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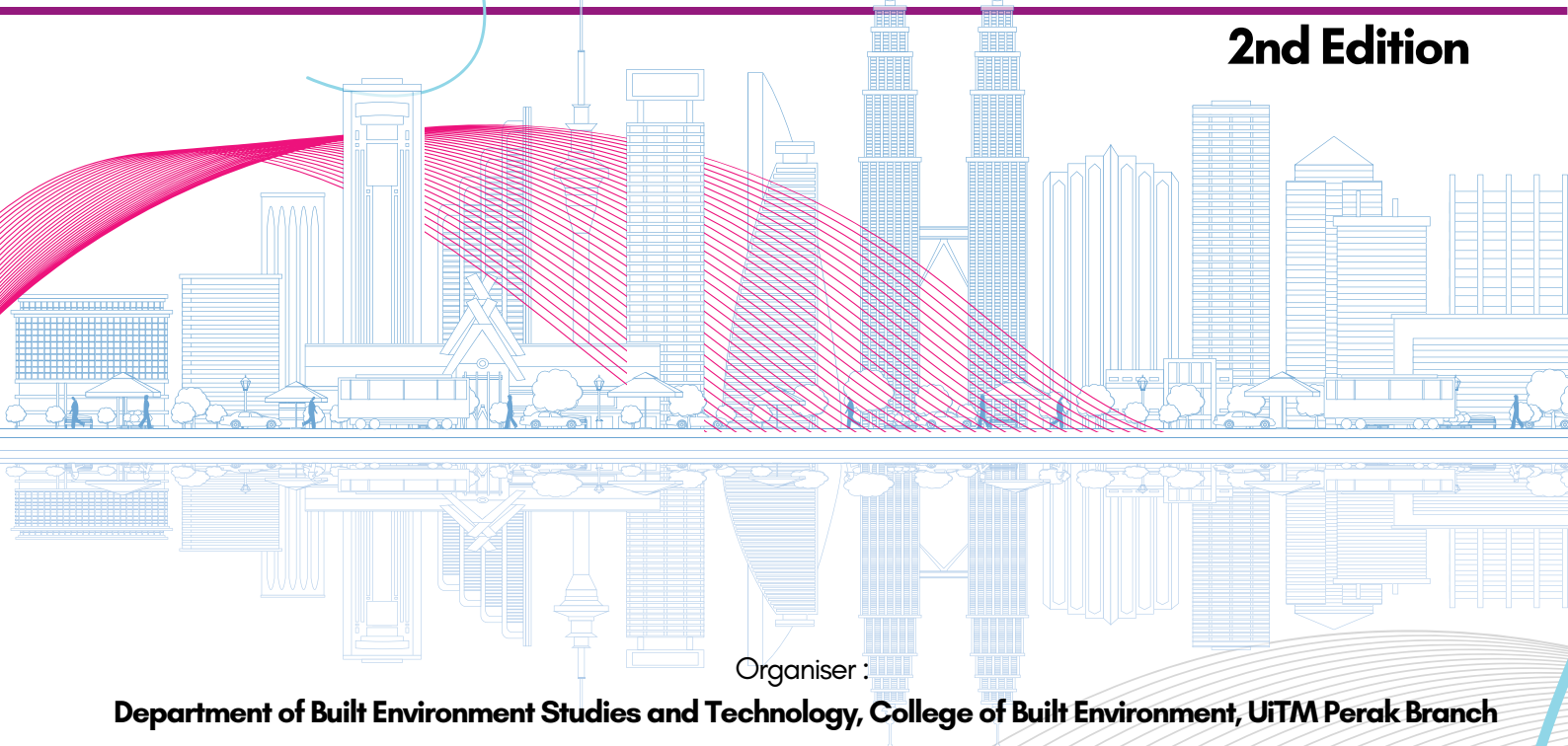
Cawangan Perak

e - Proceedings



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
"Undergraduates' Digital Engagement Towards Global Ingenuity"

2nd Edition



Organiser :

Department of Built Environment Studies and Technology, College of Built Environment, UiTM Perak Branch

Co-organiser :

INSPIRED 2024. Office of Research, Industrial Linkages, Community & Alumni (PJIMA), UiTM Perak Branch

Bauchemic (Malaysia) Sdn Bhd

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Publication date :

November 2024

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Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e- ISBN: 978-967-2776-42-0

Cover Design: Muhammad Anas Othman

Typesetting : Arial

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AUTONOMOUS WILDLIFE DETERRENT SYSTEM (AWDS)

Muhammad Afiq Muhammad Nazri^{1*}, Haekal Erfan Mohd Hazuhaini², Aina Shafiza Shaifful Azzwan³, Amylea Nadzirah Abd Hafidz⁴

^{1,2,3,4}Diploma in Building Technology, College of Built Environment, University Teknologi MARA Seri Iskandar, 32610, Bandar Baru Seri Iskandar, Perak Darul Ridzwan

*2023661366@student.uitm.edu.my

ABSTRACT

The Autonomous Wildlife Deterrent System (AWDS) is a cutting-edge solution developed by students from the College of Built Environment, Universiti Teknologi MARA, to address the escalating issue of human-wildlife conflicts. By leveraging advanced detection sensors, artificial intelligence (AI) algorithms, and automated deterrents, the AWDS aims to proactively prevent wildlife from encroaching into human-inhabited areas. This innovative system not only enhances safety for both humans and wildlife but also promotes harmonious coexistence by minimising conflict incidents. With features such as real-time monitoring, species identification, and environmentally sustainable power sources, the AWDS offers a comprehensive and effective approach to mitigating human-wildlife conflicts.

Keywords: *detection sensor, wildlife, sustainable*

1. INTRODUCTION

Human-wildlife conflicts have increased due to urban expansion into wildlife habitats, leading to safety risks and negative impacts on wildlife populations. Such conflicts can result in property damage, injury, and even loss of life for both humans and animals. Effective mitigation strategies are necessary to protect both humans and animals, fostering harmonious coexistence. The Autonomous Wildlife Deterrent System (AWDS) aims to address this issue by using advanced detection technologies, AI, and automated deterrents to prevent animals from entering human-populated areas.

2. MATERIALS AND METHODS

The AWDS is meticulously designed to operate seamlessly and effectively in diverse environmental contexts, drawing upon a comprehensive array of components and technologies. Advanced detection sensors, including motion and heat sensors, acoustic sensors, and camera traps, form the foundation of the system's surveillance capabilities, enabling real-time monitoring and analysis of wildlife presence and behaviour. Sensored data is processed by AI and machine learning algorithms to identify species, discern behavioural patterns, and predict potential conflict scenarios, thereby facilitating targeted and timely responses. Automated deterrents, such as ultrasonic emitters, strobe lights, and water sprayers, are strategically deployed to deter wildlife from approaching human settlements, minimising the likelihood of confrontations and damage. A centralised control system enables remote monitoring, management, and adjustment of AWDS operations, ensuring adaptability and responsiveness to evolving conditions. Moreover, the system's reliance on solar power and battery backup enhances its sustainability and resilience, enabling continuous operation even in off-grid or remote areas.

2.1 Detection Sensors

To accurately detect the presence of wildlife, the AWDS uses a combination of sensors

Table 2.1. Combination of Sensors

	<p>Motion and Heat Sensors</p> <p>These sensors are placed at strategic locations to detect the movement and body heat of animals. They are particularly effective at night and in low-visibility conditions.</p>
	<p>Acoustic Sensors</p> <p>Acoustic sensors are designed to pick up sounds characteristic of different wildlife species. These can include vocalisations, rustling in the vegetation, and footsteps.</p>
	<p>Camera Traps</p> <p>High-definition cameras equipped with night vision capabilities are installed to visually confirm the presence of animals. These camera traps provide images and video footage that are analysed by the AI system.</p>

2.2 AI and Machine Learning

The heart of the AWDS is its AI system, which processes data from the sensors. The data will be used for:

- Animal Identification: Using a database of wildlife images and sounds, the AI algorithm identifies the species detected by the sensors.
- Behavioural Analysis: Machine learning models analyse the patterns of detected animals' movements and behaviours, predicting their next moves to effectively deploy deterrents.

2.3 Automated Deterrents

Once an animal is detected and identified, the system activates one or more of the following deterrents:

Table 2.2. Automated Deterrents

	<p>Ultrasonic Emitters Emit sounds at frequencies that are unpleasant to certain animals, causing them to leave the area.</p>
	<p>Strobe Lights Bright, flashing lights startle nocturnal animals, discouraging them from approaching.</p>
	<p>Water Sprayers Water jets are used to physically deter animals. This method is particularly effective for animals that are sensitive to sudden sprays of water.</p>

2.3 Centralised Control System

The AWDS includes a centralised control system that allows for:

- i. **Real-Time Monitoring:** A dashboard provides continuous updates on wildlife detections and system status. This helps in monitoring the effectiveness of the deterrents and making necessary adjustments.
- ii. **Remote Control:** Wildlife managers can manually activate deterrents and adjust system settings via a mobile app or web interface.

2.4 Power Supply

The system is designed to be environmentally friendly by using solar panels and battery backup.

Table 2.3. Power Supply

	<p>Solar Panels Solar panels ensure that the AWDS operates on renewable energy.</p>
	<p>Battery Backup Batteries store energy to keep the system running during periods of low sunlight.</p>

2.5 Community Alerts

To keep residents informed and safe, the AWDS includes:

- Notification System: When wildlife is detected near human habitats, alerts are sent to residents via SMS, email, or a dedicated app.
- Safety Tips: Notifications include advice on how to avoid conflicts with wildlife and what to do in case of an encounter.

3. RESULTS AND DISCUSSIONS

The deployment of AWDS holds significant promise in mitigating human-wildlife conflicts and promoting harmonious coexistence between humans and wildlife. By proactively detecting and deterring wildlife from areas of human habitation, AWDS reduces the frequency and severity of conflict incidents, thereby enhancing safety for both humans and wildlife. Importantly, the system's non-lethal approach to wildlife management aligns with ethical and conservation principles, minimising harm while preserving biodiversity. Additionally, AWDS offers cost-effective, scalable, and environmentally sustainable solutions that can be tailored to meet the unique needs and challenges of diverse landscapes and communities. However, the successful implementation and acceptance of AWDS require careful consideration of factors such as system reliability, community engagement, and regulatory compliance, underscoring the importance of holistic planning and stakeholder collaboration.

4. CONCLUSION

To sum up, the Autonomous Wildlife Deterrent System (AWDS) is a game-changing invention in the field of mitigating human-wildlife conflict since it provides a proactive, compassionate, and long-term strategy for protecting human and wildlife populations.

With the use of cutting-edge sensors, artificial intelligence (AI) algorithms, and automated deterrents, AWDS has the potential to dramatically lower the number of conflict-related occurrences, improve safety, and encourage cooperation in shared environments. To maximise the efficacy, usability, and acceptance of AWDS and hence promote conservation efforts and better human-wildlife coexistence, further study, development, and implementation work are necessary.

5. REFERENCES

- Wildlife Conservation Society Malaysia (WCS Malaysia). (2022). Teknologi Pengesanan Hidupan Liar. *WCS Malaysia*. Retrieved from wildlifeconservation.my
- Rahman, A. (2021). AI dan Pembelajaran Mesin dalam Pemuliharaan Hidupan Liar. *Ulasan Pemuliharaan Alam Sekitar*. Retrieved from alamsekitar.org
- Ismail, N., & Tan, H. (2020). Penyelesaian Mampan untuk Konflik Manusia-Hidupan Liar. *Inovasi Hijau Malaysia*. Retrieved from inovasi.hijau.my

Surat kami : 700-KPK (PRP.UP.1/20/1)

Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak



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Sekian, terima kasih.

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SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

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