

Assignment 1: Innovation & Research AI-Powered Dog Breeding Management System

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BSc Applied Computing

**ACCA5033 –
Changemakers: Creativity
and Value Creation**

Introduction

01 July 2026 09:39

This project was inspired by my personal experience as a dog breeder. Through managing breeding records, health information, pedigrees, breeding schedules, and customer information, I recognised an opportunity to investigate how modern computing technologies could improve the efficiency of breeder management.

As an Applied Computing student, I wanted to combine my practical experience with my academic knowledge by exploring how artificial intelligence and digital technologies could support breeders through improved record management, automation, and decision-making. This project aims to investigate an innovative solution that addresses real-world challenges while promoting efficient and responsible breeding practices.

Task 1 – Ideation & Mind Map

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Innovation and Creativity in Dog Breeding Management

AI-Powered Dog Breeding Management System

Dog breeders have traditionally used manual records, paper files, and spreadsheets, relying heavily on personal experience [4]. While these approaches can work, they are time-consuming and prone to human error, which can negatively affect breeding outcomes [4]. Manual methods also make it difficult to systematically track health, lineage, and performance data, limiting evidence-based decisions. Recent research shows that digital tools improve accuracy, record-keeping, and animal welfare by enabling more informed decisions [7], [8]. As technology advances, breeders gain automated support and better management, improving practices overall.

Digital systems have clear benefits compared to older methods [4], [9]. They can keep health records, vaccination dates, breeding history, pedigree details, and financial information all in one place [4]. This makes it less likely you'll lose paperwork and makes it easier to find what you need. Digital tools also help breeders work faster and make better decisions by giving quick access to data.

A key advantage of a digital breeding management system is automation [4], [8]. Automated reminders help breeders keep track of vaccinations, vet visits, mating dates, and health checks, reducing the risk of missing important tasks. Scheduling tools also support better planning. However, breeders should regularly review system outputs to avoid missed procedures due to overreliance or technical errors. Oversight remains crucial to ensure animal welfare and proper breeding management.

Mind Map

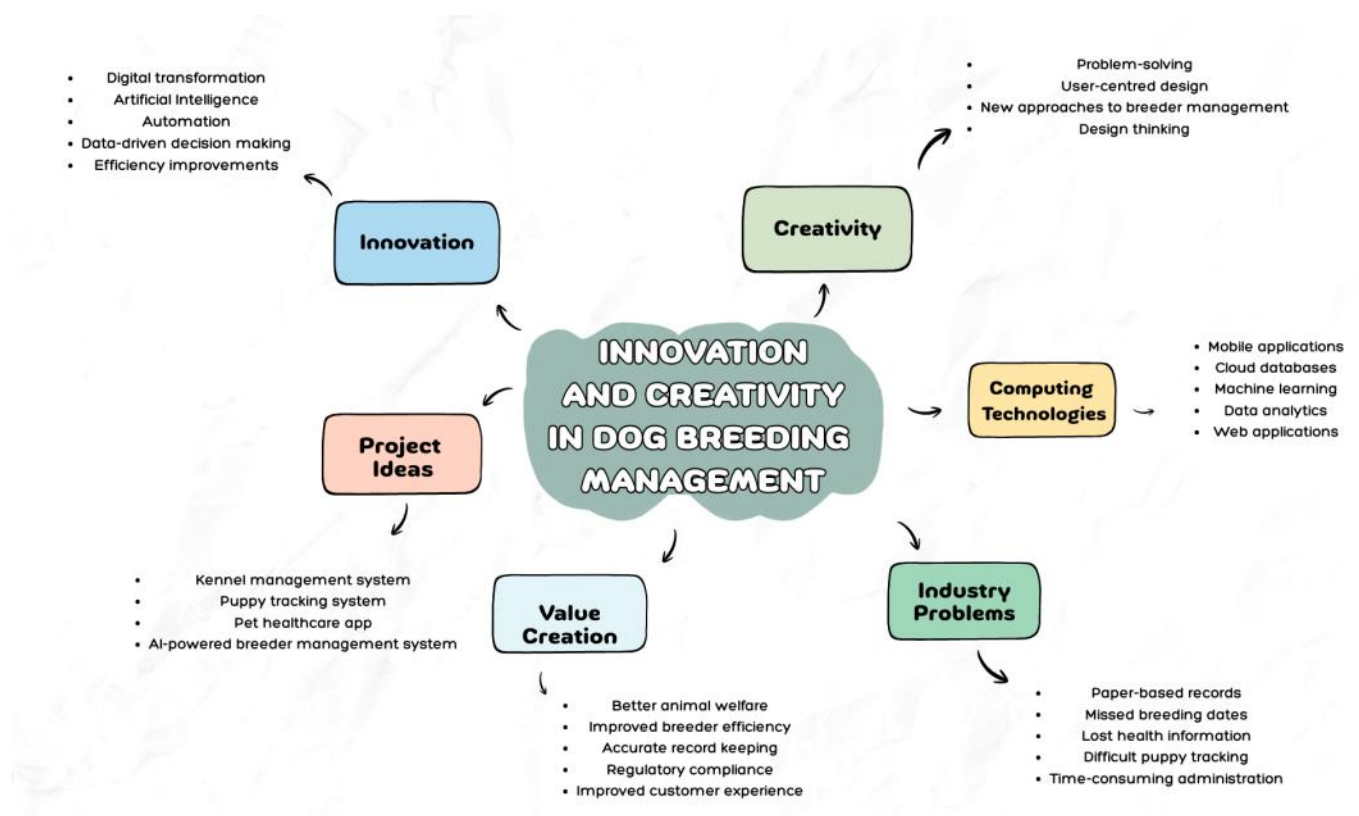


Figure 1: Mind map for Innovation and Creativity in Dog Breeding Management.

Idea

Scheduling tools help breeders plan breeding activities better by offering calendar planning and task management. With less admin work, breeders can spend more time caring for their dogs.

Artificial Intelligence (AI) can make these systems even more useful [5], [7]. AI is increasingly used to analyse large datasets and discover patterns that people might miss. For example, AI could review past breeding records to predict whelping dates, identify health trends, or suggest optimal breeding times. AI helps breeders make better decisions by turning data into actionable advice and improving efficiency.

AI-powered reminders and scheduling can also adapt to breeders' preferences [5], [8]. For instance, if a breeder books vet visits in advance, the AI could suggest optimal times and send reminders. Predictive tools can help breeders plan for new litters and manage resources more efficiently.

This project is particularly relevant for Applied Computing because it integrates key areas such as database design, web development, AI, and user experience [4], [5]. Developing an AI-powered dog breeding management system applies technical skills to a practical problem and demonstrates how new technology can make breeding more efficient and responsible.

This project aligns with the broader trend toward digital transformation and smart systems. As more organizations adopt AI, the ability to design and implement these tools is increasingly important for computing professionals. Developing a system that meets real industry needs demonstrates both technical expertise and practical problem-solving [4], [5].

Task 2 Research Aim, Objectives And Methodology

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Task 2 – Research Aim, Objectives and Methodology

AI-Powered Dog Breeding Management System

Aim -

The aim of this project is to investigate, design, and evaluate an AI-powered dog breeding management system that improves breeder record management, breeding planning, and animal welfare through the use of digital technologies. The proposed system will explore how artificial intelligence can assist breeders with managing breeding records, scheduling important events, and supporting informed decision-making.

Objectives

To achieve the overall aim, the following objectives have been identified:

1. Investigate current methods used by dog breeders to manage records and breeding information.
2. Review existing breeder management software solutions and identify their strengths and limitations.
3. Examine how artificial intelligence can improve breeder workflows through automation, reminders and predictive support.
4. Identify user requirements through primary and secondary research.
5. Design a prototype AI-powered dog breeding management system.
6. Evaluate the effectiveness and usability of the proposed solution against the identified requirements.

Research Philosophy

This project adopts a pragmatist research philosophy, focusing on practical solutions for real-world problems rather than abstract theory. Pragmatism is suitable here as the goal is to address dog breeders' challenges. However, it may overlook deeper theoretical issues or lack philosophical coherence due to its flexible approach.

Pragmatism supports both qualitative and quantitative data collection, such as interviews and surveys. This allows the use of methods best suited to the research question [1]. In contrast, interpretivism focuses on qualitative insights into breeder experiences, but may not address measurable outcomes or generalisability.

Pragmatism is widely used in computing research because it emphasizes practical outcomes and solutions for real-world environments. Setting clear user and system requirements early is especially important in AI-based projects, as it ensures the solution meets stakeholder needs and supports good design [1], [2], [6].

Research Databases

A comprehensive literature review will be conducted using reputable academic databases to ensure that the research is based on reliable and high-quality sources. The following databases will be used:

IEEE Xplore

IEEE Xplore provides access to research papers relating to artificial intelligence, software engineering, information systems, and digital technologies. It is a valuable source for identifying current developments in AI applications.

ACM Digital Library

The ACM Digital Library contains peer-reviewed computing research and is particularly useful for studies relating to system design, user experience, and software development methodologies.

Google Scholar

Google Scholar provides access to a broad range of academic publications from multiple disciplines. It will be used to identify relevant journal articles, conference papers, and citations.

ScienceDirect

ScienceDirect offers access to scientific and technological research journals, including studies relating to information systems, artificial intelligence, and animal welfare technologies.

SpringerLink

SpringerLink contains scholarly books, journals, and conference proceedings covering computing, machine learning, and digital innovation.

Search Keywords

The following keywords will be used when conducting literature searches:

- Dog breeding management systems
- Artificial intelligence in animal management
- Digital record-keeping systems
- Animal welfare technology
- Breeder software applications
- AI scheduling systems
- Predictive analytics in animal care
- Livestock and breeding management software

These keywords may be modified throughout the research process as new themes emerge from the literature.

Search Strategy

A structured search strategy will be implemented to ensure relevant literature is identified efficiently.

Boolean operators will be used to refine search results. The operator AND will combine related concepts, for example “Artificial Intelligence AND Animal Management”. The operator OR will broaden searches by including alternative terms such as “Dog Breeding OR Breeder Management”. The operator NOT will exclude irrelevant topics where necessary.

To ensure the research reflects current technological developments, publication dates will be filtered to prioritise recent studies, typically those published within the

last five years. Preference will be given to peer-reviewed journal articles and conference papers because they have undergone academic quality assurance processes.

Unreliable sources like unverified websites, blogs, and non academic publications will be excluded to maintain academic rigor and avoid bias. Focusing on reputable, peer-reviewed sources ensures credible and evidence-based results [1], [2].

Task 3 – Research Strategies

Validity

Validity is about whether the research measures what it's supposed to. For this project, validity will be improved by making sure all survey questions directly address breeder experiences and are linked to the main objectives.

A pilot study will be conducted before the main data collection phase. This will help identify any ambiguous or misleading questions and ensure participants interpret questions consistently. Feedback from pilot participants will be used to revise and improve the questionnaire. Additionally, questions will be reviewed carefully to ensure they are clear, concise, and relevant to the research aims [1], [2].

Reliability

Reliability means getting consistent results if the study is repeated. To improve reliability, all participants will get the same standard questionnaire in the same order.

The data collection process will also remain consistent throughout the study. Surveys will be distributed using the same online platform, and responses will be recorded and analysed using the same procedures. Maintaining a structured and repeatable approach will increase the reliability of the findings [1].

Generalisability

Generalisability is about applying findings to a wider group. Responses will be gathered from breeders with different experience levels to get a broader view of requirements and challenges.

Comparing responses from different breeder types will help ensure the system meets the needs of the wider breeding community, even with a small sample size [1], [2].

Ethical Considerations

Ethics is an important aspect of any research involving human participants. All participants will be provided with information about the purpose of the study and their involvement before completing the questionnaire. Informed consent will be obtained prior to data collection.

Confidentiality and anonymity will be maintained. Personal details will only be collected if necessary, and any identifying information will be removed. The research will comply with GDPR by storing data securely and using it only for academic purposes [2], [3]. Participants can withdraw their data at any time before analysis.

Data Collection Methods

Primary Research

Primary research will be conducted through an online questionnaire distributed to dog breeders and individuals involved in breeding activities. This method allows data to be collected efficiently from multiple participants and provides insight into current record-keeping methods, challenges, and attitudes towards AI-powered solutions [1], [2].

Secondary Research

Secondary research will be carried out using academic journals, textbooks, conference papers, and industry reports. Sources from databases such as IEEE Xplore, ACM Digital Library, Google Scholar, ScienceDirect, and SpringerLink will be used to investigate existing breeder management systems, artificial intelligence applications, and digital record-keeping technologies [4], [5], [9], [10].

Pilot Questionnaire

A pilot questionnaire will be created and included in Appendix A.

Example questions include:

1. How do you currently manage breeding records?
2. What challenges do you experience when managing breeding information?
3. Do you currently use any breeder management software?
4. How useful would automated reminders be?
5. Which features would be most valuable in a breeding management system?
6. How often do you update breeding records?
7. Would AI-generated recommendations improve your workflow?
8. Would you consider using a dedicated breeder management application?

Pilot Feedback

A small pilot study will be conducted with 2–3 participants before the final survey is distributed. Feedback may highlight areas where improvements are required.

Feedback Received	Improvement Made
Questions unclear	Simplify wording and provide examples
Too many questions	Reduce survey length and remove repetition
More feature examples needed	Add descriptions of potential AI features

This feedback process helps improve the quality of the questionnaire by increasing clarity, reducing participant fatigue, and ensuring questions are relevant to the target audience [1], [2].

Data Analysis

Quantitative Analysis

Quantitative analysis will be used for closed-ended survey questions. Data will be analysed using frequencies, percentages, and mean scores. Charts such as bar and pie charts will be used to visually present findings [1], [2]. For example, percentages may show how many breeders currently use digital record systems, while mean scores can measure attitudes towards AI-powered features.

Qualitative Analysis

Qualitative analysis will be applied to open-ended responses. A thematic analysis approach will be used to identify common ideas and recurring patterns. Responses will be coded into categories such as record-keeping challenges, desired features, issues with technology, and expectations of AI support. This method allows a greater understanding of breeder experiences and helps identify requirements for the

proposed system [1], [2].

Using both quantitative and qualitative analyses supports evidence-based system design and develops important skills like data interpretation and critical thinking. These skills help computing professionals address real-world challenges and adapt to new technologies [4], [5], [8].

Conclusion

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In my project I have explored how an AI-powered dog breeding management system could improve the way breeders manage records, breeding schedules, and important health information. By reviewing existing research and selecting appropriate research methods, the project has identified how artificial intelligence can support better organisation, decision-making, and efficiency within dog breeding.

The research has also shown the importance of understanding user requirements and following ethical research practices when developing new technology. Overall, this project provides a strong foundation for designing a practical system that could benefit breeders and improve day-to-day management while supporting responsible breeding practices.

Appendix A – Pilot Questionnaire

AI-Powered Dog Breeding Management System Survey

1. How do you currently manage breeding records?
 - Paper records
 - Spreadsheet
 - Breeding software
 - Other
2. How often do you update breeding records?
 - Daily
 - Weekly
 - Monthly
 - Only when required
3. What challenges do you experience when managing breeding information?
4. Do you currently use any breeder management software?
 - Yes
 - No
5. How useful would automated reminders be for vaccinations, mating dates and health checks?
 - Very useful
 - Useful
 - Neutral
 - Not useful
6. Which features would be most valuable in a breeding management system?
 - Health records
 - Vaccination reminders
 - Financial tracking
 - AI recommendations
 - Pedigree management
7. Would AI-generated recommendations improve your workflow?
 - Yes
 - No
 - Unsure
8. Would you consider using a dedicated breeder management application?
 - Yes
 - No
 - Maybe
9. What concerns would you have about using AI in breeding management?
10. Are there any additional features you would like to see included?

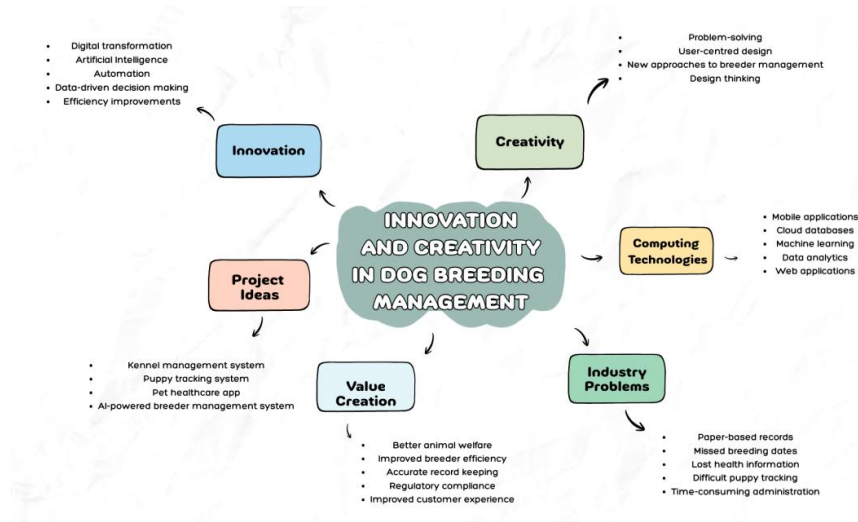
Appendix B – Pilot Feedback

A pilot questionnaire was distributed to three participants involved in dog breeding activities.

<u>Feedback Received</u>	<u>Improvement Made</u>
Some questions were unclear	Simplified wording and added examples
Survey appeared too long	Removed duplicate questions
More examples of AI features were needed	Added examples such as health alerts and breeding predictions
Questions about software experience needed clarification	Added additional explanation
Some participants wanted more feature options	Expanded feature list

The pilot study improved the clarity and usability of the questionnaire before the main survey was distributed.

Appendix C – Mind Map Screenshot



Appendix D – Literature Search Notes

Search Databases

- IEEE Xplore
- ACM Digital Library
- Google Scholar
- ScienceDirect
- SpringerLink

Example Search Terms

- "AI dog breeding management"
- "Animal welfare technology"
- "Breeding record systems"
- "Artificial intelligence scheduling"
- "Digital transformation animal management"

Inclusion Criteria

- Peer-reviewed sources
- Published within the last five years
- Relevant to AI, databases, management systems and animal welfare

Exclusion Criteria

- Blogs
- Opinion articles
- Unverified websites
- Non-academic sources

Figure 2 : SUMMERISED PROJECT POSTER

The poster is my own branding and own photo's of my own personal dogs.



AI-POWERED DOG BREEDING MANAGEMENT SYSTEM

INNOVATION & RESEARCH PROJECT

BSc Applied Computing – ACCA5033
Louis Shortland (Student ID: 2433889)



INTRODUCTION

This project was inspired by my personal experience as a dog breeder. Managing breeding records, health information, pedigrees, breeding schedules, and customer information can be time-consuming and prone to error when using manual or disconnected systems.

As an Applied Computing student, I aim to combine my practical knowledge with academic skills to investigate how AI and digital technologies can improve breeder management through automation, smart scheduling, and better decision-making.



PROJECT AIM & OBJECTIVES

AIM:
To investigate, design and evaluate an AI-powered dog breeding management system that improves breeder record management, breeding planning, and animal welfare using digital technologies.

OBJECTIVES:

- 1 Investigate current methods used by dog breeders to manage records.
- 2 Review existing breeder management software and identify strengths and limitations.
- 3 Examine how AI can improve workflows through automation and predictive support.
- 4 Identify user requirements through primary and secondary research.
- 5 Design a prototype AI-powered dog breeding management system.
- 6 Evaluate the effectiveness and usability of the proposed solution.



WHY THIS PROJECT MATTERS

-  Centralised records for health, vaccinations, pedigrees, breeding history and finances.
-  Automated reminders for key tasks like vaccinations, vet visits and mating dates.
-  AI-powered predictions to support breeding planning and identify health trends.
-  Better organisation, less admin work and more time to focus on dogs and breeding.
-  Supports animal welfare and promotes responsible breeding practices.



MIND MAP (INNOVATION & CREATIVITY)

Innovation

- Digital transformation
- AI integration
- Automation
- Data-driven decisions
- Efficiency improvements

Creativity

- Problem-solving
- User-centred design
- New approaches to breeder management
- Design thinking

**INNOVATION
AND CREATIVITY IN
DOG BREEDING
MANAGEMENT**

Project Ideas

- Kennel management system
- Puppy tracking system
- Pet healthcare app
- AI-powered breeder management system

Value Creation

- Better animal welfare
- Improved breeder efficiency
- Accurate record keeping
- Regulatory compliance
- Improved customer experience

Computing Technologies

- Mobile applications
- Cloud databases
- Machine learning
- Data analytics
- Web applications

Industry Problems

- Paper-based records
- Missed breeding dates
- Lost health information
- Difficult puppy tracking
- Time-consuming admin

Research Philosophy

Pragmatism

Focus on practical solutions for real-world problems using both qualitative and quantitative methods.

Approach

Mixed Methods

Combines surveys, interviews, literature review and prototype development.

Primary Research

- Online survey (breeders)
- Interviews
- Pilot study

Focus on user needs, challenges and preferences.

Secondary Research

Academic papers, industry reports, articles and existing system analysis.



KEY FINDINGS & EXPECTED OUTCOMES

- ✓ Breeders need a simple, all-in-one system to manage records and tasks.
- ✓ Automation and reminders can reduce missed tasks and improve organisation.
- ✓ AI can provide useful predictions and insights to support better decisions.
- ✓ Current software options have useful features but can be complex or expensive.
- ✓ A user-friendly, AI-powered system can improve efficiency and animal welfare.



ETHICAL CONSIDERATIONS

- ✓ Informed consent obtained from all participants
- ✓ Data kept confidential and used for research only
- ✓ Anonymity ensured in surveys and interviews
- ✓ Compliance with data protection regulations (GDPR)
- ✓ Focus on animal welfare and responsible breeding



PROJECT IMPACT

- Helps breeders save time and reduce administration.
- Supports better breeding decisions through data and AI.
- Promotes responsible breeding and animal welfare.
- Demonstrates how technology can solve real-world problems.





**BETTER SYSTEMS.
BETTER DECISIONS.
BETTER OUTCOMES
FOR DOGS.**

CONCLUSION

This project shows the potential of an AI-powered dog breeding management system to improve record management, automate tasks and support breeders with smart, data-driven insights. The research provides a strong foundation for future development and real-world application.



@BIGSMOKEBULLYZ



References

24 June 2026 11:15

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