USN NUMBER: 1RVU22BSC110
NAME: YASHWANT RAJ

Ex No: 3 Date: 21-08-2024	Deep Neural Network for Image Classification: Application

Objective:

To build a logistic regression classifier to recognize cat vs. non-cat images using Gradi ent Descent implementation.

Descriptions:

Binary classification is the task of classifying elements of a given set into two groups. Logistic regression is an algorithm for binary classification. The input is an image xxx, and the output is a label to recognize the image. The label 1 indicates that a cat is in the image, while 0 indicates that a non-cat object is in the image.

Logistic regression is a supervised learning algorithm that can be used when labels are either 0 or 1, making it suitable for binary classification problems. An input feature vector XXX may correspond to an image that we want to recognize as either a cat (1) or a non-cat (0). The goal is to have an algorithm that outputs a prediction, which is an estimate of yyy. Logistic Regression does not include a hidden layer. If weights are initialized to zero, the first example xxx fed into the logistic regression will output zero. However, the derivatives of the Logistic Regression depend on the input xxx, so at the second iteration, the weight values follow xxx's distribution and are different from each other, assuming xxx is not a constant vector.

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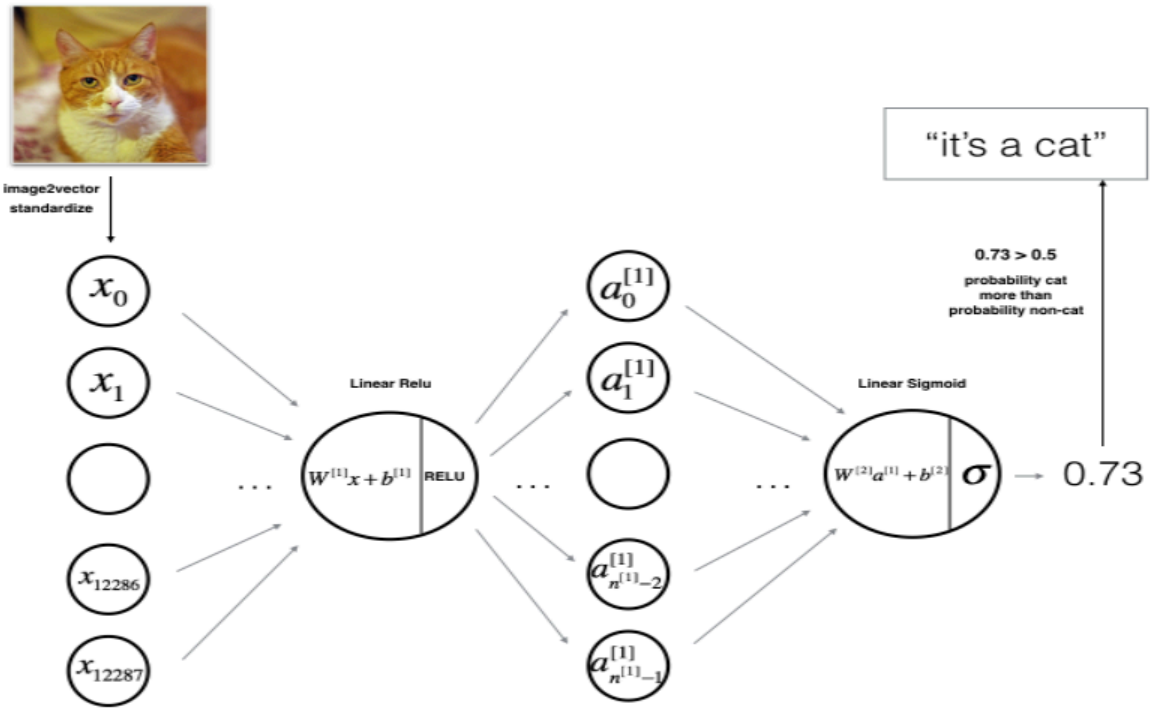
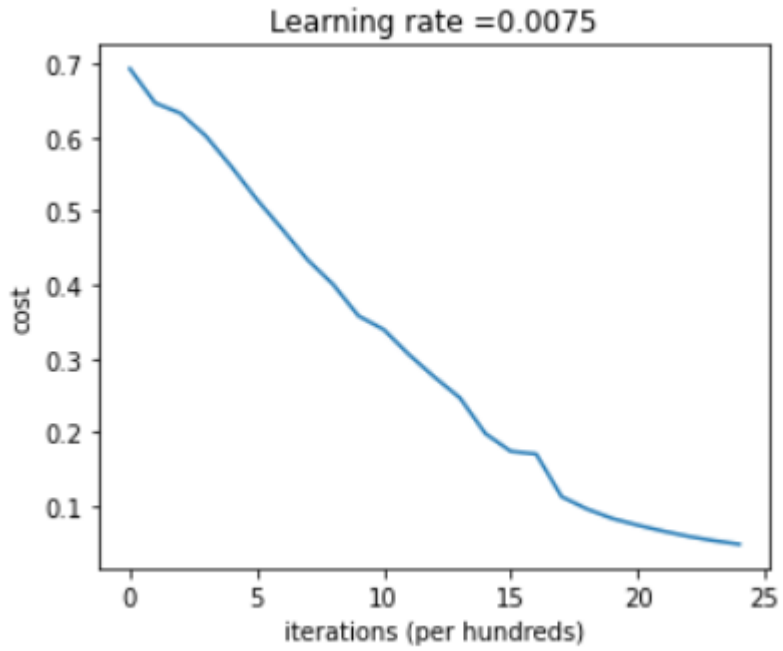


Figure 2: 2-layer neural network.

Model: 2-layer neural network



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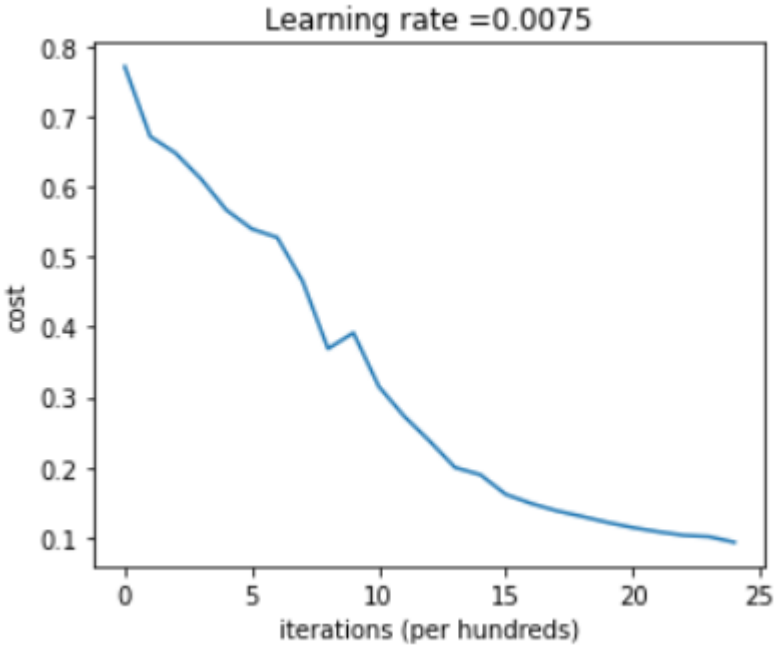
Model: l-layer neural network



The main steps for building a Neural Network are:

1. **Define the model structure (such as the number of input features).**
2. **Initialize the model's parameters.**
3. **Loop:**
    - **Calculate current loss (forward propagation).**
    - **Calculate current gradient (backward propagation).**
    - **Update parameters (gradient descent).**

GitHub Link: