#01

VITRINA DE INVESTIGACIÓN

- DISEÑO UDD

EQUIFY

NOV. 2024

Universidad del Desarrollo
Facultad de Diseño

UDD Design Research Showcase

The Design School of Universidad del Desarrollo presents: **Vitrina de investigación**, a periodic initiative that seeks to share our school's most significant challenges, projects, and achievements in the field of design research. The aim is to contribute to the development of the discipline and open new opportunities for collaboration at a global level.

Design research has experienced profound growth and evolution in recent decades, consolidating as an area that integrates human, technological, and systemic dimensions to address complex challenges and transform realities.

Regarding the evolution of design research, Diseño UDD created its Research Area in 2012, formalizing it as the Research Directorate in 2016. Since then, we have strengthened the team with interdisciplinary researchers around five lines and three Technological Development Foci, identified by the UDD Vice-Rector's Office for Research as priority areas.

These efforts have led us to obtain recognitions such as the IXDA Award 2019, the Chile Design Award for Research in 2019 and 2022, and the Ibero-American Design Biennial Award (BID) 2023. In addition, we have registered the first national and international patents for UDD. We have consolidated collaboration with prestigious institutions such as UC Davis, The Open University, and Lapland University, and we are part of the International Advisory Committee of the Design Research Society (DRS), among others.

A fundamental part of our strategy is the link with undergraduates and the support we have received to deepen technological development. These have materialized by integrating research in seven courses of our curriculum within the 'Line of Research and Transfer' and through the PADT Alumni Technological Development Support Program. iCono UDD, the University's Technology Transfer Department, partnered with us on this initiative.

These actions have enabled us to identify and support the continuity of outstanding projects such as Equify, which we highlight in detail in this capsule. This project, focused on the early detection of Acute Abdominal Syndrome in equines, is an example of innovation in the veterinary field and an example of the positive impact of our research across industries.

Through this initiative, we want to share these advances and promote dialogue between academic institutions and design professionals globally, with the commitment to continue exploring new frontiers in design research, thus contributing to a more sustainable, inclusive, and creative future.

Alejandra Amenábar Figueroa
Dean
Design School
Universidad del Desarrollo

Paulina Contreras Correa
Research Director
Design School
Universidad del Desarrollo

EQUIFY

Facilitating the detection of Acute Abdomen Syndrome (AAS) in equines

1.

Research context

Equify is a clear example of the link between research and undergraduate studies outlined by UDD Design. This project was born in the interest of students Isidora Abusleme and Alfredo Varela, who had extensive experience with equines and had identified how acute abdominal syndrome (AAS) affects multiple areas. In response to this problem, they decided to address the challenge from a design perspective during the development of their degree Project.

Their motivation to find an effective solution encouraged them to continue their research and apply for an internal UDD fund that would allow them to advance in the project's development. The award of the PADT Alumni, an institutional fund for recent graduates, supported the incorporation of researcher Francisco Zamorano into the team.

To bring the product closer to the market, the team applied and where granted a second fund, PADT Regular, which facilitated the development of a functional prototype that was validated by experts in veterinary medicine.

The patent application for Equify was finalized on 24 May 2024 and, if accepted, would join two other patents held by UDD Design School. This underscores our commitment to innovation and technological development.

"This patent application is an important milestone for the Design School because it demonstrates how innovation and collaboration can lead to life-saving solutions in the veterinary field and many other areas. This achievement underscores the importance of technological development in academia and the positive impact it can have on industry and the lives of animals."

Francisco Zamorano

UDD Design faculty and researcher in charge of the project

01. Device for capture, monitoring and biometric analysis of bowel sounds

2.

Project Description

What is Equify?

Equify is an innovative biometric monitoring and analysis system for the equine world. Its main objective is to address the challenges associated with Acute Abdominal Syndrome (AAS) in horses, commonly known as 'equine colic'. This syndrome is responsible for 50% of medical deaths in horses and is the main reason for veterinary care. AAS affects especially in stabled sport horses and represents the leading cause of economic losses in equine farms worldwide (Cenk et al., 2020).

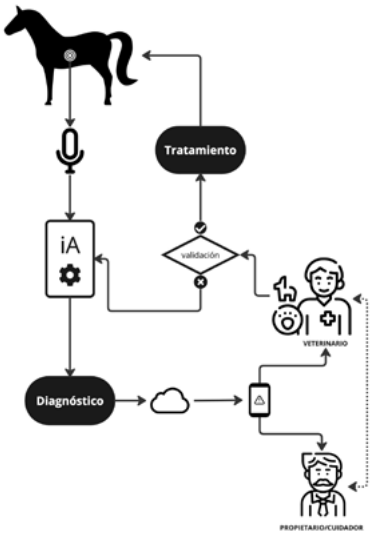
Horses often hide their symptoms of discomfort, making it difficult to diagnose AAS early before it becomes severe. This poses challenges for veterinarians, as the syndrome has multifactorial causes and progresses rapidly, sometimes resulting in death within hours of the first symptoms. This situation complicates diagnosis and treatment.

Diagnosis of AAS requires constant monitoring of abdominal sounds using a stethoscope. Due to practical reasons, veterinarians cannot perform prolonged auscultation on a regular basis, making timely detection difficult. For horse owners, this has a significant emotional and financial impact.

Although surgery is one of the most common treatments, it has a low recovery rate and a high risk of postoperative complications. In addition, a history of colic surgery negatively affects the commercial value of the horse, reducing its chances of being sold in the equine market.

Equify is thus presented as a technological innovation that addresses the complexities of AAS, automatically detecting early symptoms, making the veterinarian's work more efficient, and positively impacting the welfare of horses.

02. Function and process diagram of the Equify biometric monitoring and analysis system



How does it work?

Equify offers continuous monitoring of intestinal sounds, automatically capturing long-duration recordings that are analyzed by AI to detect abnormalities and generate automated diagnoses. Veterinarians can validate these diagnoses through a detailed visual interface, which helps optimize their time and enables timely intervention before the condition requires emergency surgery or threatens the animal's life.

In addition, Equify automates a complex process, improving clinical efficiency by enabling simultaneous monitoring of multiple horses. It offers owners and caregivers an effective solution for equine health, accelerating decision-making and improving horse welfare. Thus, Equify assists veterinarians and makes the monitoring process transparent to caregivers and owners.

Among the main advantages of the system over traditional abdominal auscultation are the following:

1. **Constant and minimally invasive monitoring,**
2. **Long-lasting recordings without causing stress to the horse,**
3. **Ability to monitor multiple horses simultaneously,**
4. **Data-driven diagnostics support.**

Through preliminary validations by veterinary experts, Equify has achieved 93.3% assertiveness in diagnosing AAS. In addition, world-renowned veterinary experts, such as Dr. Jack Snyder, chairman of the FEI Veterinary Commission at the 2010 World Equestrian Games and UC Davis academic, have validated the solution. Snyder highlighted Equify's potential for AAS research and improved colic diagnosis and response, confirming Equify's relevance and potential impact on equine veterinary medicine.

"If it [the system] can actually give advance warning that something is coming up so a veterinarian can treat or do something, that would be extremely beneficial."

Dr. Jack Snyder
Academic UC Davis
School of Veterinary Medicine

93.3%

accuracy in the diagnosis of SAA achieved by Equify

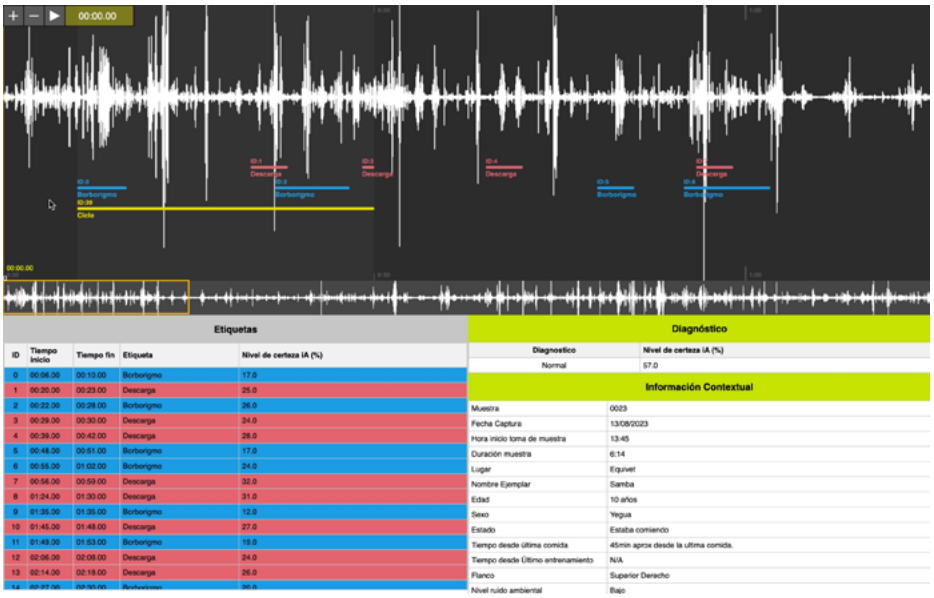
The Equify system has three key components:

1. An audio capture device that attaches to the horse's abdomen by means of an adjustable cape.

2. Artificial intelligence software that analyzes peristaltic sounds and classifies them based on labels to make a diagnosis.

3. A visualization software that allows the veterinarian to review the captured audio, tags, and diagnostics for validation.

Watch Equify video



03. Interactive interface to visualize bowel sound analysis

04. Capturing device

"Our vision with Equify is for it to become an accessible and universal diagnostic tool. It will be useful for veterinarians, horse owners, and animal lovers in general, revolutionizing equine care globally," says Alfredo when asked about his long-term vision for the technology. "Hopefully, Equify will serve as a database to better understand the phenomenon, providing valuable knowledge to improve the quality of life we give to horses."

Isidora Abusleme y Alfredo Correa

Creators and researchers

Stages of the project

2021

Conceptualization

Preliminary concept validation

2022

Capture Device Improvement

2023

MVP development (capture system, AI software, viewer software)

Expert validation

2024

IP protection, patenting, transfer

3.

Creators and researchers

Isidora Abusleme

Isidora Abusleme is a Spaces and Objects designer specializing in prototyping and digital manufacturing, accumulating 3 years of experience in teaching, research, and project development. Her work has focused on interdisciplinary collaboration for manufacturing technology projects, focusing on design methodologies for environmental monitoring and mold production for creative projects. Her strong interest in animal welfare and design has led her to devise new ways to understand and improve the quality of life of domestic horses.

Alfredo Varela

Alfredo Varela Armendáriz is a Digital Interaction Designer with more than 4 years of experience in R&D research and development of digital products for the financial sector. His vision and passion for design have led him to stand out in awards such as the Ibero American Design Biennial, Index Awards, and iCono UDD. In addition, he has worked on optimizing user interfaces and user experiences through Lean and Design Thinking methodologies, contributing significantly to advanced and innovative technological solutions.

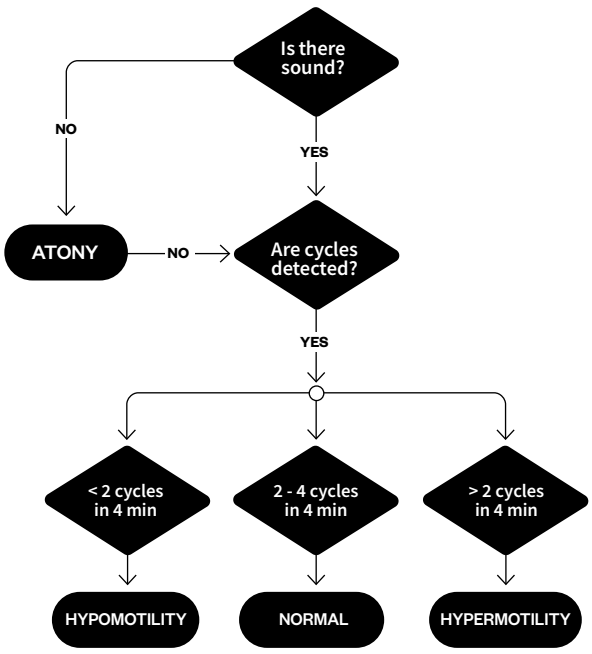
Francisco Zamorano

Francisco Zamorano is a Researcher at the Design School of UDD, Chile. He is a PUC Designer with a Master of Fine Arts degree in Design & Technology from Parsons School of Design, NY. His work has focused on how technology can help people perform complex tasks, focusing on learning through collaborative experiences and developing interfaces that explore interactions beyond the traditional computer screen. Winner of the Ibero American Design Biennial, Innovative Researcher Award UDD, Best Concept IxDA Award, and Chile Design Award in the Research category.

4.

Funding

This project has been awarded two internal funds from Universidad del Desarrollo. In the first stage, funding was obtained through the PADT Alumni, a fund granted by the Directorate of Technology Transfer - iCono UDD. This prize aims to promote research and new technology development among recent graduates. Subsequently, it obtained the Regular PADT, whose purpose is to provide financial support to applied and technological research projects, to create conditions that facilitate the transfer of the knowledge developed and ensure its adoption and/or application in industry or society.



“At iCono UDD Technology Transfer Department, we are deeply committed to promoting research that generates a real and positive impact on society. We believe that technology transfer is key to transforming knowledge into concrete solutions that improve the quality of life of people and society in general. For this reason, we provide our researchers with all the necessary support -from financing for technological maturation and development to specialized advice on intellectual property matters to links with relevant stakeholders for project validation. The purpose is so that they and the technologies and innovations they generate transcend academic boundaries and become engines of progress in diverse industries and markets”.

Rodrigo del Canto
Director iCono UDD
Technology Transfer Department

5.

Projections

The equine market, particularly in the sport horse segment, offers a great opportunity for Equify's implementation. With a global industry valued at $300 billion USD (Equine Business Association, 2023) and a significant segment dedicated to equestrian sports such as racing, jumping, and dressage, the potential for Equify penetration is considerable. In the U.S., a major market, there are 9.2 million horses, 30% of which are destined for sporting competitions (EquiMed - Horse Health Matters, 2023), representing a potential base of more than 2.7 million horse beneficiaries.

Equify is expected to be highly demanded by breeders and veterinarians, who already make significant investments in the health and performance of sport horses. Early detection of AAS can reduce equine mortality rates and the need for expensive surgical treatments. As a result, it is anticipated that Equify will penetrate the market and lead to considerable savings for the industry. By preventing such interventions, Equify could provide a substantial return on investment, potentially saving the industry tens of millions of dollars each year.

In addition, the scalability offered by Equify will enable its expansion into other equine market segments, including recreational and working horses, further increasing its global reach. The growing trend towards animal welfare and demand for non-invasive solutions will drive the adoption of Equify, especially in highly professionalized markets such as Europe and the U.S. As AI-based technology becomes integrated into standard practices, adoption is projected to be high, cementing Equify as a competitive and valuable solution for improving diagnostic accuracy and horse welfare.

2.7

million

horse beneficiaries

Horse breeders & veterinarians

early detection of SAA can reduce equine mortality and costly surgical treatments.

Equestrian sports

- Racing
- Dressage
- Jumping

06. Device for capture, monitoring and biometric analysis of bowel sounds

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