# Multi-Layer Neural Network for Image Classification

**Project Name**: DeepCatClassifier

**Overview:**

The "DeepCatClassifier" project aimed to enhance image classification performance by implementing a multi-layer neural network. Using the "Cat vs non-Cat" dataset, the project compared the performance of a two-layer neural network against a deeper five-layer model.

**Implementation:**

The project began with a two-layer neural network (LINEAR->RELU->LINEAR->SIGMOID), achieving a notable improvement over the baseline logistic regression model. The accuracy rose from 72% to a perfect 100% on the training set. Subsequently, a more complex five-layer model was implemented, showcasing a further accuracy improvement to 84% on the test set.

**Dataset:**

The dataset consisted of 209 training images and 50 test images, each of size (64, 64, 3) representing RGB channels. The models were trained to classify images as either a cat (1) or a non-cat (0).

**Key Results:**

**Two-layer Neural Network**:

* Training Accuracy: 100%
* Test Accuracy: 72%

**Five-layer Neural Network:**

* Training Accuracy: 100%
* Test Accuracy: 84%

**Technical Details:**

**Libraries Used**: NumPy, Matplotlib, PIL, Scipy

**Techniques**: Deep Learning, Neural Network Implementation, Gradient Descent

**Parameters: Learning rate**=0.0075, 2500 iterations

**Conclusion:**

The "DeepCatClassifier" project successfully demonstrated the effectiveness of multi-layer neural networks in image classification. The iterative development process and comparative analysis highlighted the impact of increasing model complexity, providing valuable insights into deep learning techniques for image recognition tasks.