
Is Competitor?	NO
Founded	London, UK, Mar 2, 2017
Main Goal	Estride™ tracker is a rider-friendly multi-functional fitness tracker that measures everything you need to improve your riding and insure the health of your horse. Ideal for hacking, training, competition and/or any other activity in the equestrian field.
Product	Tracker (features are described below) Estride Steady bracelet: ● wearable hand-aid designed for riders to measure their hand steadiness for each hand while riding; ● it triggers vibrations if the incorrect movement is detected; ● Price - 99 pounds+app Harmony (is a pressure sensing mat specifically designed to measure the pressure exerted by saddle and rider on horses' back)-799 pound+app
Is Stable Management Software?	NO
Hardware Dependable	YES (all products)
Provides Analytics	YES
Free software	YES

Subscription	NO
Installs	10k+ 500 (Android, latest updates in January 2019)
Features	• Training Time - compare daily training time • Stride Count & Pattern - Monitor stride count and analyze the pattern in each gait • Gait Analysis - Analyze walk, trot & canter pattern to measure the time spent in each gait. • Regularity & Stability - Identify stability of front or hind legs and measure the stride consistency in each gait during training and over time. • Rehabilitation Assistance - Monitor stride patterns to assist injury or lameness recuperation • Jump Measure - Measure jump efforts in training sessions. • Stride Change Alert - Automatic advanced warnings and alerts in case of irregularities in regular stride patterns. • Predictive & Technical Analytics • Pre-Purchase Analysis Bracelet features: • Vibration alerts (wrong moves) in real time • Beginner, Intermediate, Professional training modes • Check steadiness of both hands and compare left vs right over daily, weekly or monthly • Badges and achievements for trainings

WeTOD

Table 1.8

WeTOD Startup Summary[18]

Logo	The picture can't be displayed.
Name	WeTOD https://www.wetod.fr/
Is a Competitor?	YES
Founded	France, Caen, Normandie, 2017
Main Goal	WeTod is the first virtual vocal coach of the Equestrian World: the rider chooses the

	a most suitable program for his horse and only has to put on his headphones and be guided during his solo sessions, on foot or on horseback.
Is Stable Management Software?	NO
Hardware Dependable	NO
Provides Analytics	YES
Free software	YES
Subscription	YES Integrated purchases 20 credits €9.99 60 credits €26.99 100 credits €39,99 Monthly renewable subscription: 29,99 € / month Has an interesting commercial model - pay for sessions
Installs	1k+
Features	WeTod is: - A library of pre-set sessions: sessions are designed by professional riders, instructors and experts; - A vocal coach who adapts to the will of the rider: the rider can change his live session depending on the difficulties encountered; - Real-time monitoring: statistics of each session are available to deepen the analysis of the work done by the rider.

Piavita

Table 1.9

Piavita Startup Summary[19]

Logo	
Name	Piavita https://www.piavita.com/
Is a Competitor?	NO
Founded	Zurich, Switzerland Mar 1, 2016

Main Goal	to support the veterinarian with a fast, easy-to-use and smart combination of the Piavet Sensor Technology and the Piavet Cloud Applications
Products	Sensor (records vital signs on horses in any size or shape) Base station (enables the wireless transmission of high-volume medical data) Charger
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	Together with the sensor cloude-based app
Subscription	NO
Installs	N/A
Features	Unique solution that simplifies monitoring and horse vital sign recordings. Transfer complex data securely over 4G/LTE or Ethernet to use the Piavet System both in clinics or in driving practices. Records vital signs on horses in any size or shape. The soft-touch materials are UV-resistant, offer good grip, are water and cleaning resistant, and enable long-term measurements. Measures ECG, heart rate, respiration rate and pattern, activity, bosy core temperature Features ● easy monitoring from distance patients in isolation box ● simple and painless colic monitoring ● real time visualizing heart health suspect arrhythmias ● sustained monitoring during sedation ● diagnosis and treatment laminitis early recognition

Nightwatch

Table 1.10

Nightwatch Startup Summary[20]

Logo	
Name	Nightwatch https://www.smarthalter.com/
Is a Competitor?	NO
Founded	US, Austin
Main Goal	is an early warning system that automatically alerts you at the first signs of danger/distress in your horse (via text, phone call, and email).
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	NO (web app available after subscription)
Subscription	YES Halter - 800USD Contract 360USD/yr
Installs	N/A
Features	Uses novel radio frequency technology (ie, ultra-wideband impulse radar [UWB-IR]) to monitor your horse's heart rate and respiratory rate Uses a variety of sensors, including accelerometers, gyroscopes, magnetometers, and altimeters to continuously assess your horse's activity, motion, and posture. Has embedded cellular and WiFi technology to ensure connectivity at home, on the road, and while away, as GPS technology tracks their location Uses multivariate analysis to simultaneously assess your horse's biometrics, behaviors, and personal risk factors for a

	more comprehensive picture of their health and wellness. Leverages advanced artificial intelligence to learn your horse's unique physiology and adapt to them over time.

Hylofit

Table 1.11

Hylofit Startup Summary[21]

Logo	
Name	Hylofit https://hylofit.com/
Is Competitor?	NO
Founded	US, 2016
Main Goal	The Hylofit System includes the hardware and software components listed below and requires Membership to access all features within the Hylofit App and on the web.
Products	Horse girth attachment, The rider chest strap, Horse heart rate monitor, Rider heart rate monitor, Extra straps Together 349 USD
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	NO
Subscription	YES Requires membership Monthly $9.99 Annual $99.99
Installs	100+
Features	GIRTH ATTACHMENT — connects seamlessly to the girth and captures the horse heart rate HORSE TRANSMITTER — connects to the girth attachment and transmits the horse heart rate to the app in real time CHEST STRAP — worn by the rider to capture heart rate

	RIDER TRANSMITTER — connects to the chest strap and transmits the rider heart rate to the app in real time The Hylofit girth attachment is waterproof and the transmitters are IPX7 water resistant. Each transmitter has a disposable battery that will last 6 months to one year, depending upon the frequency of use. The horse transmitter measures the horse's heart rate in real time and sends this information via Bluetooth continuously and wirelessly to the Hylofit app. Speed and distance are measured using the GPS on your phone. -Real-time feedback -Horse's heart rate, speed, distance -Rider's heart rate -Full-ride analytics and graphical display of performance -Calendar view and activity details -Monitoring Resting Heart Rate

Arineo

Table 1.12

Arineo Startup Summary[22]

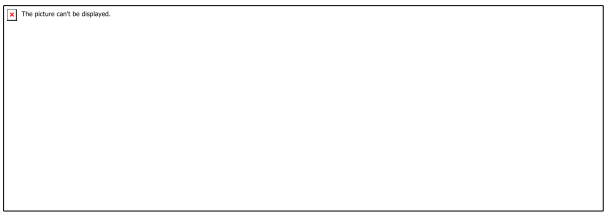
Logo	
Name	Arineo https://www.arioneo.com/en/home/
Is a Competitor?	NO
Founded	France, 2014
Main Goal	Its mission is to develop connected sensors for the equine world while collecting valuable data to oversee horses' health and performance. Arioneo's 2 product lines, Care and Performance, provide precise yet easy-to-analyse data for users. DESIGNED TO MONITOR YOUR HORSE AT REST
Products	Orscana sensor (under the blanket) - 99 EUR
Is Stable Management Software?	NO
Hardware Dependable	YES

Provides Analytics	YES
Free software	YES
Subscription	NO
Installs	1k+
Features	• Measures the temperature beneath the rug • Detects the levels of sweat underneath the rug • Monitors and reports time standing or lying • Make your decisions with weather data • Data can be shared

CoreX Equine

Table 1.13

CoreX Startup Summary[23]

Logo	
Name	CoreX Equine https://corexequine.com/
Is a Competitor?	NO
Founded	
Main Goal	Provides real-time biofeedback to monitor and analyze posture
Product	Sensor 149.99 USD
Is Stable Management Software?	NO
Hardware Dependable	YES
Provides Analytics	YES
Free software	N/A
Subscription	N/A
Installs	N/A
Features	• Level selection • Gait selection and monitoring • Front/Back tilt feedback • Data tracking • List of Horses • Left/Right lean feedback • Cloud hosted analytics

	• Bluetooth synchronization • Progress tracking

Summary

Table 1.14

Startups Summary

Name	Number of downloads	Hardware dependency	Stable Management software	Price	Analytics and Reports	Analytics (not from hardware)	Health monitoring	Purpose	Trainings
iStable	1k+	No	Yes	Free	Yes		No	Not active	
Equicty	1k+	No	Yes	Free app	Yes	No	No	More for horse business management	No
Equisense	50k+	Yes	Yes	Not free	Yes	No	Yes (separate product)	Trainings and horse health monitoring	Yes
EquiLab	**100k+**	**No**	**Yes**	**Not Free**	**Yes**	**Yes**	**No**	**Team collaboration in high priority**	**Yes**
HorseTeq	1+	Yes	No	Free app	Yes	No	Yes	Rider's performance and horse health monitoring	No
Seaver	1k+	Yes	Yes	Free app	Yes	No	Yes	Rider's performance and horse health monitoring	Yes
Estride	10k+	Yes	Yes	Free app	Yes	No	Yes	Rider's performance and horse health monitoring	Yes
WeTOD	**1K+**	**No**	**Yes**	**Not Free**	**Yes**	**Yes**	**No**	**For coaches and riders**	**Yes**
Piavita	N/A	Yes	Yes	Not Free	Yes	No	Yes	Health monitoring and control	No
Nightwatch	N/A	Yes	N/A	Not Free	Yes	Yes	Yes	Health monitoring and control	No
Hylofit	100+	Yes	N/A	Not Free	Yes	No	Yes	Rider's performance and horse health monitoring	Yes
Arineo	1k+	Yes	No	Free app	Yes	No	Yes	Horse health and performance	No
CoreX Equine	N/A	Yes	No	N/A	Yes	No	No	Rider's performance	Yes

As a summary I do identify only two competitors that provide similar functionality set without additional device requirements.

EquiLab is additionally compared in Appendix A.3. The competitor makes huge focus on emotional part of a ride, on nice stories about equestrian activities, very strong

presence in social networks, and they are also supported by very professional team from equestrian clinics. The accuracy of analytics is not the best, and sometimes even very random (one year time old detailed analysis). But the lack of good analytics was compensated by a perfect feedback that “You are the best rider in the area”, and that engages people to keep using the app.

WeTOD has a focus on riding coach capabilities and has interesting financial model of making a request to do rider’s session review for money. Besides that they have monthly subscription for data storage and very basic analytics.

SWOT

In the table below the HorseAnalytics product is analysed within 2 years history in front of other competitors.

Table 1.15

SWOT

Strengths	**Weaknesses**
- No dependencies on other 3rd party devices - Mobile phone is required only - Basic analytics of 4 riding types, and Left&Right motion analysis is supported and polished for 2 years - Available analytics useful for all levels of the riders (support for 2Hz, 20Hz & higher) - High level of accuracy in covered arenas which don’t allow GPS usage, and actively used during cold weather - Support of iOS/Android app - Audio assistance to make riding lessons	- Only two types of analytics - No support of health related devices to measure heartrate - No support of additional devices to collect and analyse data from legs - No support of analysis of colics motions - No positive accent on any type of riding results, so application can engage Rider to do and try more
Opportunities	**Threats**
- Emulation of an artificial equestrian judge who can evaluate the ride - Support of additional riding types and activities: jumps, step length, recovery, lameness, types of trott, types of gallop - Annual summary of horse activity useful for sales - to evaluate a horse price - A tool for trainer and pupils to keep track of progress and skills improvement - Internal shop of riding lessons - Directory of horses - Directory of riders - Dashboard for smart glasses with output of all riding metrics - Instant heart beat analysis	- No visibility on the market - No aggressive market promotion - Not defined core Users (riders? Coaches? Horse owners?) - Horse clinics with good staff, big number of horses, very different horses profiles and data collection tools may recreate similar concept - Device manufacturer may take the market if device price is low - less than 100 euro for a set of two

- Partnerships with clinics - Partnership with Olympic committee	

Wanted Innovations

In the table below I have listed wanted innovations that is possible to do average efforts and investments.

It is also good to know a term IMU device. An inertial measurement unit (IMU) is an electronic device that measures and reports a body's specific force, angular rate, and sometimes the magnetic field surroundings the body, using a combination of accelerometers and gyroscopes, sometimes also magnetometers [9].

Table 1.16

Innovations

Technology	Descriptions	
Horse Activity Reports	A report about 30 min, 1+ hours about what a horse was doing. That covers feedback about timing of horse being standing, walking, trotting or galloping. The timing is organized into a sequence of different recognized activities. The quality of feedback depends on placement of sensors, sensors' frequency levels, types of sensors and number of sensors. The cheapest way is to use a smartphone to do data collection about a horse. Flagman smartphones may give very good quality feedback Commerce Value: - daily activity log - weeks, months, years - quality of regular activity has an impact on price of sales - training trend of improvement - stride transitions should be immediate - horse is riding perfectly Hardware: -smartphone-,-imu-device-	Healthcare, training
Injury Image Analysis	A tool about what kind of wound horse does currently have. Commerce Value: - understand what is the injury without calling a doctor - communicate with doctor remotely in more effective way Hardware: -smartphone-	healthcare
Vitals Report	A report about health state from connected health device	healthcare

	Commerce Value: - understand what is the health state without calling a doctor - communicate with doctor remotely in more effective way Hardware: -smartphone-, 3rd party devices like HeartRate monitor	
Step Length	A report about step length estimate or dynamic of change of calculated length. Commerce Value: - at runtime it says about physical capabilities of an animal, - how speedy it might be, - how strong the horse is, and rider's proficiency level, - what is recovery level Hardware: -smartphone-,-imu-device-	Healthcare, training
Lameness Check	A report about probability of horse lameness. A vet doctor should make a decision from the report about next steps and whether the animal needs further treatment Commerce Value: - at runtime evaluate lameness probability - early understanding prevents dangerous injury and expensive treatment - understand what is the health state without calling a doctor - communicate with doctor remotely in more effective way Hardware: -imu-device-	healthcare
Jumping Evaluation	A report about jumping sessions of a horse - how analytics evaluates quality of performed training, passed obstacles, type of rides before jumps, speed dynamics, evaluation if horse is tired Hardware: -smartphone-,-imu-device-	training
Training Assistant	A tech approach to help to do training via voice commands, keep an eye about sequence of exercises, runtime advice about training quality Hardware: -smartphone-	training
Video monitoring	A technology to observe horse behaviour in stables and immediately alert if some potential emergency detected Commerce Value: - no need to have many staff to monitor horses instantly in the stables - early identification of colics probability Hardware:	healthcare

	-camera-	
Video monitoring on Arena	A technology to observe horse riding on arena and immediately share current horse location Hardware: -camera-	training
Training evaluation	A robot evaluation of training quality - trained as medium, junior or professional Hardware: -smartphone-,-imu-device-	training
Rider fall detection	A technology that notifies (emergency service) about rider's fall from a horse. Hardware: -smartphone-,-imu-device-	training
Rider posture feedback	Evaluate rider's posture while doing different riding tasks Hardware: -smartphone-,-imu-device-	training

1.3 Product Description

The challenge

The product owner came to us with an idea to monitor horse activity 24/7 including exercise, sleep and behavior and to translate all of this into meaningful data for the user. [7]

Preface

Majority of stable owners already have some stable management systems (SMS) installed. These SMS already operate with huge amount of data and people are used to these systems.

Some stables use just a desktop computer, some use only paper records, some use powerful stable management systems.

The core value of every stable or horse owner are records about horses and stable maintenance. Also the flow and tradition of using these old-fashioned systems is

part of daily routine and mostly all are happy about it. Nobody doesn't want to spend time to change the system and get unknown and very questionable profit. Data and tools transfer is a very big step to get the courage to do that.

What could be the motivation to sign up under some minimum changes? That is a cheap effortless solution with a very good value that may evolve in time.

The main value to majority available systems would "analytics" that can be retrieved via using external gadgets from mobile phones to very specialized devices.

To use rider's smartphone is the most cost effective way of data collection and most affordable or free of charge approach.

The core product for final customer would be a detailed report about different specifics of a ride that covers side of riding skills, training level, health related feedback. It might be compared to a blood test report. The report can be read and treated in a way that is special in respective "industry", for respective consumer. The product includes software and hardware parts that collect and process data to make the report.

I do identify maintenance, training and healthcare. Maintenance and healthcare are very interrelated because good maintenance includes healthcare. The consumers would be individual riders, horse owners and stable owners, trainers and pupils, equestrian software providers.

What is not a product? I will identify what areas product doesn't compete:

- Not a stable management tool
- Not a time slot booking tool for horses rent
- Not a healthcare tool to keep track of all medical records about a horse
- Not an accounting tool
- Not a photo gallery
- Not a staff management tool
- Not a task management tool

Product Parts

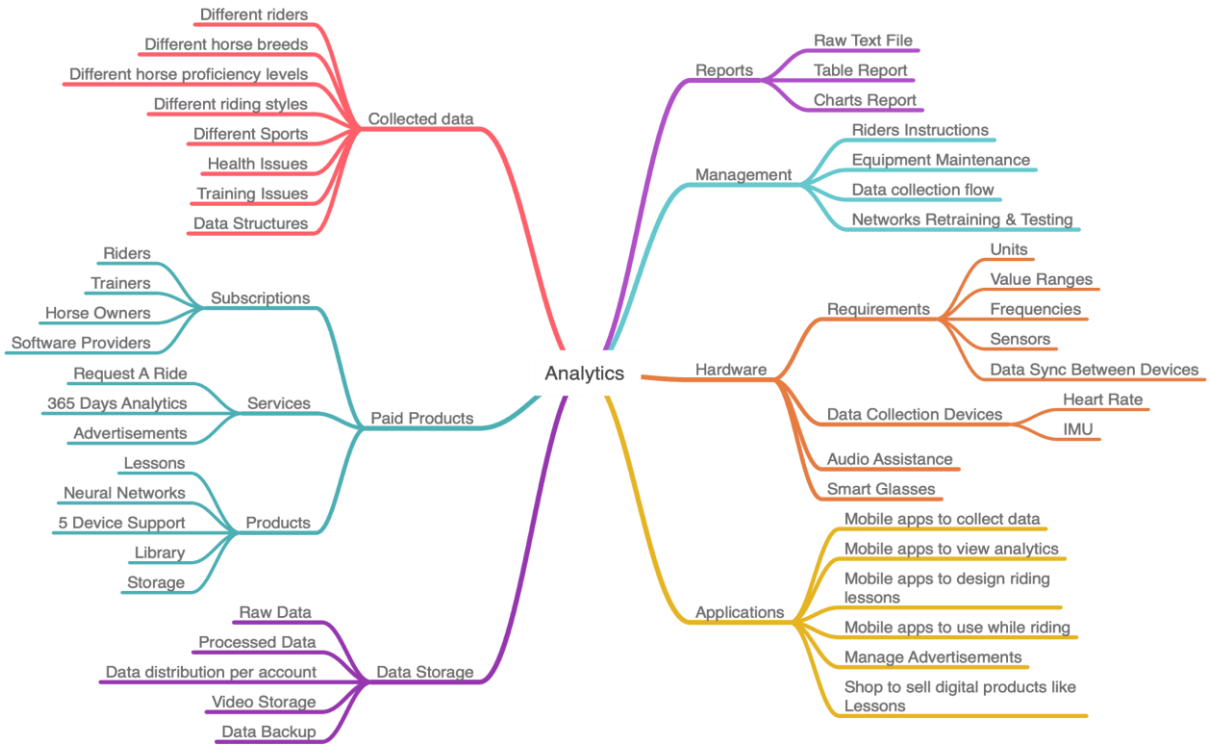
Table 1.17

Different product parts

(A) Analytics Report **[checked with real users]**	- Reports - the core value of a product. - Visual representation of a report with nice charts and tables, and other graphics that highlights important data trends. - Also that can be a text file with all grouped data parts so final consumer can reuse it in a suitable way (in customers' environment). - Reports could be simple with basic data - Reports could be complex with extended data - has value for deeper analysis - Bind analytics to particular sport discipline like Dressage Examples: ● What is the timing of training? ● What is the timing of standing, walking, trotting, galloping? ● Lameness? Jumping? Rider posture? ● Annual training progress ● Horse recovery analysis ● Training comparison: ○ "me 3 months ago", ○ "me 6 months ago" ○ Comparison with other horses-riders of same class ○ etc
(B) Riding Tools **[checked with real users]**	- (1)Audio assistant that will provide audio advice and guidance during a ride - sequence of tasks, how to perform a task, when to start a task, when to complete. - (2)Tool to record a riding with optimal sensors' frequency level, or Rider can do this manually, including usage of GPS data. The tool gathers raw riding data that after can be used for analysis - (3)Tool to compare planned riding vs actual riding
Data Collection Tools	- Similar tool to (B.2). Records data during a ride from all available sensors (accelerometer, gyroskop, artificial rotation sensor) - Data collection considers supervised machine learning after, so it means that we need to have data collection program of ride. It is a very similar tool to (B.3)
People Management Approach	And that will include not only finances, but attention to other process details. ● You need to find experts in riding - so they can feedback on the quality of ride ● You need to find horses with different training categories ● You need to find a group of people who will assist with data collection ● You need to train this group of people to explain to them importance of accurate data collection ● You need to emphasize people not to cheat about not properly recorded riding sessions

	● You need to provide people with proper equipment and always maintain the equipment
Data Processing	- Physically it exists in the form of a library that takes a data in a special format. The library uses a set of neural networks, mathematical models and fuzzy logic module (decides when evaluation of events is very similar) that makes a summary. - System has ML part and inference part -
Data Storage	- All collected raw data and all processed data should be stored somewhere. If to take an average of 11Gb per year per horse - storage is a vital part of the system - Additional data is
Hardware	● Core ○ Integration with smartphones (flagman device with good sensors, ordinary devices with average hardware parts) ● Additional hardware ○ Price of 3rd party hardware is high ○ Cover devices that users already have ○ Introduce basic hardware requirements-limitations
Subscriptions	Different subscriptions for all user profiles: ● Standard ● Standard + ● Professional ● Professional + ● Horse Owner ● Stable Owner ● Trainers' Toolkit. Standard + ● Trainers' Toolkit. Professional + Additional service purchases and digital products like riding lessons.

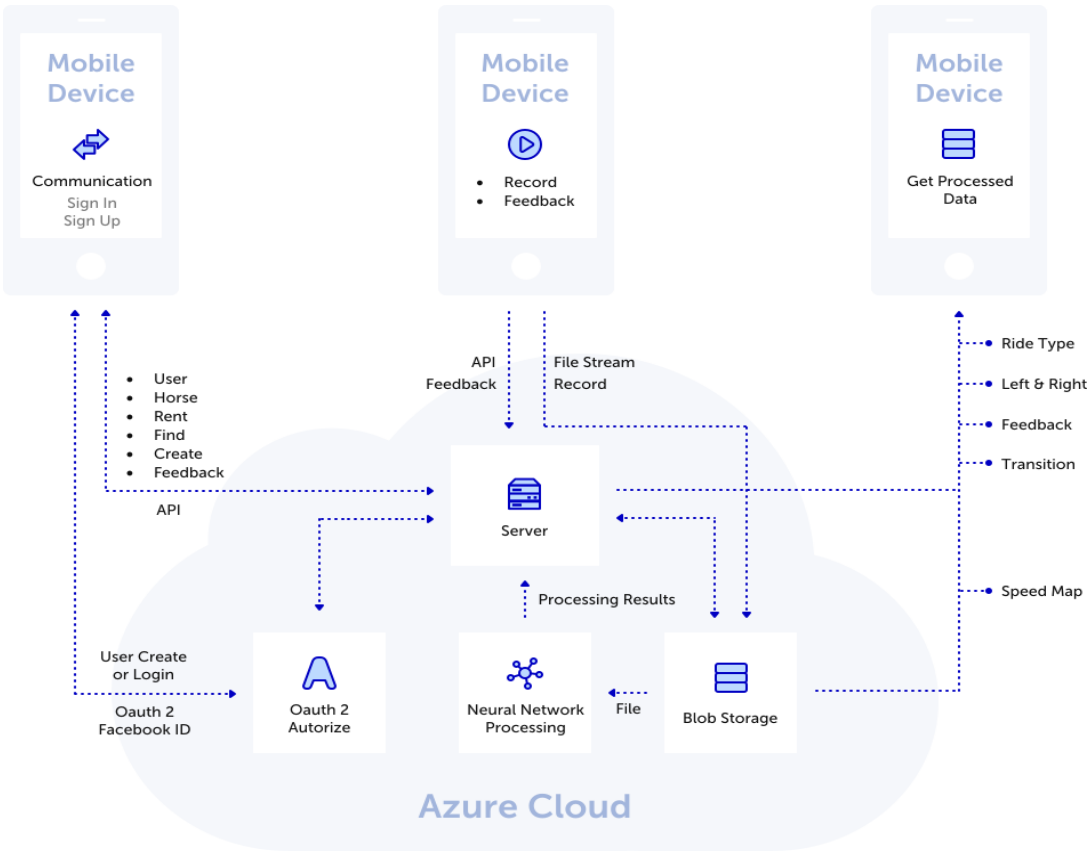
Figure 1.1



Product Software Structure Schema

Figure 1.2

Schema Of Product Technical Structure



What is important in different areas of use?

In *training* it is important to record what kind of riding styles were practiced during a lesson. And it is important to keep a discipline of regular recordings of all riding lessons.

In *training* it is interesting to know improvement of a ride day by day. So applied neural networks can evaluate a ride of "Type A" as a ride of "Type A", otherwise it means that ride is still not recognizable.
Also trained network can evaluate a ride as a Junior level with some probability, Medium level with some probability, or Professional level.

Table 1.18

Probability evaluation of networks that identify different riding levels

Level	Q 1	Q 2	Q 3	Q 4
Junior	80%	70%	60%	50%
Medium	50%	55%	60%	65%
Professional	30%	32%	35%	37%

From the above table it is possible to summarize that Junior skills are losing, and Medium/Professional skills are getting better. That means that riding lessons have good trends of improvement.

In *training* it is important to know that lesson is done according to a trainer's plan. So the next training will be corrected or modified based on current accomplishments of a rider and a horse.

Table 1.19

Summary of a riding recognition comparing to selected riding program

Riding Program	Minutes	Minutes	Feedback
walk, right hand (circle & ganze bahn is mixed)	2	2.5	Activity probability
Trott, right hand (Rising Trott or Sitting, circle & ganze bahn is mixed)	2	1.5	Activity probability
Gallopp, right hand, Aussitzen	1	0.5	Activity probability

walk, left hand	2	1.8	Activity probability
standing	1	1	Activity probability
Trott, left hand, Rising Trott oder sitting, circle or ganze bahn variing	2	1.9	Activity probability
Gallopp, left hand, Aussitzen	1	0.6	Activity probability

In case of unexpected riding results (good or bad), the trainer may review "earlier" riding reports to discover why unexpected results might happened. Trainer may immediately ask either pupil or maintenance staff about additional information - what happened within last couple of days with a pupil or a horse.

In *maintenance* it is important to understand that everyday in a specific timeframe the horse is being trained with some mandatory activities. And what were these training activities, what was the level of these activities. And whether statistics is taken always from the same horse.

Table 1.20

Evaluation of riding by skill level (junior, medium, professional)

Riding Type	**Start**	**End**	**R-J**	**R-M**	**R-P**
Walk	10:00 am	10:02 am	68%	75%	72%
Trot	10:03 am	10:06 am	67%	72%	65%
Walk	10:07 am	10:09 am	67%	79%	70%
Trot	10:10 am	10:12 am	62%	75%	67%
Gallop	10:13 am	10:14 am	55%	80%	65%

R-J - riding junior
R-M - riding medium
R-S - riding senior

In *maintenance* it is important to identify that riding has a difference. And the next task would be to discover what are the reasons of that, and how to correct it the best way. The technology will allow to reveal that at a very early stage.

From a point of sale, it is important to know annual riding summary, to see how a horse evolved during a year, what were health issues and how they reflected on a riding quality. Has the horse managed to recover after injury.

The basic most accessible device for every horse rider is a personal mobile device. The mobile device can be placed under a saddle or within a rider (pocket, boot, belt, hand). The only requirement is to have accelerometer and gyroscope sensors available on a device.

Figure 1.3

Schema Of Device Placement Options

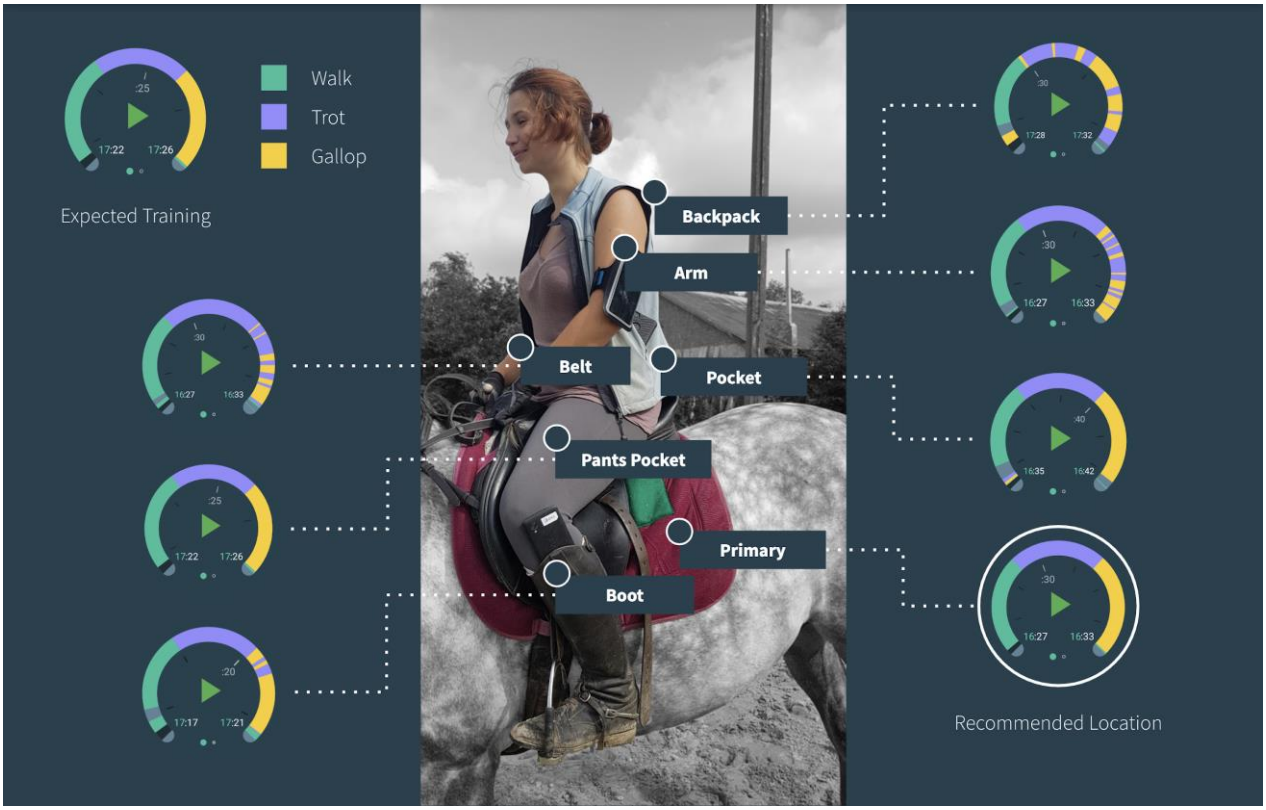
What gives more value

- 4-leg devices
- Heart rate device
- Extra movement device (on a head)

Feedback from individual riders who train alone (according to Enri Strobel): "*Initially the feeling of timing of every ride style was different - gallop or trot was treated as something that lasts longer. But even minute appeared to be not a minute, but a smaller timeframe. So the analytics feedback showed that exercises lasts less time, and audio assistance is a helpful instructor.*"

Figure 1.4

Schema Analytics Accuracy For Different Device Placement



2. ANALYSIS

The focus is on a DACH region including UK. Population of horses in the UK and Germany is 1 000 000 horses in each country. And the first two years of HorseAnalytics product were focused around Germany.

Equestrian sport is very affordable and popular in Germany [10]. While the UK has similar horses population, but prices for riding and maintenance are higher. So it is planned to start with Germany and after apply approach with lessons learned to the United Kingdom.

2.1 Economic Analysis. Financial Model. Value Proposition

I would start with a small review of equestrian statistics within Germany and small reference to other Europe countries.

Horses in Europe

Table 2.1

Horses Population Per Country In Europe [5]

Country	Horses Count
Austria	100,000
Belgium	300,000
Czech Republic	64,126
Denmark	150,000
Estonia	4,900
Finland	77,000
France	900,000
Germany	1,000,000
Great Britain	1,000,000
Greece	27,000
Hungary	60,000
Ireland	80,000
Italy	300,000

Latvia	13,600
Luxembourg	4,490
Netherlands	400,000
Norway	45,000
Poland	320,000
Serbia	35,000
Slovakia	8,000
Slovenia	22,000
Spain	559,598
Sweden	280,000

From the table above it is clear the maximum number of horse account in Germany - that is 1 million.

Riding Schools

Table 2.2

Schools In Europe and Lessons Prices [5]

Country	Number of riding schools	Average fee of a 1 hour riding lesson (EUR)
Austria	**1400**	**15**
Belgium	1310	10
Czech republic		10-20
Finland	800	30
France	4038	12
Germany	**7500**	**15**
Great Britain	600	45
Hungary		15
Ireland	130	25
Latvia	0	-
Montenegro	0	-
Netherlands	400	20-30
Serbia	0	-
Slovenia	71	12-25
Spain	592	15-30
Sweden	1000	14

Presently, around 1,200,000 people, age fourteen and older, participate actively in equestrian activities. The number soars to 1,700,000 people when those under the age of fourteen are added into the calculation [6].

Furthermore, extensive research of the German Equestrian Federation (Fédération Equestre Nationale/Deutsche Reiterliche Vereinigung, FN) determines that another 1,000,000 Germans hold an interest to take up equestrian sports, while yet another 11,000,000 generally claim a keen interest in horses [6].

Table 2.3

German Riders Statistics

Active Riders	Active Riders under the age of fourteen	People that want to be riders	Claim a keen interest in horses
1 200 000	1 700 000	1 000 000	11 000 000

The German Equestrian Federation is the umbrella organization of approximately 7,700 commercial riding and driving schools and clubs and 4,000 commercial equestrian centres. These account for 720,000 members in total.

The equestrian sport is practiced with particular enthusiasm by women. They amount to 75% (more than 544,000) of the membership of the FN, leaving the male representation at around 170,000 members or 25%[6].

In 2012, approximately 3,600 equestrian events were held in Germany. These included 69,000 different competitions and 1,480,000 starts. In order to compete in these shows, each rider has to obtain an FN annual horse show licence. 80,000 of these were issued to German nationals in 2012, while 1,350 were issued to non-national riders competing in German national events.

Studies have shown that every three to four horses create one job. This means that approximately 300,000 German workplaces have been created as a result of equestrian activity. Of these, around 10,000 people earn their living as professional instructors or coaches. Around 10,000 companies exist which specialize in the production of equestrian merchandise or provision of equestrian services. Additionally,

horse feed production benefits from the increase in equestrian activities, as horses and ponies in Germany consume more than 1,600,000 metric tonnes of grain and 1,800,000 metric tonnes of hay and straw per year. Overall, German horse riders and owners spend about 2.6 billion Euro a year for the recurring costs that come with standard horse maintenance.

The entire turnover of the equestrian industry is estimated to range between five to six billion Euro per year.

The equestrian sport and horses also have an indirect economic impact. Over 5,000 books on equestrian topics are currently on sale in Germany. Moreover, around 60 periodicals and magazines are available on the German-speaking market [6].

Stabling Costs

Table 2.4

Stabling Costs In Europe [5]

Country	Cost Of A Horse		Monthly Cost		Annual Cost	
	Min	Max	Min	Max	Min	Max
Austria	€8,000.00	€10,000.00	€250.00	€400.00	€3,000.00	€4,800.00
Belgium	€10,000.00	€10,000.00	€350.00	€350.00	€4,200.00	€4,200.00
Serbia	€1,500.00	€1,500.00	€150.00	€200.00	€1,800.00	€2,400.00
Czech Republic	€1,500.00	€1,500.00	€250.00	€250.00	€3,000.00	€3,000.00
Finland	€5,000.00	€5,000.00	€400.00	€750.00	€4,800.00	€9,000.00
France	€7,500.00	€7,500.00	€300.00	€350.00	€3,600.00	€4,200.00
Germany	€7,500.00	€7,500.00	€500.00	€500.00	€6,000.00	€6,000.00
Great Britain	€4,000.00	€7,000.00	€500.00	€700.00	€6,000.00	€8,400.00
Hungary	€5,000.00	€6,000.00	€250.00	€250.00	€3,000.00	€3,000.00
Ireland	€6,000.00	€7,000.00	€280.00	€280.00	€3,360.00	€3,360.00
Netherlands	€10,000.00	€10,000.00	€250.00	€250.00	€3,000.00	€3,000.00
Poland	€5,000.00	€5,000.00	€250.00	€250.00	€3,000.00	€3,000.00
Spain	€7,500.00	€7,500.00	€400.00	€600.00	€4,800.00	€7,200.00
Sweden	€6,000.00	€7,000.00	€250.00	€600.00	€3,000.00	€7,200.00

For example, distribution of expenses in UK for different forms of horse maintenance.

Table 2.5

Horse Owning Expenses [4]

Item	Horse or Pony at Grass Livery	Horse or Pony at DIY Stabled Livery	Horse or Pony at Full Livery
Livery	£1,040-£1,300	£1,560-£2,080	£5,200-£7,800
Hay, Straw and Shavings	£140-£220	£1,040-£1,560	Normally included in livery fee.
Feed	£120-£240	£260-£520	Normally included in livery fee.
Vet's Fees	£70	£70	£70
Insurance	£240-£480	£240-£480	£240-£480
Farrier	£225-£765	£225-£765	£225-£765
Dentist	£50-£70	£50-£70	£50-£70
Worming	£40-£105	£40-£105	£40-£105
Extras	£1,000	£1,000	£1,000
Total	**£2,925-£3,630**	**£4,485-£6,660**	**£6,825-£10,300**

Doctor call costs average $100 - just for arrival.

Expenses summary for riding is the following.

Table 2.6

Riding Lesson Prices

Session Type	Description	Price For 30 min
Lessons	an instruction session when you are present and riding the horse	€30-€100
Training	a session between the trainer and the horse	€30-€100

The distribution of annual horse expenses has the following structure.

Table 2.7

Expenses Distribution Based On Table 2.5

Livery	Hay, Straw and Shavings	Feed	Vet's Fees	Insurance	Farrier	Dentist	Worming	**Extras**
35.6%	4.8%	4.1%	2.4%	8.2%	7.7%	1.7%	1.4%	**34.2%**

The HorseAnalytics product earnings are located in the “Extras” section. Where customers expect other services besides the vital & mandatory onces for horse maintenance.

That is €2,040.00 in Germany and €2,040.00 - €2,856.00 in UK.

A feedback from a stable owner from US (Savannah McGuire) states that the stable would be happy to spent $120.00 annually for riding analytics (prices in euro would be similar). That is equal to $10.00 per month. Similar subscription pricing proposes EquiLab competitor. See Appendix A.2.

A feedback from riding trainer Diana (Lviv, SKA) states that "parents would be happy to pay from 1.5 euro per month to have a training report". While the actual training costs 11 euro. That means annually €18+ euro additionally to have all the training records available.

HorseAnalytics product already has a ready core and a history of 2 years:

- Analytics
  - 4 types of ride
  - Left & right
- Audio assistant
- Data collection tools
- Organizational approach
- Databases of collected data with different properties that can be used for quality assurance, comparison

Main expenses to build and maintain the system will be related to:

- storage, processing time (Microsoft Azure is the provider)
- data collection (data science team and trusted project contributors)
- models design and training (data science team)
- system engineering and maintenance (engineering team)
- customers' support (support team)
- marketing (marketing team)

Depending on a user profile customer will select its desired subscription plan.

Product Features Expenses

The product considers development of the following parts

Table 2.8

Development Expenses Per Feature

Module	Scope	Quote
Subscription & Payment	- Every user has a subscription type - Subscription for regular analytics (monthly, annually) - Subscription for additional tools - Purchase a feedback - Purchase a lesson - Purchase extended analytics	€28,800.00
Advertisement	Feature set to provide customers with possibility to publish advertisements of accessories and food to app's users of certain profile and geography: - Change app's color schema for all users - Change app's color schema for group of users - Show advertisement for group of users	€38,400.00
Directory Of Professional Riders	- Database of riders who agreed to help other riders with advice - Agreement of help is done in users profile	€7,200.00
Trainers Toolkit	Feature set to allow trainer maintain pupils and supervisors - Manage pupils - Manage pupils observers (like parents) - Setup lesson program per pupil - Feedback on a lesson	€76,800.00
Request a lesson feedback	- Uses Directory Of Professional Riders to search for a coach - Request a coach to make a feedback - Coach will evaluate the feedback - The requestor will agree or decline - The requestor will after evaluate the feedback	€9,600.00
Riding Lessons Shop	- Storage - Lesson details (texts, images, audio)	€23,400.00
Analytics	- Include additional analysis for recorded riding session - Additional analysis can be bought separately	€115,200.00
API (online & offline libraries)	- Analytics Library that can process data in customer's environment - Analytics API that can be used when required, hosted on Horse Analytics servers	€19,200.00

Expenses On Azure Cloud

The core expenses are related to storage. The core storage consumer is a horse, so everything is related to particular horse account. Horse may be used by different actors like Horse Trainer, a rider, horse owner, pupils or trainers. But all riding data from different actors will be stored under the same horse.

On the other side we do have riders that also aggregate data like comments, images and videos. That is especially important for individual riders or pupils for whom is very important to store videos or other big size media files.

Table 2.9

XXX

Horse Storage	User Storage
- Raw data related to riding - Processed data	- Video files of riding - Comments regarding a ride To keep independently riding data User may also store: - Copied raw collected data - Copied processed data

Imagine that a norm of daily activity is 2 hours per 24 hours.

2 hours of activity is 25-35 Mb. ~ 30 Mb

A year we will have 365 * 30Mb that will make 10 950 Mb. ~ 11 Gb

Table 2.10

XXX

Number Of Devices	1	3
Storage	11 Gb	33 Gb

In case it is required to have 4-6 hours

6 hours of activity is ~90Mb.

A year we will have 365 * 90Mb that will make ~ 33 Gb.

Table 2.11

XXX

Number Of Devices	1	3
Storage	33 Gb	~100 Gb

At this point of time 5000 users create randomly a load of 200 active users.

The next expenses are related to computational time that is used to make analysis of collected ride. Also depending on number of neural networks used for the computation, the price may vary.

Table 2.12

XXX

Number Of Paying Users	**Pricing Plan For** X Horses 2 hours per Day	**Pricing Plan For** X Horses 2 hours per Day	**Pricing Plan For** X Horses 2 hours per Day	**Pricing Plan For** X Horses 2 hours per Day
`costs per year / per horse (user that pay)	200	From 10 000 to 100 000	Up to 1 000 000 Average Case	Up to 1 000 000 Bad Case (or > 10 m)
Storage + Processing (5000 active users/horses current load)	**$0.18** **Current Expenses**	$4,39	27,13 $	240,96 $
200	$5.5			
1000	$1.1	$22		
10 000	$0.11	$2.2	14 $	
100 000		$0,22	1.4 $	12 $
1 000 000			0,14 $	1.2 $
10 000 000				0,12 $

Current annual expenses per one user per year is $0.18.

I would also state that active users behave according to customer's profile of individual riders who care about their goals, their development, and for whom the riding history and summary is important. So reliable storage has a sense for them.

We can also identify trainers in these groups who records several hours of riding a day. 4% of users are active - and they will pay money for data storage.

Current state of matters with total users, active users, horses and active horses.

Table 2.13

XXX

Month	Users	Created	Active Users	Number Of Horses	Created	Active Horses
2017		1702	111		11912	153
2018						
Jan			82			103
Feb			52			64
March			60			79
April			136			157
May **FAIR**	1702		231	11912		262
June	2051	349	233	12216	304	276
July	2505	454	234	12608	392	263
August	2893	388	238	12894	286	251
September **FAIR**	4299	1406	628	14036	1142	695
October **FAIR**	6848	2549	1544	16108	2072	1725
November **FAIR**	11906	5058	2884	20230	4122	3211
December **FAIR**	16684	4778	3290	24472	4242	3746
2019						
Jan	21883	5199	3589	29028	4556	4079
Feb	26401	4518	4424	33145	4117	5011
March	28792	2391	3431	35404	2259	3867
April	30991	2199	2977	37478	2074	3346
May	> 31528	> 537	> 1411	> 37958	> 480	> 1525

I will do a summary of users dynamics in a system with current marketing approach.

% of increase of users every month regarding total number of users

17	18	13	**33**	**37**	**42**	**29**	24	17	8	7

Big increase of User Count was observed only when Fair visits were made. The last feature release was in the transition between 13% to 33%.

% of active users compared to total user count

14	11	9	8	15	23	24	20	16	17	12	10	4

From User profiles it is possible to identify the following if we select the last month data. That data is possible to identify from other months, but similar distribution can be always observed.

Table 2.14

XXX

%	User Type	1411
58%	Owners	790
42%	Riders who don't own a horse, but only ride	593
4%	Users that share similar horses that mostly related to pupils	56
0.8%	Estimated number of trainers	11

We had 10 000 users more, but did a cleanup of users who never used application in any form (just launch and open, or even do riding).

Data Collection Expenses

To make additional analytics it is required to gather additional data

Table 2.15

XXX

API	Processing Complexity	Data Collection Complexity	Collection Afforts
Basic Riding Types	Simple	Simple	100 min 20 different breeds
Left & Right	Simple	Simple	40 min (different ride programs)

Extended Riding Types [focus]	Hard	Hard	90 min (high skilled riders)
Jumping [focus]	Simple	Hard	30 jumps for every standard obstacle height and type
Step Lengths [focus]	Hard	Medium	80 min with 4 main ride types
Horse Lameness	Hard	Hard	40 min wit different ride types
Rider's Fall	Simple	Hard	15 falls
Colics	Medium	Hard	30 min
Posture	Medium	Hard	40 min (high skilled rider 4 main ride types)
Evaluation [focus]	Hard	NA	120 min with different ride programs and rider skills
Comparison [focus]	Hard	NA	80 min with different ride programs
Obstacle Counter	Simple	Hard	30 min (with different obstacle type and height, different breeds)

Table 2.16

XXX

Data Collection	Clean Minutes	All Minutes	Budget
Extended Riding Types	90	1080	€2,160.00
Jumping	30	360	€720.00
Step Length	80	960	€1,920.00
Evaluation	120	1440	€2,880.00
Comparison	80	960	€1,920.00
TOTAL			**€9,600.00**

The main source for data science team are data sets grouped in the following way.

Table 2.17

XXX

Content	These data sets are marked by nature of what they recorded
(Timestamp + accelerometer + gyroscope + rotation sensor + gps) of certain frequency	standing
(Timestamp + accelerometer + gyroscope + rotation sensor + gps) of certain frequency	walking
(Timestamp + accelerometer + gyroscope + rotation sensor + gps) of certain frequency	trot
(Timestamp + accelerometer + gyroscope + rotation sensor + gps) of certain frequency	gallop

These are supervised sets so we know what was recorded, and after it is possible to train machine to identify different

Staff Structure

We do have a clear vision of the staff structure due to existing 2 years experience in all activities required for product support.

PT - part time, FT - full time

Table 2.18

XXX

Analytics	Non-Analytics	Maintenance	Marketing
PM - PT Data scientist - FT Data Engineer - FT Mobile Engineer - PT Backend Engineer - PT Hardware engineer - PT 1 QA engineer - FT Devops - PT	PM - PT 2 Backend Engineers - FT 2 Mobile Engineer (iOS) - FT 2 Mobile Engineer (Android) - FT 2 QA engineers - FT Designer - FT BA - FT	PM - PT 1 Backend Engineer - FT 1 Mobile Engineer - FT 1 QA engineer - FT	Product Owner - FT Marketing - FT Content Writer - FT Designer - FT

Analytics or Data Science Team - responsible for core product value, design and development of informational models. To recognize 4 types of ride it was required to

make research and development of around 6 months. To recognize left & right directions of riding - 2 additional months.

Non-analytics team - responsible for other application features.

Maintenance team - responsible for ongoing maintenance of already delivered software. Help users with some issues regarding mobile app usage, issues with data processing, losing data.

Hardware

We have tried to make our own hardware based on consumer electronic components. That actually worked, but the reliability level was pretty low. The main unusual condition was - the overload force on a device during gallop.

Pros

- Analytics will add more value - coverage of 2 legs and back gives maximum understanding of motion quality. It is possible to cover more, but that will be very professional analysis, and it is not required for our consumers.
- Analysis time can be extended - not only during a ride, but also in a stable

Cons

- Battery consumption
- Should be water resistant
- Should be resistant to overloads that happen during gallop
- Requires maintenance and self-test before a ride, so we know every device works

On the other hand, it is understandable that not all riders will require additional hardware.

For 3rd party device integration I do recommend to reuse the following model https://mbientlab.com/metamotionr/ Velcro Sleeve Kit for MMC and MMR.

With device specification that completely suits requirements of HorseAnalytics

This clinical grade sensing solution is a velcro sleeve device that provides recorded (logging) or real-time (streaming) sensor data:

BMI160 3-axis **Accelerometer**

BMI160 3-axis **Gyroscope**

BMM150 3-axis **Magnetometer**

BOSCH 9-axis IMU **Sensor Fusion**

BMP280 **Barometer/Pressure/Altimeter**

BMP280 **Temperature**

LTR-329ALS **Luminosity/Ambient Light**

Device price would be around €120 per device pair. The third device is user's smartphone. That is lower than all available competitors. And we do prognosis to have 35 customers of device pairs in the worst case within 3 years.

Development Expenses

The total cost of 3 year expenses are provided in the following table.

Table 2.19

Product Development Expenses

Types Of Work	Year 1	Year 2	Year 3
Analytics	€121,680.00		
Non-Analytics	€216,000.00		
Maintenance		€66,300.00	€100,800.00
Marketing	€163,200.00	€163,200.00	€163,200.00
Management Team	€108,000.00	€108,000.00	€108,000.00
Equipment	€96,000.00		
Team Management Software	€8,340.00	€8,340.00	€8,340.00
Office	€3,072.00	€3,072.00	€3,072.00
TOTAL	**€713,220.00**	**€345,840.00**	**€380,340.00**
			€1,439,400.00

Office expenses include office rental + office management.

Table 2.20

Office Expenses

Area, m2	Price
256	€3,072.00

Table 2.21

Management Team Expenses

Management	Qty	Gross Salary	Annual Gross Salary
CEO	1	€2,500.00	€30,000.00
CTO	1	€2,500.00	€30,000.00
CFO	1	€2,500.00	€30,000.00
HRM	1	€1,500.00	€18,000.00
TOTAL			**€108,000.00**

Table 2.22

Non-analytics Team Expenses

Non-Analytics Engineering Team	Qty	Load	Salary	Annual Salary
PM - part time	1	0.5	€2,000.00	€12,000.00
Backend Engineer	2	1	€2,200.00	€52,800.00
Mobile Engineer (iOS)	2	1	€2,200.00	€52,800.00
Mobile Engineer (Android)	2	1	€2,200.00	€52,800.00
QA engineer	2	1	€1,000.00	€24,000.00
Designer	1	1	€1,000.00	€12,000.00
BA	1	1	€800.00	€9,600.00
TOTAL	**11**			**€216,000.00**

Table 2.23

Analytics Team Expenses

Analytics Engineering Team	Qty	Load	Salary	Annual Salary
PM	1	0.5	€2,000.00	€12,000.00
Lead data scientist	1	1	€3,000.00	€36,000.00
Data Engineer	1	1	€1,500.00	€18,000.00
Mobile Engineer	1	0.5	€2,200.00	€13,200.00
Backend Engineer	1	0.5	€2,200.00	€13,200.00
Hardware engineer	1	0.2	€2,200.00	€5,280.00
Devops	1	0.2	€2,500.00	€6,000.00
QA engineer	1	1	€1,500.00	€18,000.00
TOTAL	**8**			**€121,680.00**

Table 2.24

Support Team Expenses

Support Engineering Team	Qty	Load	Salary	Annual Salary
PM	1	1	€2,000.00	€24,000.00
Backend Engineer	1	1	€1,200.00	€14,400.00
Mobile Engineer	1	1	€1,200.00	€14,400.00
Data Scientist	1	0.5	€3,000.00	€18,000.00
Data Engineer	1	1	€1,500.00	€18,000.00
QA engineer	1	1	€1,000.00	€12,000.00
TOTAL	**6**			**€100,800.00**

Table 2.25

Marketing Team Expenses

Marketing Team	Qty	Load	Salary	Annual Salary
Product Owner/Sales	1	1	€2,500.00	€30,000.00
Marketing Manager	1	1	€1,500.00	€18,000.00
Content Writer	1	1	€900.00	€10,800.00
Designer	1	1	€1,500.00	€18,000.00
TOTAL	**4**		**€6,400.00**	**€76,800.00**

Table 2.26

All Marketing Expenses

Marketing	Expenses
Staff	€76,800.00
Fairs	€60,000.00
Customers Visits	€12,000.00
Newspaper & Magazines	€8,400.00
Social Media	€6,000.00
TOTAL	**€163,200.00**

Table 2.27

Equipment Expenses

Equipment	Qty	Avg Price	Costs
Mac Book Pro	26	€2,500.00	€65,000.00
Mobile Devices	30	€1,000.00	€30,000.00
Headphones	20	€50.00	€1,000.00
TOTAL			**€96,000.00**

Table 2.28

Management Software Expenses

Services	Plans	per user month price	in Year for 26 person's
google G Suite -> Plans's	Basic	€6 per user in month (30GB drive storage)	€1,872.00
	Business	€12 per user in month	€3,744.00
	Enterprise	€25 per user in month	€7,800.00
Slack Plan's/Pricing	Free	€0.00	€0.00
	Standard	€8.00	€2,496.00

	Plus	€15.00	€4,680.00
Internet	50 Mb Speed	1200 uah	€540.00
Atlassian Confluence	Small teams of up to 10 users	€10.00	
	For the first 100 users	€5.00	€1,560.00
	For the next 150 users	€3.50	
	For each additional user over 250	€1.10	
TOTAL			**€8,340.00**

2.2 Buyer Persona & Consuming Model

Buyer Personas

I will describe all groups of consumers who are interested in a product. All these users are very interrelated because it is the same area of life, but different activities.

Usual Rider

A person who does riding for personal development and improvement. A sports person like people who are doing running, swimming, cycling etc. That could be also a horse owner (an owner of a single horse).

Major part of training is performed without a mentor who can feedback or correct. That's why it is good to have a selfcheck tool like a clock where you can track timing, but in that case would be great to check change of a stride.

Stable Owner

Here a focus on a person who is more interested in horses activities, but doesn't participate itself. That is an owner of several horses or a stable owner, who wants to know everything regarding horses activities, and any significant changes in that.

It is important to know that horses are properly maintained in terms of physical tasks, and sequence and quality of these tasks. So animals are not exhausted being overtrained within riding lessons or horse training session.

Trainers

A riding trainer is focused on improvement of riding skills of his/her pupils. It is done via visual observation how the pupil is performing. But it is also good to know other means of evaluation and measurement. And specially for the case when the trainer is not able to supervise or overlook the lesson due to some reasons.

Another group of people who are always interested in progress details - parents of pupils. These details could be beginning from what is the riding program, what horse was rided, how kid's performance fits planned program, what should be improved and why.

Good analytics in equestrian software can answer all these questions and provide even more input like comparison to earlier trainings.

Equestrian Software Owner

Software provider very often is focused on stable management features and activity tracking that doesn't covers sophisticated analytics. They are focused on other functionality and analytics may be good additional value for their business. Their customers might also be trainers and stable owners, or other profiles.

For instance iStable or Equicty are very classic examples of stable management system providers, but activity tracking of animals is done manually.

Table 2.29

What is important for different customers

For horse owner **For stable owner**	**For riding trainer**	**For parents who track children progress**	**For equestrian software that lacks of analytics**
Fundamental Need Activity tracking	**Fundamental Need** Activity tracking	**Fundamental Need** Activity tracking	**Fundamental Need** Activity tracking
How horses are maintained? Are they properly trained daily? Are they trained the min required time? What annual summary I can have for sales evaluation?	How pupils are performing? How training was done without a trainer on arena? How training is relevant to planned riding program	How well children are progressing? How feedback from children and trainer correlate? May parent request a feedback from other trainer having HorseAnalytics data?	How to integrate analytics into my existing software? How to use ready analytics to extend my product value?

Consuming Model

How to earn money?

Table 2.30

Options Of Consuming Models

Method	Description
Data Storage	Sell data storage for final application users. Depending on a user type it is reasonable to select a subscription of data storage. More active users require more storage, some users don't require at all. Active rider with 2 hours of daily training will consume 12Gb annually. And that will be raw data 95%. 5% would be processed results. Similar approach as Ever Note for instance. Cloud space is the primary thing required to keep big data of riding history.
Mobile Advertisements A	The most primitive way of money earning. Turns off annoying advertisement after paying money. Advertisement is done via popup banners at the bottom of mobile screens. Note: *I would not recommend to use this approach as it creates very cheap sense of application*
Mobile Advertisements B	Sell application styling for 3 months and more, and also sell banners on most actively used screens in the app. Style application according to color schema of food or accessories seller, or other equestrian service providers. That could be vet clinics, stables that provide services of full boarding, riding schools etc. We will call Food or accessories seller orders an app styling, or buys advertisement place in master app that is distributed in AppStore or Google Play. The styling and advertisement can be enabled on certain geography of interest and for specific user profiles. HorseAnalytics will know and already knows customers' nature, and may reuse these data for advertisement. Support team of HorseAnalytics can prepare graphical and text assets to be displayed by HA software.
Feedback on a Riding Session	A real person (riding professional) can be requested to feedback - and be paid for the feedback.

	The feedback will have more value if it is also accompanied with video of the ride. People that could be requested for a feedback will be searched in a separate directory. That will be either trainers or riding professionals. The feature requires to have at least two smart phones. That will provide the reviewer with full picture, besides motion based analytics. Pricing will be around €10.00-€30.00, or more depending on feedback demand of particular riding professional.
Riding Lessons Shop	Lessons sponsored or sold from influencers or food/accessories resellers. Application owner can sell riding lessons as an audio book and riding instructions. Usage of audio instructions is already tested Riding instructions can be prepared by riding trainer
Process riding with extended networks - to identify more riding specifics	Recorded riding session can be reprocessed via additionally trained neural networks. This feature will have more value if rider uses additional two devices on front legs.
365 days riding analytics	For horse sellers with a summary of 365 days it is possible to provide very detailed statistics to prove pricing. These horse sellers are horse owners in HorseAnalytics application. Analytics for a trainer with a summary of 365 days can show trends in an annual riding training of a particular pupil.
Tool for a trainer	Trainer is paid via cash or other meanths by his/her pupils. And the trainer buys a subscription for 5 horses and 20 users. White label app design for your customers - if you are a trainer, a stable owner, a food/accessories seller etc, or a riding school. Your customer's will access application with special code or own credentials, and will see a branded application. Tool for a trainer: - to be used by pupils and parents - to review how pupils are performing riding lessons - to assign a new program for a pupil - to share a feedback - to observe trends in developemnt Trainers and school will also have a control on advertisement. And they can sell application parts for these purposes.
Analytics Library	A library with analytics API that can be used in customer's software.

Pricing of Subscriptions

The prices were formed taking into account storage prices of other non-equestrian mobile apps (like EverNote) and equestrian competitors. For instance WeTOD (1k+ downloads) asks €29,99 per month subscription and additional fee for A Ride Session feedback from €9 per session. EquiLab (100k+ downloads) asks €10 per month subscription.

Take a look at the Evernote Price Plan. In our price plan we include 5Gb into annual usage.

Table 2.31

Evernote Pricing

60 Mb	1 Gb	10 Gb
Free	$34.99	$69.99

And the following table lists the subscription pricing.

Table 2.32

Proposed Product Subscriptions

Subscriptions	Comments	Month Fee
Standard		€5.00
Standard +		€10.00
Professional		€15.00
Professional +		€20.00
Horse Owner		€10.00
Stable Owner	5 horses, 20 users	€40.00
Trainers' Toolkit. Standard +	5 horse accounts, 20 users	€40.00
Trainers' Toolkit. Professional +	5 horse accounts, 40 users	€80.00

Pricing of Single Purchase Products

Pricing for the library was taken based on an accurate data collection budget. That is equal to **€9,600.00.**

Table 2.33

Proposed Paid Products

Product	Comments	Fee
Library	Buy a library to use it in own software	€10,000.00

Single Lesson Price		€9.00
Additional Horse	Add additional horse to your account	€5.00
Additional Analytics	Buy additional analytics type	€1.00
5 device support	Buy support of additional devices	€14.00

Request a riding feedback will have the following price plan.

Table 2.34

Proposed Paid Services

Services		
Request A Feedback	Riding professionals may request different pricing	€20.00
	Riding professionals may request different pricing	€30.00
	Riding professionals may request different pricing	€40.00
365 days analytics		€9.00

Table 2.35

Pricing For Advertisement

Advertisement		
Styled App	Active for 3 months	€500.00
Prolong agreement		€300.00
Banners		€50.00

Table 2.36

Equipment Options For Different App Users

Standard	**Professional**
● 1 flagman smartphone or average smartphone ● Headphones	● 2 flagman smartphone - one to be on a rider, another to use for video capture. ● A holder for the smartphone that is used as a camera ● Headphones ● 2(4) devices to put on horse legs

Prognosis

I am making a worse case scenario prognosis with a start point of total users of 32 000.

Increase of users will be around 7%. From this resulting total amount 4% would be treated as active. And I assume that 50% of them would be our customer. That is 2% of all users.

Table 2.37

Users Distribution Assumption

T	P	O	R
Trainers	Professionals	Owners	Riders
0.8%	1%	56%	42%
Subscription Trainers' Toolkit. Standard	Subscription Professional+	Subscription Standard+	Subscription Standard
T.S	**P+**	**S+**	**S**
€40.00	**€20.00**	**€10.00**	**€5.00**

That is with the current marketing approach - passive one with an accent on social networks only and on current user experience.

Table 2.38

Emulation Of Users Growths Based On Table 2.37

			User Count According to User Types				Subscriptions				
Month	**Users**		**T**	**P**	**O**	**R**	**T.S**	**P+**	**S+**	**S**	
#	**100%**	**2%**	**0.8%**	**1%**	**56%**	**42%**	**€40.00**	**€20.00**	**€10.00**	**€5.00**	**TOTAL**
Jun	34240	685	5	7	384	288	€200	€140	€3,840	€1,440	€5,620
Jul	36637	733	6	7	410	308	€240	€140	€4,100	€1,540	€6,020
Aug	39202	784	6	8	439	329	€240	€160	€4,390	€1,645	€6,435
Sep	41946	839	7	8	470	352	€280	€160	€4,700	€1,760	€6,900
Oct	44882	898	7	9	503	377	€280	€180	€5,030	€1,885	€7,375
Nov	48024	960	8	10	538	403	€320	€200	€5,380	€2,015	€7,915
Dec	51386	1028	8	10	576	432	€320	€200	€5,760	€2,160	€8,440
Jan	54983	1100	9	11	616	462	€360	€220	€6,160	€2,310	€9,050
Feb	58832	1177	9	12	659	494	€360	€240	€6,590	€2,470	€9,660
Mar	62950	1259	10	13	705	529	€400	€260	€7,050	€2,645	€10,355

Apr	67357	1347	11	13	754	566	€440	€260	€7,540	€2,830	€11,070
May	72072	1441	12	14	807	605	€480	€280	€8,070	€3,025	€11,855
Jun	77117	1542	12	15	864	648	€480	€300	€8,640	€3,240	€12,660
Jul	82515	1650	13	17	924	693	€520	€340	€9,240	€3,465	€13,565
Aug	88291	1766	14	18	989	742	€560	€360	€9,890	€3,710	€14,520
Sep	94471	1889	15	19	1058	793	€600	€380	€10,580	€3,965	€15,525
Oct	101084	2022	16	20	1132	849	€640	€400	€11,320	€4,245	€16,605
Nov	108160	2163	17	22	1211	908	€680	€440	€12,110	€4,540	€17,770
Dec	115731	2315	19	23	1296	972	€760	€460	€12,960	€4,860	€19,040
Jan	123832	2477	20	25	1387	1040	€800	€500	€13,870	€5,200	€20,370
Feb	132500	2650	21	27	1484	1113	€840	€540	€14,840	€5,565	€21,785
Mar	141775	2836	23	28	1588	1191	€920	€560	€15,880	€5,955	€23,315
Apr	151699	3034	24	30	1699	1274	€960	€600	€16,990	€6,370	€24,920
May	162318	3246	26	32	1818	1363	€1,040	€640	€18,180	€6,815	€26,675
June	173680	3474	28	35	1945	1459	€1,120	€700	€19,450	€7,295	€28,565
											€356,010

Increase of users will be around 10%. From this resulting total amount 4% would be treated as active. And I assume that 50% of them would be our customer. That is 2% of all users.

Table 2.39

Emulation Of Earning Based On Subscription

Monthly % User Increase	7	Year 1	€100,695.00
Active Users % / 2	2	Year 2	€255,315.00
		Year 3	€516,015.00
		Total	**€872,025.00**

And other options of monthly % of total users and active for cases of more aggressive marketing. And total development expenses would be **€1,439,400.00**.

Table 2.40

Emulation Of Earning Based On Subscription

Monthly % User Increase	8	Year 1	€107,835.00
Active Users % / 2	2	Year 2	€307,550.00
		Year 3	€699,550.00
		Total	**€1,114,935.00**

Table 2.41

Emulation Of Earning Based On Subscription

Monthly % User Increase	9	Year 1	€115,500.00
Active Users %	2	Year 2	€370,205.00
		Year 3	€946,460.00
		Total	**€1,432,165.00**

Table 2.42

Emulation Of Earning Based On Subscription

Monthly % User Increase	10	Year 1	€123,720.00
Active Users %	2	Year 2	€445,275.00
		Year 3	€1,278,070.00
		Total	**€1,847,065.00**

And now I would suggest review emulation if monthly % of total User increase in same %7, but the % of active users is growing. And from results we do see what should be the marketing focus.

Table 2.43

Emulation Of Earning Based On Subscription

Monthly % User Increase	7	Year 1	€150,985.00
Active Users %	3	Year 2	€383,060.00
		Year 3	€774,055.00
		Total	**€1,308,100.00**

Table 2.44

Emulation Of Earning Based On Subscription

Monthly % User Increase	7	Year 1	€201,420.00
Active Users %	4	Year 2	€510,685.00
		Year 3	€1,031,895.00
		Total	**€1,744,000.00**

Table 2.45

Emulation Of Earning Based On Subscription

Monthly % User Increase	7	Year 1	€251,815.00
Active Users %	5	Year 2	€638,375.00
		Year 3	€1,289,895.00
		Total	**€2,180,085.00**

Profit regarding selling advertisements with worse case engagement might be the following.

Table 2.46

Emulation Of Earning Based On Advertisement

Annual Number Of Fairs	Min Number Of Clients		Annual
4	4		
Total Adv Customers	16		
Styled App	1	€500.00	€500.00
Prolong agreement	1	€300.00	€1,200.00
Banners	16	€50.00	€9,600.00
TOTAL			**€11,300.00**

We do assume that every fair we engage 4 customers who pay for the banners. And only one customer a year will agree to pay for the whole application styling. Expenses on development of advertisement are €38,400.00.

Table 2.47

Emulation Of Earning Based On Advertisement For 3 years

Year	Qty Of Clients	Budget
Year 1	16	**€11,300.00**
Year 2	28	€18,500.00
Year 3	40	€25,700.00
TOTAL		**€55,500.00**

Prognosis for a riding feedback of the minimum price of €20. With the worst customer grows we may have the following picture of earnings .

Table 2.48

Emulation Of Earning Based On “Request Feedback” Feature

Year	Customer Qty	Costs
year 1	105	€2,098.00
year 2	264	€5,284.00
year 3	755	€15,073.00
TOTAL		**€22,455.00**

I have allocated 0.002% of active users that wish to request a riding feedback. The expenses to develop the feature are €9,600.00.

The last earnings would be related to selling lessons based on “if monthly % of total User increase is %7, the % of active users is 2%”.

Table 2.49

Emulation Of Earning Based On Selling Lessons

Year	Qty Of Clients	Budget
Year 1	122	€1,098.00
Year 2	311	€2,799.00
Year 3	666	€5,994.00
TOTAL	**1099**	**€9,891.00**

Table 2.50

Emulation Of Earning Based On 7% Total Users Grows, 2% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€489.00	€100,695.00	€1,098.00	€20,000.00	€112,484.00
Year 2	€18,500.00	€1,105.00	€255,315.00	€2,799.00	€20,000.00	€274,920.00
Year 3	€25,700.00	€2,798.00	€516,015.00	€5,994.00	€20,000.00	€544,513.00
TOTAL						**€931,917.00**
						€507,483.00

Table 2.51

Emulation Of Earning Based On 7% Total Users Grows, 3% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€736.00	€150,985.00	€1,647.00	€20,000.00	€163,021.00
Year 2	€18,500.00	€1,656.00	€383,060.00	€4,194.00	€20,000.00	€403,216.00
Year 3	€25,700.00	€4,197.00	€774,055.00	€8,991.00	€20,000.00	€803,952.00
TOTAL						**€1,370,189.00**
						€69,211.00

Table 2.52

Emulation Of Earning Based On 7% Total Users Grows, 4% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€981.00	€201,420.00	€2,223.00	€20,000.00	€213,701.00
Year 2	€18,500.00	€2,207.00	€510,685.00	€5,589.00	€20,000.00	€531,392.00
Year 3	€25,700.00	€5,596.00	€1,031,895.00	€11,961.00	€20,000.00	€1,063,191.00
TOTAL						**€1,808,284.00**
						-€368,884.00

Table 2.53

Emulation Of Earning Based On 7% Total Users Grows, 5% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€1,225.00	€251,815.00	€2,745.00	€20,000.00	€264,340.00
Year 2	€18,500.00	€2,759.00	€638,375.00	€6,993.00	€20,000.00	€659,634.00
Year 3	€25,700.00	€6,996.00	€1,289,895.00	€14,958.00	€20,000.00	€1,322,591.00
TOTAL						**€2,246,565.00**
						-€807,165.00

Table 2.54

Emulation Of Earning Based On 8% Total Users Grows, 2% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€525.00	€107,835.00	€1,179.00	€20,000.00	€119,660.00
Year 2	€18,500.00	€1,320.00	€307,550.00	€3,384.00	€20,000.00	€327,370.00
Year 3	€25,700.00	€3,767.00	€699,550.00	€8,082.00	€20,000.00	€729,017.00
TOTAL						**€1,176,047.00**
						€263,353.00

Table 2.55

Emulation Of Earning Based On 9% Total Users Grows, 2% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€562.00	€115,500.00	€1,278.00	€20,000.00	€127,362.00
Year 2	€18,500.00	€1,581.00	€370,205.00	€4,050.00	€20,000.00	€390,286.00
Year 3	€25,700.00	€5,069.00	€946,460.00	€10,908.00	€20,000.00	€977,229.00
TOTAL						**€1,494,877.00**
						-€55,477.00

Table 2.56

Emulation Of Earning Based On 10% Total Users Grows, 2% Active Users

Year	Adv	Request Feedback	Subscriptions	Lessons	Library	Total
Year 1	€11,300.00	€600.00	€123,720.00	€1,350.00	€20,000.00	€135,620.00
Year 2	€18,500.00	€1,888.00	€445,275.00	€4,860.00	€20,000.00	€465,663.00
Year 3	€25,700.00	€6,802.00	€1,278,070.00	€14,697.00	€20,000.00	€1,310,572.00
TOTAL						**€1,911,855.00**
						-€472,455.00

2.3. Marketing Strategy. Positioning

Every User Profile is expecting different stuff from analytics.

There is a common part of a product that has a sense for every user (activity tracking) and also specifics that have sense for every separate group. Professional riders are interested in extended analytics and wider data storage, trainers are interested in capabilities to assist their pupils, owners interested to keep records of all horse activities.

And also there is another group of customers who want to access all app users - advertisement.

Decision makers appear to be very old fashioned group that can be accessed via newspapers, magazines or fairs. Social network would be very low effective approach to access them.

Table 2.57

Marketing Channels

Fairs	Social Media	Newspapers & Magazines	Competitions
Riders **Stable Owners** **Horse Owners** **Schools** **Trainers** **Food Sellers** **Accessories Sellers**	Junior Riders Professional Riders Trainers	Riding Schools Stable & Horse Owners Professional Riders	Professional & Junior Riders Trainers

From our experience the most valuable marketing approach was *industry exhibitions* or *competitions with exhibition stands*.

Examples of fairs (exhibitions) SPOGA (is a B2B Fair), Hanse Pferd (Hamburg), Pferd & Jagd (Hannover) and Partner Pferd (Leipzig).

It is required to allocate around 15k Euro for every fair:

- To design booth
- 2 people to be at the booth

- 1 person to visit other booths and communicate with customers or partners, participate in product testing
- 1 person to cover media (newspapers, exhibition tests, social media coverage)
- Exhibition equipment & marketing assets (hardware for riding, PC to demo how product works, accessories to demo placement of devices, papers to share)

Within a year there is around 4 fairs that should be visited. So it is expected to allocate on fairs at least 60k per year. I would look at least on 3 year timeframe, so it is 120k budget per 3 year time.

Software Testing during fairs:

- Some Media Companies want to do a Test of the Product and write about it. We told them we want to wait a little until we have at least Left/Right Feature included.
- Some also want to focus on a long term usage so actually the average over the last 7/30 sessions would be good to have inside as well

Below I will share how to approach different customer profiles.

About food or accessory sellers

Food or accessory sellers are interested in access to databases of potential customers. Sellers would like to make direct sales to people who are looking for their services or products. HA application does have a good database of user profiles. These people can be accessed via HorseAnalytics mobile application advertisement.

Client engagement is done via industry exhibition visits and demonstration of the app and advertisement capabilities, or direct customer visits with a nice application demo.

What is important?

- Different user profiles
- User profiles that correspond to buyer persona of selected product or service provider

- Number of installs of every application
- Number of active users per month and their profiles

About individual riders

Client engagement might be done via industry exhibition visits. But also a nice effective approach was to use a Facebook and share riding specifics, share stories about fun time with HorseAnalytics application.

Good approach is to identify “influencers” in riding with popular accounts in Facebook, Instagram, YouTube and Twitter. That could be individual riders or professional riding trainers who may share their feedback within own networks of followers.

This approach is the second one after fairs regarding amount of engaged people. Support and marketing team also do communicate directly with customers via social networks. That is a very easy way to find out reasons of issues if customer does have troubles with the application.

About trainers and riding schools

Germany does have around 7700 riding schools, and a riding as a sport is more accessible for people with very different income. On the other side people with less available costs might be interested in software that can accompany them during a ride and provide immediate feedback.

Client engagement is similar to food & accessories sellers, but the focus will be around cooperation experience between trainers and pupils. Also it is important to visit trainers personally and talk to them.

From my experience it will be always a laugh after product demo. The algorithm is the following:

- *You pay 30 Euro for private lesson*
- *Put device with installed application into rider’s jacket*
- *The trainer always knows his/her riding program*
- *After training is over - show a riding log to the trainer and ask what he/she thinks about*

After this approach you increase the chances of having a customer.

HorseAnalytics application even without trainer specific logic is applied to training flow.

About horse & stable owners

From current user analytics - owners appear to be almost 70% of HorseAnalytics users. Usually they are also individual riders, so this profile is mixed currently in the system.

Client engagement might be done the same way as individual riders. But also with an accent on sales features - like 365 day analytics.

About software providers

Client engagement is done via industry exhibition visits, technology conferences, startup accelerators. Engagement is done via technical talks, demonstration of the app and advertisement capabilities, or direct customer visits with a nice application demo.

Positioning

For different users the HorseAnalytics product would be proposed with different feature set. The main feature set profiles are shared in the following table.

Table 2.58

Subscription Options

Individual Rider	
Standard	Analytics - Basic Riding Activities - Left & Right Storage - Processed data (5 Gb) Database - Access to horses directory - Access to riding professionals directory
Standard+	Analytics - Basic Riding Activities - Left & Right Storage - Raw data collection for further analysis - Processed data Database - Access to horses directory - Access to riding professionals directory
Professional	Analytics

	- Basic Riding Activities - Left & Right - Jumps Storage - Raw data collection for further analysis - Processed data Database - Access to horses directory - Access to riding professionals directory
Professional+	Analytics - Basic Riding Activities - Left & Right - Jumps - Step Length - Comparison - Evaluation - Lameness Storage - Raw data collection for further analysis - Processed data Database - Access to horses directory - Access to riding professionals directory Devices - 3+ device support (main, 2 legs)
Trainer	
Junior	Usual But with communication capabilities with a trainer
Professional	Professional+ But with communication capabilities with a trainer
Stable Owners, Horse Owners	Usual+
Software Providers	Interested in independent library or SDK that can assist with analytics report generation. Is equal by capabilities to Professional +

3. PROJECT LAUNCH

The product is already launched, and the target market is Germany (DACH region). The product doesn't have any real customers who pay money, but has customers who use the basic riding analytics.

32k users and also feature requests from potential customers allow us to make some decisions.

The launch would reflect the recommended marketing flow per every user type.

Marketing (& sales) team should proactively communicate with trainers and individual horse riders.

Decision makers appear to be very conservative or old school, so the best way to approach them - equestrian events (fairs, competitions, clubs, paper magazines or newspapers). A different sales person should be in charge of "decision makers" communications.

Technology tests and reviews should be always the target to participate in so you can reach decision makers, and influencers who are testing the new stuff and share a feedback with their networks of friends.

3.1 Stage Of Going International

To go international and in our case that is UK we have to perform according to the next plan:

- Hire UK equestrian professionals to be your marketing and sales team
- Find UK equestrian companies (schools and clubs) that are happy to use technology for free. HorseAnalytics will invest in cloud storage, sponsor free riding audio lessons, provide extended analytics and device set
- The UK equestrian companies should have several influencers that will tell the world about new HorseAnalytics technology
- Invest into weekend events with usage of HorseAnalytics
- Invest into training of riding coaches to use the app and share with them free of charge accounts for a year

- Meanwhile setup cloud environment to maintain UK customer, and UK horses and individual riders directories
- Start reaching food and accessories providers with HorseAnalytics "advertisement platform"
- Start advertisement of HorseAnalytics in UK (mobile app stores, social media)

3.2 New Opportunities and Risks

From competitor analysis which I did with several iterations and there was a time delay of 2-3 months within a year, I can definitely state that competitors are investing in hardware, in sensors quality, battery lifetime, reliability and usage simplicity. Features set and their quality is aggressively improved.

Anyway two primary competitors are always the same - Equilab and Equisense. Equilab we tested two times, and every time there was a significant improvement, but indoor analytics was still bad regarding accuracy.

The strong advantage of HorseAnalytics can be analytics that covers very different styles, very different breeds, different riding skill levels, different non-riding motions (like some potential health issues movements), different device placements, multiple device set and extended sensor sets.

The next level of a technology progress would be emulation of a digital artificial trainer or a judge who will evaluate a rider's skills.

A run-time advice during a training can be very helpful. Audio is a more complicated way of advice, an alternative option would be a usage of something similar to Google Glass - when a rider can see analytics summary during a ride - like a dashboard in a car. And make a decision about "next steps". Anyway audio assistance or visual assistance is a know-how in equestrian.

Another technology that improves training is a location tracking in a covered arena. The main issue of artificial trainer is to understand where a horse is located at a particular moment of time. In covered arena GPS is not working, so that is a problem. Location tracking helps to understand the speed of performance of a riding task. So at the end of the current task, audio assistant can make an advice to start the next task.

To achieve a huge variety of analytics it is required to have a wide network of riding professionals. Who can actually assist in data collection with good feedback of recorded motion specifics.

Nowadays market proposes more options regarding 3rd party devices that can record accelerometer & gyroscope data. These kind of devices are widely used in agriculture to keep track of animals free walking on open areas. Agriculture businesses buy these trackers with big volumes, so prices will definitely go down. That means that it will be easier to buy 5 devices or more for small price to achieve maximum analytics level.

The next step would be to review data storage prices and whether to keep raw data, or only processed data.

Risks

- Horse clinics with good staff, big number of horses, very different horses profiles and data collection tools may recreate similar concept
- 3rd party device prices might be still high, so 5 point analytics may be affordable for smaller group of users
- Producer of hardware for agriculture who has very low pricing and reliable devices may want to reuse all his data by his own. I estimate the efforts are equal to 8-12 months with good team of data scientists. And they may take more market doing this step
- Issue with horse identification - that may introduce a mass while doing data collection.

SUMMARY

The product requires €1,439,400.00 investments. The timeline of product launch would be one year - that is to finalize development of all promised product features.

Meanwhile it is reasonable to focus on marketing side and reach maximum number of potential customers:

- Via Fairs
- Via Social Networks
- Via customers' visits

The product fundamentals already exist that makes it easier to aggregate future customer base, and the existing app already gives a good value for all customers' profiles.

From our experience the most valuable marketing approach was *industry exhibitions* or *competitions with exhibition stands*. Even without actively delivered features, marketing team managed to engage from 30% to 42% of new users. That is only activities at different fairs.

From my observation I can also see that new users added in current months will narrow down to 2%-5% in 3 months (percentage of active users from this added amount). So that is the goal to find out why people are getting bored with the app. Three months we had % of active users above 20% (23%, 24%, 20%) and after 16%m and now ending with 4%. That is the number that can be influenced and maintained by marketing team.

Active development and bigger team size of engineers is required only the first year. The next two years team size would be decreased 2 times as it will be more product maintenance stage.

The core point of being profitable is to keep % of active users high:

- That gives more value to the system in general as number of records per horse is increasing. The value of horses directory feature will be increased

- Keeping active users at the level of 8% and increase of total users 8% per months, will make the project profitable in the first two years after launch with pessimistic the most low cost subscription plans.
- Reaching *356 days analytics database* for the first group of active users will make additional marketing impact because new show cases will be available
- Showcase of selling a horse with such analytics and with a nice interview will add more trust and potentially improve selling culture

Monthly % User Increase	8	Year 1	€431,300.00
Active Users %	8	Year 2	€1,230,065.00
		Year 3	€2,798,020.00
		Total	**€4,459,385.00**

Device price would be around €120 per device pair. The third device is user's smartphone. That is lower than all available competitors. And we do prognosis to have 35 customers of device pairs in the worst case within 3 years. The device producer sells the device for ±€100, but they do have custom deals for different volumes and whitelabbeling.

Advertisement will be another place of profit. Having reached nice % of active users it is reasonable to change pricing for advertisement in mobile apps and also integrate AdWords as advertisement provider.

Year	Qty Of Clients	Budget
Year 1	16	**€11,300.00**
Year 2	28	€18,500.00
Year 3	40	€25,700.00
TOTAL		**€55,500.00**

The product does have a database of very niche users, so a customer profile for every seller's product would be very easy to identify.

With very pessimistic scenario of customer engagement the product will not be profitable in 3 years. Table below gives 2 KPI that do have an impact on money earning.

Active Users %	% Of Total Users Increase

	7	8	9	10
2	€931,917.00 -€507,483.00	€1,176,047.00 -€263,353.00	€1,494,877.00 €55,477.00	€1,911,855.00 -€472,455.00
3	€1,370,189.00 -€69,211.00	€1,736,086.00 €296,686.00	€2,214,602.00 €775,202.00	€2,840,262.00 €1,400,862.00
4	€1,808,284.00 €368,884.00	€2,296,419.00 €857,019.00	€2,934,060.00 €1,494,660.00	€3,768,582.00 €2,329,182.00
5	€2,246,565.00 €807,165.00	€2,856,670.00 €1,417,270.00	€3,653,957.00 €2,214,557.00	€4,696,847.00 €3,257,447.00

LbBS helped to identify the primary points of scale of the product, make analysis or competitors and design pricing based on the analysis:

- Sell a storage of data
- Data can be produced by different product types for different customers' profiles
- Shop of riding lessons
- Resell application access to your customers (for trainers)
- Sell library for companies that have their own software and need analytics only
- Engage people to share feedback for money
- Engage people to collect accurate data for money

All these parts have similar core and are interconnected. And can be tuned for a particular customer's profile. The product has potential to scale to other countries with the same approach as for UK. In every next country engagement should proceed in a more smooth way, because software would be more reliable by the time, and cooperation patterns will be established, database of users would be very solid.

Points that make product work:

- Aggregated database is the product for advertisement.
- Good analytics attracts individual riders, trainers and horse owners.
- Nice training toolkit attracts trainers and pupils, and generates data for horse owners.
- Extended analytics attracts professional riders.

- Riding lessons shops attracts pupils as customers.
- Riding shops attracts trainers as lesson producers.
- “Request feedback” attracts trainers and professional riders to earn money on sharing feedback.

The product adds more competence in the equestrian sport for the whole product team. The project specifics appears to be unique in terms of technology+equestrian knowledge. That type of professionals are rare in Europe and could be very good boost for Ukrainian business environment.

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Appendix

A.1 Interview With A Riding Trainer and A Horse Trainer

1.

Indeed, it is crucial to have a ride evaluation for each horse. The evaluation of a group of horses would be of no value as it is then not clear which individual horse was doing which particular task.

Having an annual report comes in very handy at the stage of selling a horse as it can easily prove that the claimed endurance level corresponds to the required standard. Furthermore, this way we will know that the average weekly training measures up the average norm of the distance which has to be practised at this proficiency level.

This indicator would be of particularly great importance when selling a horse for a long distance race.

What is important?

- Types of riding
- Mileage
- Expected average workload – distance

2.

How accurately (concerning distance) the student has completed the task is very important for the instructor due to the fact that the knowledge of a daily workload makes up the general picture of the trainings, which, in turn, provides the instructor with the understanding of the progress made by both the student and the horse.

Otherwise, if the student reported fake workload which was not covered in reality at the coach's absence, in the future the coach may assign an inadequate or grueling task for the horse and the student alike.

What is important?

- general picture of trainings – for continuous monitoring of the trainings
- leads to inappropriate tasks in case the students doesn't tell the truth at the instuctor's absence

3.

Trajectory, unlike the knowledge of the number of covered kilometres as well as the time used for that task, is not a crucial factor of the effectiveness of a horse.

However, during the horse training lessons dedicated to perfecting jumps, trajectory of a horse's movement can either prove that the tasks were properly practised or reveal some gaps in the way the students tackled certain tasks.

What is important?

- general picture of trainings

4.

The change to the dynamics of the length of the step is rather an important factor to determine how accurately the instructor's tasks have been performed.

The possibility to extend or shorten the pace or tempo when needed depends on the distance between the pace inside one gait. This in turn, can influence the ride evaluation during the horse training or while estimating the way to approach an obstacle during the competition.

Of course, the bigger this difference is, the higher the price for the horse can be. The evaluation of every individual step without the dynamics of the length of the step inside one gait is of practically no importance without the information about the horse's height, its health or proficiency level.

5. While visually evaluating the quality of the way a horse approaches an obstacle (which is:

- trajectory;
- the distance between the start of the jump and the obstacle
- the distance between the start of the jump and the point of landing
- the distance between the obstacle and the horse's legs (both front and hind)
- the accuracy of the gait which the horse approached the obstacle with
- the way the body works while overcoming the obstacle)

it must be noted that each of the above mentioned factors can affect both the evaluation of a horse's work and its price.

How can these factors be evaluated without the use of video equipment?

6.

Providing the horse can free walk, collecting data about its activity is important 24/7.

If the horse is kept in the stable and is only out for trainings, then the data collection is important only in this period.

If a horse is taken for walks for a certain period between workouts, then it is also important to know the distance at that time.

What is important?

- Data collection 24/7 on condition of free walking
- Data collection only during trainings - if the horse is in the stables

The dynamics of the change in the heart rate of the horse indicates how much the workload affects its well-being. Horses, preparing for distance races during trainings and competitions, are subjected to these measurements without exception.

If during the training the number of heart beats exceeds the norm, this is the evidenced of the fact that either the workload for the horse is unbearable or the level of its physical level is insufficient for this workload. If these factors are excluded, and the level of dynamics the cardiac rhythm still exceeds the norm, it may mean that the state of health of the heart muscle, or the general condition of the horse is not satisfactory for the level of workload at which the measurements are made.

Another important factor that can indicate a horse's health is its temperature. Exceeding or lowering the indicators may also be the evidence of the imbalance of the horse's physical condition, workload or temperature mode, at which the workload occurred.

The breathing rate is also an important indicator, which may mean sufficient or insufficient volume of the horse's lungs or tell if the animal suffers of has ever suffered from any illnesses associated with the respiratory organs of horses. Also, this figure may indicate some heart problems. Each of the above mentioned indicators can affect the price of a horse on sale, especially when it comes to selling a horse for long distance runs.

8.

As practice proves, cramps are one of the most important factors in the health of a horse.

With the proper care and the right choice of diet, the horse can live all its life showing no signs of those.

However, it must be taken into account that there are more than 30 kinds of cramps, and some of them are impossible to diagnose and cure without special equipment or even surgical intervention.

In order to prevent them, it is necessary to ensure the correct care for the horse, which includes:

- **sufficient area for breathing**
- correct temperature mode
- sufficient walking
- lack of stress
- balanced nutrition
- optimally-chosen training mode
- feed quality
- no injuries
- sufficient water quantity and quality etc.

9.

Physical workload of the horse must depend on its health, age, breed, tasks, level of training and other factors. Most importantly, its well-being must correspond to the standard norms for the animal. It can be determined by its heartbeat, breathing, level of sweating, impulse, readiness to move forward.

A deviation from any of these indicators may prove an incorrectly selected level of workload. For instance, frequent breathing, increased heart rate, strong sweating, refusal to run or obey commands of a rider or a coach.

Also, the level of workload is influenced by whether the horse has the ability to take a free walk or not.

If there is no such opportunity, then the number of kilometers covered during the training should be much higher. A basic horse training usually lasts for an hour or an hour and a half And, depending on the age, the proficiency level and the health of the horse, the number and length of the time segments in which the horse stands, walks, trots, gallops and jumps is included into this time period.

You also need to take into account the temperature mode of the field or the arena where the training takes place, the soil quality, as well as the workload on the eve of

the training or health-care measures (e.g. vaccination). It is highly recommended to keep record (diaries) of the level of workload and the state of health of the horse.

10

When it comes to timing and trajectory tips, an audio assistant will be relevant. This will be especially useful in endurance training and/or in the case when a horse is returning to norm after a trauma or an illness, when it is extremely important not to exceed the recommended duration of physical activity. If it comes to the quality of the horse's gait, then visual control of a coach is important. Consequently his/her presence at the arena or video monitoring in online mode is desirable.

If there is no visual control, then high-quality correction of the defects of gait or the rider's posture are hard to be evaluated.

However, when combining the function of the audio assistant and controlling the speed of moving, the length of steps, heart and respiratory rate, measurements of time intervals at certain gaits, trajectory and direction of motion control, combined with the understanding of overcome altitude and width at jumps, such an assistant may become an indispensable helper or a practically complete substitute for the coach at his/her absence.

A.2 Interview With Stables Owner

What reports are most important?

The riding log of the 4 options would probably rank as most valuable on my list- as it could apply to any horseman or training business, not just one discipline. You want to cast as wide of a net as possible. Where the riding log comes in handy is to be able to go back and look at rides from 6mo-year ago and compare. It would be helpful if

the same app tracked the horses veterinary care to see patterns in the horses behavior in regards to how it feels and if you could put in icons about the weather that day and even video clips. To fully log each horse each day for a trainer, it needs to be fast and easy. I would give myself 2-5 minutes TOP per horse in my program to do that.

Step length?

Would only interest me in the aspect of the horses soundness- If you had an app that could do that, tell you which leg is striding shorter, it would be huge. The step length in my world in regards to exertion doesn't interest me, personally.

Does it has something with recovery?

Sort of. Horses will take shorter steps on one limb if they are in pain, but not necessarily enough pain to not work. Being able to track that, and which leg, would help alert a rider and vet to a problem before the horse is in too much pain to work.

And what about training on covered arena? Does long step length helps to do tasks quicker ?

And is that a skill of rider to keep step length stable ? Or it is wrong assumption? And that is more natural thing of a horse?

No. Most horseman are not worried about how long it takes to perform tasks, more how well the task is performed.

Yes, a skilled rider can balance the horse to an even step length- at least until the horse reaches the point that pain or talent limits it.

But if that is a junior rider - is it good to be notified for a trainer or the trained rider - that your step length is X. And rider or trainer make decision how to correct the training

We are now speaking about something new - brand new experience that we don't know whether it is helpful

Perhaps. If you could dial the technology to specific legs versus the whole horses stride, and it was reliable, I'd buy it myself in a heartbeat.

Does heartbeat is very valuable information? Especially in a 24-7 mode ?

Heartbeat mode would be valuable in racing or even ting type formats, but not in my particular discipline.

The issue of horse abuse/care would be interesting- albeit difficult to track I feel just on a heart beat.

Price Of Analytics Per Year?

I would do something like $120/year per horse potentially

A.3 Application Comparison With Competitors

The idea was simple -- we went to the real arena and made a set of predefined exercises on the horse (with help of a professional equestrian). After the test we wanted to compare metrics available in the apps:

- gaits recognition
- left/right recognition
- speed, distance
- track on the map

Feature	PacerApp	Equilab	Gallopica
Gaits recognition	+	+	+
Track on the Map	+	+	+
Left/Right distribution	+	+	-
Works indoor	+	+/-	+/-
Track speed	+	+	+
Track distance	+	+	+
Audio assistance	+	-	-
Jumps	-	+/-	-
Horse energy consumption	-	+	-

How it works

(Almost) every cell phone has gps module and a bunch of hardware sensors inside. These utilities give the developer information about location, direction, rotation and acceleration of the user. Analysing this set of data with analytical or ML algorithms, developers can recognise different types of activities. The preciseness of the results depends on the quality of hardware sensors, algorithms and app realisation.

Test exercises

To compare results we made the following exercises:

1) 3 minutes ride, walk, trot, gallop, changing gait type every 30 seconds starting from left.
2) 3 minutes ride, walk, trot, gallop, changing gait type every 30 seconds starting from right.
3) 2 minutes of trot, random directions.
4) 2 minutes of gallop, random directions.
5) 2 minutes of walk, random directions.

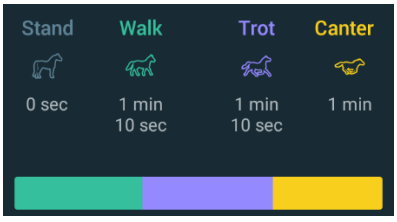
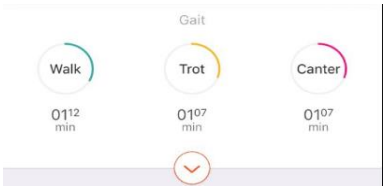
Tests took place on the open door arena covered with sand. The horse chosen was a hannoverian stallion. For each test we placed three cell phones with three different apps in the pockets on the horse cover. For the experiment we used two iPhones 7 and one iPhone 5s. GPS signal on the arena was good.

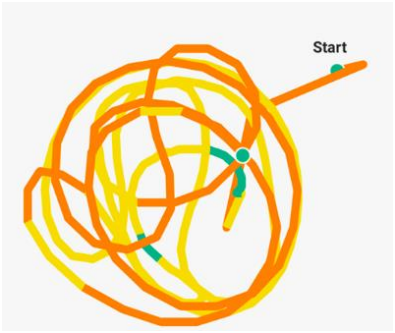
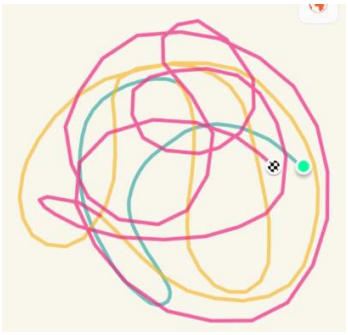
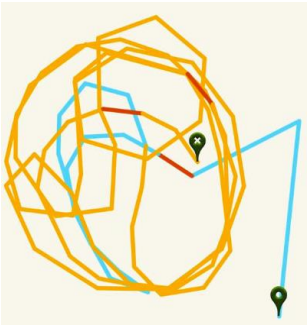
Gaits recognition

In the first two tests we wanted to check how well apps will cope with recognition of changes in gaits. Tests differ only in start direction. In the first test we started from the left and in the second one we started from the right. The expected result is 1 minute of each gait and 50 percent of left/right distribution.

After the first test we understood that it is pretty difficult to setup and start apps simultaneously. Starting/stopping the three apps on the three different phones, and placing devices on the horse took us 20-30 seconds. So in each test we have kind of idle time that should not be considered as wrong recognition. Below you can check the detailed results of the first test:

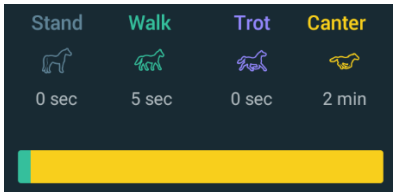
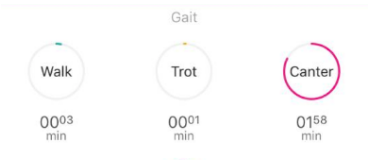
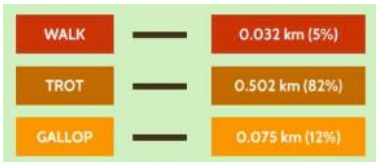
Test 1

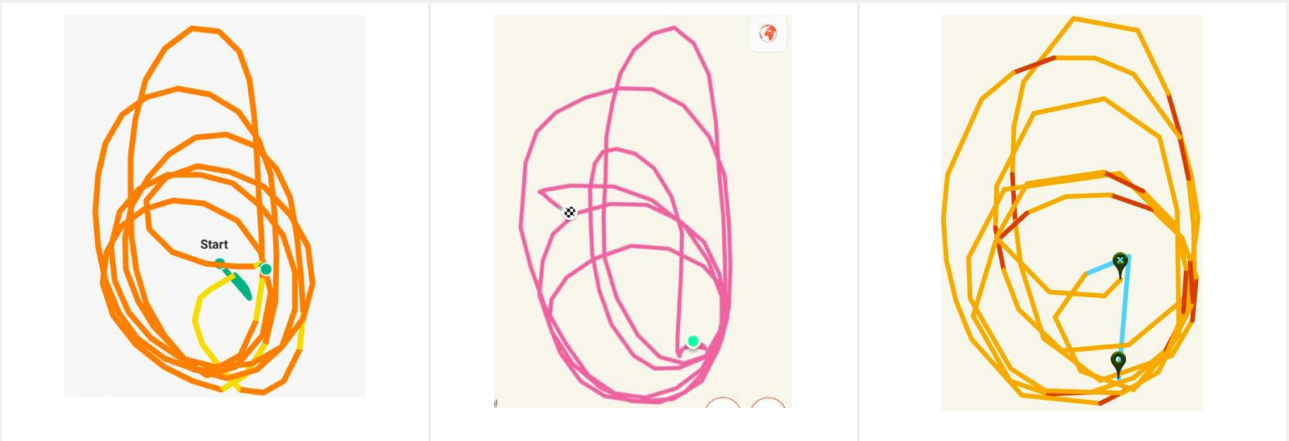
PacerApp	Equilab	Gallopica
		

Walk: 1min 10sec Trott: 1min 10sec Gallop: 1min Max speed: 16,6 km/h	Walk: 1min 12sec Trott: 1min 7sec Gallop: 1min 12sec Max speed: 14,9 km/h	Walk: 47 sec Trott: 2min 1sec Gallop: 4 sec Max speed: 20,3 km/h
		

First two tests showed pretty realistic results for PacerApp and Equilab. Both apps showed almost equal part of walk, trot and gallop. Gallopica app had troubles in distinction of trot and gallop. It showed just few seconds of gallop and more than 2 minutes of trot in 3 minute ride.

In tests 3, 4 and 5 we checked how apps will recognise 2 minutes of walk, trot and gallop accordingly. Here are the details of the test 5, the expected result is 2 minute of gallop:

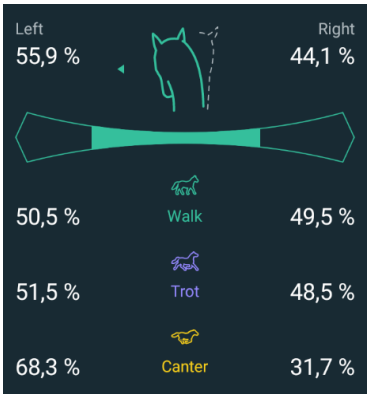
PacerApp	**Equilab**	**Gallopica**
		
Walk: 5 sec Trott: 0 sec Gallop: 2 min Max speed: 14,3	Walk: 3 sec Trott: 1 sec Gallop: 1 min 58 sec Max speed: ~16 km/h	Walk: 8 sec Trott: 2 min Gallop: 18 sec Max speed: 21 km/h



In general all apps were good at recognising walk and trott. But in the fourth test when we recorded 2 minutes of gallop PacerApp and Equilab were the only to recognise movement correctly.

Left/Right

PacerApp and Equilab are able to recognise whether the horse goes to the left or right. Gallopica lacks this feature for the time of testing. During test 1 and test 2 the horse changed direction from left to right or vice versa every 30 seconds. So we expected to see 50% of riding to the left and 50% of riding to the right.

PacerApp	Equilab
	

Walk: 50,5%(L) - 49,5%(R) Trott: 51,5%(L) - 48,5%(R) Gallop: 68,3%(L) - 31,7%(R) Total Left: 55,9% Total Right: 44,1%	Walk: 1,9%(L) - 3,9%(R) * Trott: 3,4%(L) - 1,5%(R) Gallop: 1,9%(L) - 6,8%(R) Total Left: 7,28% Total Right: 12,14% * As far as Equilab shows left/right statistics in time units, to get percents we divided each result by the training duration.

As we can see from the results, PacerApp and Equilab approach the issue differently. It looks like Equilab tracks only the moment when the horse is making a turn to the left or to the right. At the same time PacerApp analyses larger patterns. For example if you are riding on the round arena after making one circle starting from the left, PacerApp will consider the whole ride as riding to the left. This approach looks pretty useful for analysing typical dressage routines.

Conclusion

All three apps have pros and cons. Gallopica is a fairly simple app which is very easy to use, but it lacks such functionalities as charts with statistics and left/right recognition. It also has troubles with recognition of trot which is a serious con. We hope that this will be fixed in future releases.

Equilab has reach UI and a lot of interesting features. The recognition of gaits showed nice results. Left/Right recognition does not work as we expected. Tracking only momentum of changing direction is not as useful as recognition of larger patterns of the left/right riding. Also both Gallopica and Equilab cannot be used in the indoor arena, because they heavily depend on the GPS signal.

PacerApp showed high accuracy in both gaits and left/right recognition. PacerApp has no such detailed metrics as Equilab and requires internet connection to receive processed results. On the other hand PacerApp is the only one out of three apps that has audio assistance functionality and works inside indoor arenas.