אוניברסיטת חיפה
UNIVERSITY OF HAIFA
جامعة حيفا

A Proposal to Establish

The Research Center for AI-Driven Animal Welfare (AI4Welfare)

Harnessing AI technologies to revolutionize animal welfare

Executive Summary

The Research Center for AI-Driven Animal Welfare at the University of Haifa will pioneer the use of artificial intelligence (AI) to revolutionize animal welfare and combat intensive farming practices. As the world's first research center of its kind, it will harness cutting-edge AI technologies to directly benefit animals through four specialized units:

AI4Welfare-SCI: Conducts basic and applied research to advance our understanding of animal emotions and sentience, develop objective welfare assessment methods, and enhance animal protection practices.

AI4Welfare-4GOOD: Creates pro-bono digital products to benefit animals in farms and shelters, protect animal rights, and support advocacy efforts against intensive farming.

AI4Welfare-EDU: Offers educational programs and workshops on AI applications in animal welfare for professionals, researchers, and the public.

AI4Welfare-TECH: Serves as an innovation hub, developing commercial AI products to promote animal health and welfare.

Through these integrated efforts, we aim to address the interconnected challenges of animal suffering, environmental sustainability, and public health issues associated with current intensive farming practices. We invite you to partner with us in this vital mission to improve the lives of animals and create a more compassionate and sustainable world with AI.

Background

The global food system stands at a crossroads, with intensive animal agriculture at the heart of numerous environmental, ethical, and public health challenges. Intensive factory farming, while efficient in producing large quantities of animal products, comes at an enormous cost to animal welfare, environmental sustainability, and animal and human health.

Farmed animals, numbering in the billions, endure severe confinement, physical and psychological stress, and genetic manipulation that prioritizes rapid growth over well-being. These practices not only inflict immense suffering, but also contribute to the emergence and spread of zoonotic diseases, posing significant risks to global public health.

Environmentally, factory farming is a leading driver of climate change, responsible for approximately 14.5% of global greenhouse gas emissions. It also causes widespread water and air pollution, accelerates deforestation, and depletes vital natural resources. The industry's heavy reliance on antibiotics further exacerbates the growing threat of antimicrobial resistance.

Despite the critical nature of these issues, governments around the globe are falling short in their response. Often prioritizing economic growth and agricultural productivity over environmental sustainability and animal welfare, government inaction is leading to a perpetuation of harmful practices. Furthermore, there is a significant gap in funding and support for research and innovation aimed at developing more sustainable and ethical food systems.

There is an urgent need for transformative research and innovation to address these interconnected challenges. Harnessing new AI technologies can significantly improve the quality of life for farmed animals by reducing their suffering, promoting more humane practices and strengthening animal protection advocacy work.

Transforming Animal Agriculture for a Sustainable Future

In response to the urgent need for improving animal welfare and creating a more sustainable food system, the University of Haifa (UofH) invites you to partner with us to establish the Research Center for AI-Driven Animal Welfare. This pioneering research center, the first of its kind globally, will leverage AI to address critical issues in animal agriculture and welfare. Building on the University's proven excellence in promoting sustainability, and the Tech4Animals' Lab pioneering research in AI and animal welfare, as well as its extensive network of scientific connections, the Center will focus on:

- Eradicating intensive farming operations

- Advancing scientific understanding of the complexities of the emotional world and sentience, and accurately recognising them in multiple species
- Using advanced AI technologies as a tool for influencing policy change in animal welfare practices and advocacy
- Developing digital products for animal welfare: both pro-bono and commercial.

Our innovative approach, combining UofH's strengths in AI research with its commitment to animal welfare, will position the Center as an agent of change in the field of animal agriculture and welfare policy.

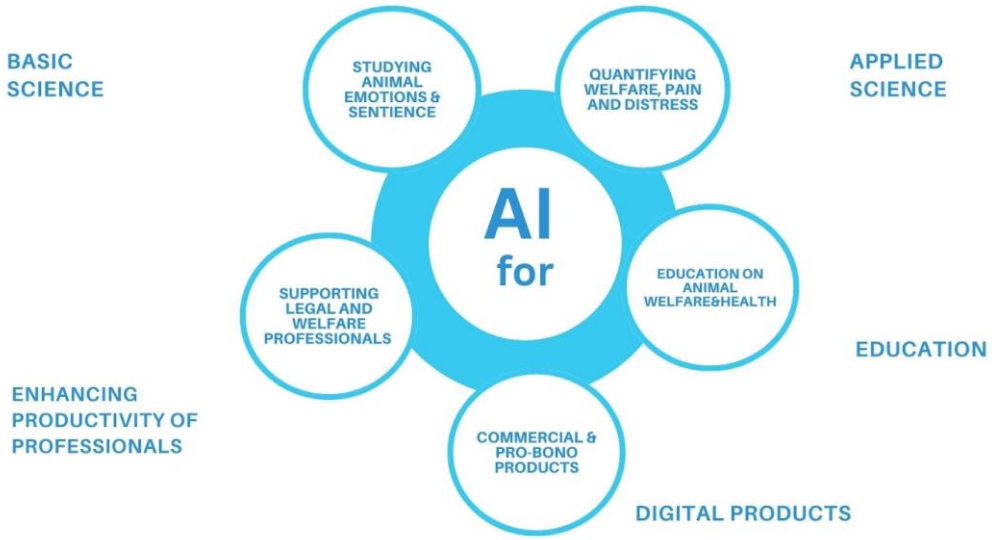
How will the Research Center for AI-Driven Animal Welfare differ from existing animal welfare initiatives?

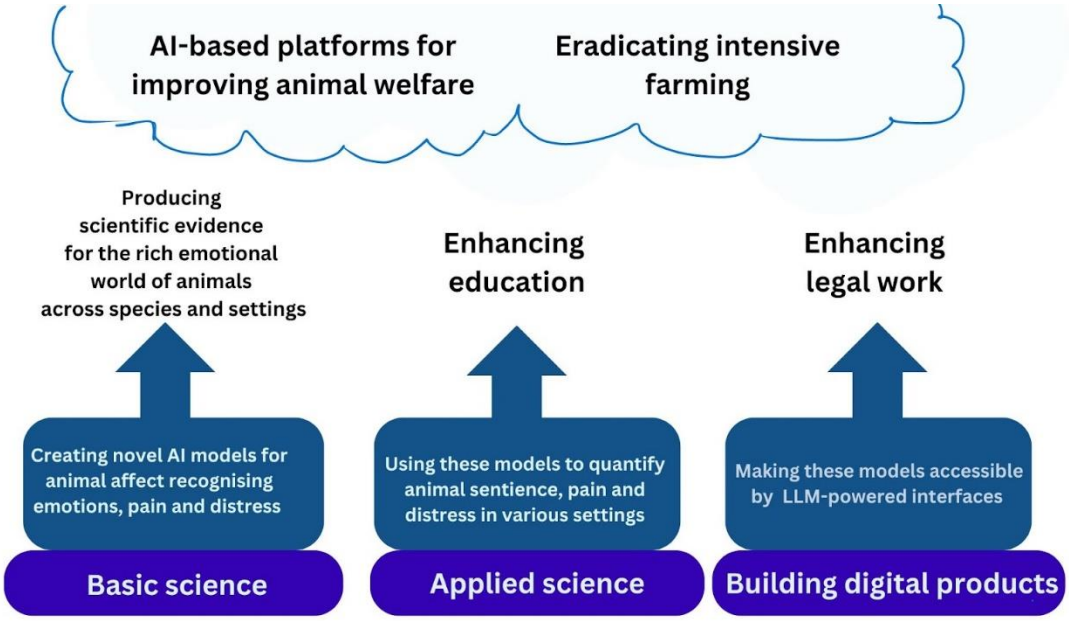
The Research Center for AI-Driven Animal Welfare will distinguish itself from existing animal welfare initiatives through several innovative approaches:

1. **Pioneering AI Focus:** We will be at the forefront of developing, applying, commercializing, and teaching AI specifically for improving animal welfare.
2. **Accessible AI Solutions:** Through our AI4Welfare-4GOOD unit, we will provide sustainable, pro-bono AI innovations for animal welfare. This unique approach will redirect resources from revenue-generating units to support those who need AI solutions, but cannot afford them.
3. **Advanced Emotional State Recognition:** We are developing cutting-edge AI technologies to recognize and interpret animal emotions and affective states using multimodal video, audio, and sensor data. This approach goes beyond traditional welfare measures that often focus solely on physical health or activity.
4. **Objective Comparison of Farming Practices:** Our AI-powered analysis of video, sensor, and audio data enables quantitative comparisons of animal welfare between intensive factory farming and more sustainable practices. This could provide lobbyists and campaigners with robust and objective scientific ‘proof’ that intensively farmed animals suffer more than the same species in more holistic settings. Please see the recent documentary “If pigs could talk” featuring our research for an example of such societal impact.
5. **Multidisciplinary Collaboration:** Leveraging the University of Haifa's ecosystem in sustainability and the Tech4Animals Lab's international network, we will bring together experts from diverse fields including computer science, data science, animal welfare, veterinary medicine, bioacoustics, and animal behavior to advance our mission.

By combining cutting-edge AI technology with a dedicated focus on animal welfare, the Research Center for AI-Driven Animal Welfare will be

poised to drive significant advancements in the field and provide unique, AI-driven solutions to improve the lives of animals in agriculture and beyond.



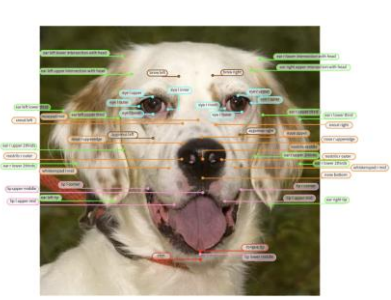
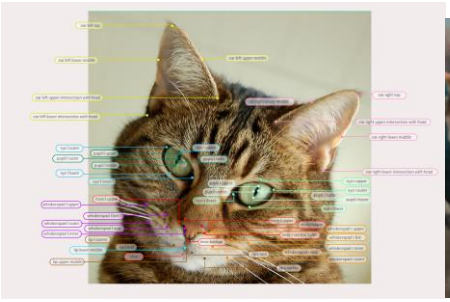
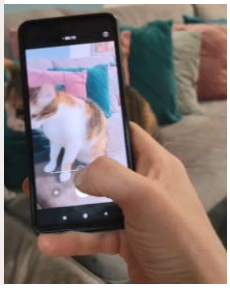


Scalable Scientific Research Initiatives: Three Examples

1. Decoding Animal Emotions with AI

The Center will develop AI systems that can analyze video, sensor data, and audio to detect subtle changes in animals' facial expressions, body language, and vocalizations. This research is crucial for understanding the complex emotional world of animals, who cannot verbally communicate their feelings.

We are currently working on digital applications like the Cat Reader app, which detects pain in cats with over 90% accuracy, and SciPet app, which identifies and describes emotional states in dogs and cats. These technologies aim to revolutionize veterinary care, enhance welfare for farm animals, pets, zoo animals, and wildlife, and deepen our understanding of animal emotions and behaviour. Our goal is to create practical apps for various animal species, enabling earlier interventions for medical issues and improving overall animal welfare.

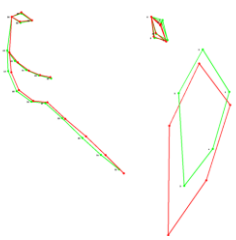




2. Quantifying differences between intensive factory farming and agro-ecological animal farming settings:

This research initiative will involve multiple PhD students and postdoctoral researchers collecting and analyzing data on various farm animal species. The study will compare different approaches to animal housing, such as contrasting the conditions of caged hens with those in barn or free-range settings. Furthermore, it will examine animal welfare standards for farm animals across different nations, highlighting global variations in practices and regulations. The research will also assess livestock transportation, focusing on measuring the relative stress levels animals experience in different scenarios. Another study that could be considered if the data could be sourced is assessing the emotional state of animals just prior or during religious slaughter (Kosher / Halal) and comparing it to more ‘humane’ slaughter practices.

This comprehensive approach aims to provide a clear, data-driven, and objective understanding of how different farming methods impact animal welfare. The resulting body of evidence could significantly inform future policy decisions and agricultural practices.





A concrete example of such scientific activities is demonstrated in the documentary "If Pigs Could Talk," produced by Miki Mistrati (Snowman Productions), scheduled for release in September 2025. In this film, the producer collected pig vocalizations from both intensive and ecological farming settings. A panel of experts, including our team as AI specialists, participated in a blind trial to objectively analyze the emotional valence of these vocalizations using AI. The aggregated quantified results revealed significantly more stress-related vocalizations in intensive farming settings compared to ecological ones.

3. **Leveraging Large Language Models for Enhanced Animal Welfare Advocacy:**

The Center plans to develop an AI-enhanced workspace[1] based on large language models (LLMs, e.g. ChatGPT) to assist CALF (and possibly other animal welfare organizations) in enhancing legislation promoting animal welfare. This project has the potential to enhance work practices of the CALF team. See the presentation on the AnimalAdvocate chatbot demo presented at our meeting with Celine Montloin.

This initiative aligns with one of the Center's key objectives: engaging policy-makers in meaningful dialogue about the intersection of technology, AI, and animal welfare. The Center plans to host discussions and seminars, providing a platform for experts, advocates, and legislators to explore the latest AI advancements and their potential applications in improving animal protection laws and practices. These events will foster collaboration among stakeholders and ensure that policy decisions are informed by cutting-edge research and innovative technological solutions, ultimately leading to more effective animal welfare policies.

Sustainability Plan

The Center's long-term sustainability and its ability to conduct scientific research and provide pro-bono solutions will be ensured through two revenue-generating units:

AI4Welfare-EDU Unit:
This unit will focus on developing and delivering educational resources tailored for animal behavior and welfare scientists, professionals, and interested members of the public. Key features include:

[1] Similar platforms already exist in other legislation domains, see, e.g., https://www.leya.law/ . However, in this project we will specifically fine-tune LLMs on the CALF database which has already collected an impressive amount of texts on which the models will be trained.

1. Specialized programs in AI and Data Science for animal welfare
2. Workshops and professional courses
3. Access to platforms and tools developed by the Center
4. Project-based learning (PBL) format, allowing participants to work on real-world problems using their own datasets
5. Projected annual revenue of $50,000 USD for reinvestment in the Center.

The implementation of PBL aligns with the University of Haifa's broader educational initiatives, with Prof. Zamansky expected to obtain her PBL certification from Aalborg University in the near future.

AI4Welfare-TECH Unit:
This unit will drive innovation and create new intellectual property (IP) specifically designed for animal welfare professionals. Its focus areas include:

1. Exploiting commercial opportunities arising from developed AI technologies
2. Ongoing development of computer vision-based products in the Carmel acceleration hub at the University of Haifa
3. Building capacity for future commercial endeavors, particularly in pet welfare

While exact revenues cannot be predicted, it is anticipated that the first year of operation will establish a strong foundation for future commercial ventures in the domain of pet welfare. Through these two units, the Center aims to create a sustainable model that supports ongoing research and pro-bono initiatives while generating revenue and fostering innovation in the field of AI-driven animal welfare.

Proven Track Record: The Tech4Animals Lab

The Tech4Animals Lab at the University of Haifa's Information Systems Department is a groundbreaking research initiative founded by Prof. Anna Zamansky over a decade ago. Prof. Zamansky, a distinguished expert in formal methods and artificial intelligence, brings an impressive academic background to her role. She graduated from the Technion's Excellence Program in Computer Science, earned a PhD in Logic and AI from Tel Aviv University, and completed a Marie Curie Postdoctoral Fellowship at the Technical University of Vienna.

Driven by her passion for animal welfare, Prof. Zamansky established the lab to harness AI's potential in improving animals' lives. Today, Tech4Animals is at

the forefront of developing advanced technologies for recognizing emotions, stress, and pain across various species, including companion animals (cats, dogs, horses, and rabbits), farm animals (sheep, goats, and cattle), and sheltered animals (sheltered dogs, captive primates).

At the heart of the Lab's research are sophisticated deep learning methods that analyze animal body language, facial expressions, and vocalizations. These AI techniques have led to innovative digital products like the Cat Reader app for detecting feline pain and the SciPet app, which employs state-of-the-art language models to recognize pets' emotional states.

Tech4Animals extends its expertise to numerous animal welfare projects. These include developing a system to monitor sheltered dogs' welfare in Lod, Israel, creating a data-driven approach to assess health indicators of rescued big cats for Four Paws, and designing a facial recognition algorithm to reunite dogs lost in Brazilian floods with their owners. The lab also develops digital educational activities to increase empathy towards farm animals among children visiting a farm for rescued animals.

The lab's multidisciplinary approach, combining computer science with veterinary expertise and animal behavior studies, has positioned Tech4Animals as a unique and influential force in the field of veterinary informatics, animal affective computing, animal-centered AI, and computational ethology. With an extensive global network of collaborators, including partnerships with institutions in Germany(Hannover Animal Hospital and Veterinary University), Switzerland (University of Bern), Brazil (State University of Sao Paolo), Czech Republic (The Agricultural University), the Tech4Animals Lab continues to push the boundaries of AI applications in animal welfare.

For further information, please visit our website:
https://www.tech4animals.org/

Media Mentions:
https://www.scientificamerican.com/article/cats-can-hide-their-pain-but-not-from-ai/
https://www.israel21c.org/unique-lab-uses-ai-to-make-a-better-world-for-animals/
https://news.vin.com/default.aspx?pid=210&Id=12153545&f5=1
https://www.jewishnews.co.uk/israeli-tech-helps-select-pick-of-the-litter/
https://www.ynet.co.il/environment-science/article/bkgolhoti (hebrew)

Why the University of Haifa?

UofH is uniquely positioned to shape a more compassionate and sustainable future. Our dedication to this cause is exemplified by our pioneering decision to adopt the United Nations' 17 Sustainable Development Goals (SDGs) as our institutional roadmap, making us the first higher education institution in Israel to

do so. Due to our focused efforts, UofH is ranking #1 in Israel for SDG impact. Furthermore, on the global stage, we have secured a position among the top 101-200 universities worldwide in the 2023 Times Higher Education SDG Impact Rankings, out of approximately 1,700 academic institutions.

Underscoring our dedication to sustainable agriculture, the University's Institute of Evolution recently launched Israel's first Regenerative Agriculture Center. Operating on a new farm in central Israel, the center focuses on developing sustainable methods for growing arable crops in a warming climate. Research priorities include enhancing carbon sequestration, improving soil health, increasing crop yields, and reducing chemical inputs through holistic practices. This work aims to address the challenges of feeding a growing population while considering the practical aspects of regenerative farming.

The university's commitment to a better future extends beyond mere rankings. UofH is proud to be the university that most accurately mirrors Israeli society. Here, Jews, Muslims, Christians, Druze, ultra-Orthodox and secular students, military and security personnel come together to study, teach and learn. For many of these students, our campus is the first meaningful point of contact with ‘the other’ in Israeli society. This unique diversity not only differentiates us from other Israeli universities, but also stands as a source of strength and innovation. By fostering an environment of tolerance and coexistence, UofH serves as a model for Israel and the entire region, demonstrating how diverse communities can thrive together in the pursuit of knowledge and understanding.

Building on our strong foundation of diversity and inclusion, the University of Haifa has taken concrete steps to expand academic opportunities and promote upward mobility for all members of Israeli society. To that end, UofH has invested heavily in our Downtown Technology Campus. Situated in the bustling port area, the Technology Campus is in close proximity to Haifa’s Innovation District. The campus consolidates our technology and data sciences offerings into a single location, providing an integrative data sciences curriculum that combine Computer Science, Information Systems, and Statistics. With easy access via public transportation, this initiative is enabling hundreds of under-represented students from Israel’s peripheral communities to enroll in academic degrees that promote social mobility.

From its inception, the University of Haifa has embraced its responsibilities to students from Israel’s underserved communities.

- 42% of our overall student body and 26% of our graduate candidates come from low-income and minority families.
- 47% of our students are 'first generation’’, compared to 25% at other major Israeli universities (Central Bureau of Statistics).
- Women make up 60% of the student body.

- 84% of our undergrads are from Israel's northern periphery.

This combination of visionary leadership, tangible achievements, and ongoing commitment uniquely qualifies the University of Haifa to spearhead efforts towards a more sustainable future, both within Israel and on the global stage.

Academic Leadership

Professor Anna Zamansky (PhD, Tel Aviv University) is the Head of Tech4Animals Lab and an assistant professor in the Department of Information Systems.

The Lab has pioneered AI models to detect pain and positive emotions in various animals, including cats, dogs, and farm animals. The Lab's projects include monitoring the welfare of sheltered dogs, aiding handlers of captive tigers and lions, and supporting vets in early detection of neurological disorders. With over 20 researchers from fields like Computer Science, Veterinary Medicine, and Anthropology, we lead in affective computing and automated behavior analysis. Collaborating internationally with veterinary hospitals, NGOs, and research groups, Zamansky's research is funded by Israel's Ministry of Technology, Israel-US Binational Foundation (BSF), Ministry of Agriculture, and Ministry of Defense.

Prof. Zamansky is a graduate of the Technion's Program for Excellent Students and received the prestigious Marie Curie Individual Fellowship for conducting her postdoctoral research at the Technical University of Vienna, Austria. She is the recipient of multiple prizes recognizing her technical contributions, and a passionate advocate for promoting women in STEM and youth education in AI and innovation.

Request for Support

Your support will play a crucial role in establishing AI innovation as a vital force in animal welfare, demonstrating that AI should benefit not only humanity but also other sentient beings. By contributing, you will help alleviate animal suffering, mitigate climate change, protect public health, and ensure food security for future generations. Together, we can harness AI to transform our food system into one that is more compassionate, resilient, and sustainable. We are excited to present scalable opportunities for you to support this important work.

1. **Flagship Contribution: $5 million**
   This generous gift will establish the Research Center for AI-Driven Animal Welfare, named in your honor. This funding will support

all four units—SCI, 4GOOD, EDU, and TECH—for five years, creating the world's first center of its kind. The funding will kick-start the Centre's initial phase, ensuring that its research outputs build a reputation that will attract further funding to establish long-term sustainability. It will also set up the income-generating streams in education and technology commercialization. The University sees the establishment of the Center as a long-term strategic priority that will build on one of our globally-respected strengths, and can only be enabled through a significant donation. A letter of support from the University's President is below. Please see the budget for the five years of funding, also below.

2. **Core Research and Pro-Bono Support: $2.8 million**
   This contribution will fund the SCI (scientific research) and 4GOOD (pro-bono digital products) units for an initial five-year period. Such funding will enable more research breakthroughs that will attract further funding.
3. **Scientific Research Focus: $1.6 million**
   This gift will support the SCI unit, dedicated to scientific research, for four years, generating world-leading research in animal welfare. This will sit within the Tech4Animals Lab and will accelerate research to help achieve the goal of eradicating factory farming.
4. **Senior AI Researcher Fellowship: $600,000**
   This donation will partially support the SCI unit's scientific research activities by funding a senior AI researcher position for five years.

Under the leadership of Professor Gur Alroey (new President) and Professor Mouna Maroun (new Rector), the University of Haifa is committed to supporting the ongoing operations of the Center and will actively seek additional funding.

We look forward to discussing this proposal further and exploring how we can collaborate to advance our pioneering research agenda.