

# **Generative Artificially Intelligent Pet**

## **MINOR PROJECT II**

Submitted by:

**ADITYA KURELE (9920103071)**

**KOKIL GUPTA(9920103076)**

**HARDIK RAINA(9920103079)**

Under the guidance of:

**MS ANURADHA SUROLIA**



**Department of CSE/IT**

**Jaypee Institute of Information Technology University, Noida**

**FEB 2023**

# Table of Contents

<b>Table of Contents</b>	<b>1</b>
<b>PROBLEM STATEMENT</b>	<b>2</b>
<b>MOTIVATION</b>	<b>2</b>
<b>OBJECTIVE AND SCOPE</b>	<b>2</b>
<b>METHODOLOGY</b>	<b>3</b>
<b>Hardware and Software Requirements</b>	<b>4</b>
Hardware:	4
Software:	4
<b>Contributions the Project will be able to make</b>	<b>5</b>
<b>Related Works</b>	<b>6</b>

## PROBLEM STATEMENT

The problem that AI pet aims to address is the lack of personalization and interactivity in current virtual companion technologies. The goal is to create an AI-powered pet that can adapt and evolve over time, providing a more engaging and personalized experience for its users. The challenge lies in developing a system that can effectively combine multiple advanced machine learning techniques, including GANs, CNNs, adaptive learning, and online learning, to deliver a virtual companion that is truly unique and engaging

## MOTIVATION

The motivation for using this AI pet project is to address the need for a more personalized and engaging virtual companion experience. By using advanced machine learning techniques such as GANs, CNNs, adaptive learning, and online learning, the AI pet will be able to provide a unique and evolving experience for its users, unlike any other virtual companion currently available.

Additionally, the AI pet has the potential to provide numerous benefits for its users, such as:

- Providing comfort and companionship to those who may be lonely or isolated
- Offering a safe and controlled environment for children to learn and play
- Allowing individuals to interact with a virtual companion in a way that feels more natural and personalized
- Providing a platform for individuals to express their creativity and imagination through customization and interaction with their AI pet
- Improving emotional intelligence and empathy skills through interactions with the AI pet.

Overall, the AI pet project has the potential to greatly enhance the virtual companion experience and provide numerous benefits for its users.

## OBJECTIVE AND SCOPE

The AI pet will be a virtual companion that combines advanced machine learning techniques to deliver an interactive, personalized experience for its users. Using a Generative Adversarial Network (GAN), the AI pet can generate new, unique images that reflect its evolving personality.

The AI pet will also use Convolutional Neural Networks (CNNs) to analyze images and recognize patterns, which will help it learn and adapt to its environment and interact with its owner. This will be further enhanced by the use of adaptive learning algorithms, which will allow the AI pet to adapt its behaviour and preferences based on its experiences over time.

# METHODOLOGY

The AI pet will also be able to continuously improve itself through online learning, which will allow it to learn from a vast array of data sources and grow and evolve as technology advances. This will allow the AI pet to deliver an ever-evolving and engaging experience for its owners.

The methodology for developing the AI pet will involve the following steps:

1. **Data Collection:** Collect a large dataset of images of Chibi art-style pets and behaviour patterns of real-life pets to be used as training data for the AI pet.
2. **Generative Adversarial Network (GAN) Development:** Train a GAN to generate new, unique images that reflect the AI pet's evolving personality.
3. **Convolutional Neural Network (CNN) Development:** Train a CNN to analyze images and recognize patterns, which will help the AI pet learn and interact with its environment and owner.
4. **Adaptive Learning Algorithm Implementation:** Incorporate adaptive learning algorithms to allow the AI pet to adapt its behaviour and preferences based on its experiences over time.
5. **Online Learning Integration:** Implement online learning algorithms to allow the AI pet to continuously improve and evolve over time, learning from a vast array of data sources.
6. **User Interface Development:** Develop a user-friendly interface for users to interact with their AI pet, including customization and control options.
7. **Testing and Evaluation:** Thoroughly test and evaluate the AI pet's performance and user experience, making any necessary improvements or modifications.

The combination of these steps will result in the development of an AI pet capable of delivering a personalised, interactive, and evolving virtual companion experience for its users.

# Hardware and Software Requirements

The hardware and software requirements for the AI pet will depend on the specific implementation, but typically the following is needed:

## Hardware:

- High-Performance CPU (Central Processing Unit)
- GPU (Graphics Processing Unit) with high memory and computation capabilities for training deep learning models.
- Enough storage space to store large datasets and models.
- A device with a user interface for users to interact with their AI pet.

## Software:

- A deep learning framework such as TensorFlow or PyTorch for training and implementing the GAN and CNN models.
- Programming languages such as Python for development and implementation.
- Tools for data processing and analysis such as NumPy and Pandas.
- Tools for visualization and debugging such as TensorBoard and Matplotlib.

## Contributions the Project will be able to make

The AI pet project has the potential to make several significant contributions in the fields of artificial intelligence and human-computer interaction, including:

1. **Advancing Personalized Virtual Companions:** The AI pet will be an engaging virtual companion combining multiple advanced machine learning techniques to deliver a unique and personalized experience.
2. **Improving Interactivity:** The AI pet will provide a more natural and engaging experience for its users, allowing for a greater degree of interaction and personalization.
3. **Advancing Adaptive Learning:** The AI pet's use of adaptive learning algorithms will help to demonstrate its potential in creating more personalized and engaging AI systems.
4. **Online Learning:** The AI pet's ability to continuously learn and evolve through online learning will demonstrate the potential for AI systems to grow and improve over time.
5. **Improving Emotional Intelligence:** The AI pet's interactions with its users have the potential to improve emotional intelligence and empathy skills, making a positive impact on individuals and society.

In summary, the AI pet project has the potential to make significant contributions in the fields of artificial intelligence and human-computer interaction, delivering a unique and engaging virtual companion experience for its users.

## Related Works

- S. Bussa, A. Mani, S. Bharuka, and S. Kaushik, "Smart Attendance System using OpenCV based on Facial Recognition," International Journal of Engineering Research & Technology (IJERT), vol. 9, no. 3, Mar. 2020.
- X. Liu, Y. Ge, C. Yang, and P. Jia, "Adaptive Metric Learning with Deep Neural Networks for Video-Based Facial Expression Recognition," Journal of Electronic Imaging, vol. 27, no. 1, pp. 013022, 2018. [Online]. Available: <https://doi.org/10.1117/1.JEI.27.1.013022>
- G. I. Parisi, R. Kemker, J. L. Part, C. Kanan, and S. Wermter, "Continual Lifelong Learning with Neural Networks: A Review," Neural Networks, vol. 113, pp. 54-71, 2019. [Online]. Available: <https://doi.org/10.1016/j.neunet.2019.01.012>
- H. Shin, J. K. Lee, J. Kim, and J. Kim, "Continual Learning with Deep Generative Replay," arXiv, 2017. [Online]. Available: <https://doi.org/10.48550/arxiv.1705.08690>
- A. Radford, L. Metz, and S. Chintala, "Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks," arXiv, 2015. [Online]. Available: <https://doi.org/10.48550/arxiv.1511.06434>