

CS-584 Machine Learning Project

Phase-1

Oct 1, 2022

Project Title

Classification of Doremon Cartoon Characters From a Custom Image Data Set Using a CNN Model

Team Members

S.no	Name	A number
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Description

The goal of this project is to implement a character recognition algorithm on a hand-collected and hand-labeled data set of cartoon character images from the cartoon, Doremon. Our project is inspired by other projects that categorize cartoon characters by image recognition, such as [one](#) for the Tom and Jerry cartoon. We will implement our categorization model with a convolutional neural network. If time permits, we will compare this approach with other approaches in the literature and compare the relative performance of the techniques.

Reason for choosing Dataset

There are many pre-trained models available for real-life human face detection, including HaarCascade. However, while conducting a pre-survey we observed comments from Kaggle users, claiming that cartoon images can be more difficult to classify. We started looking for cartoon datasets and came across hand-collected and hand-labeled data sets of images from the cartoon, Tom and Jerry - [Dataset1](#), [Dataset2](#).

Inspired by the idea of using a cartoon data set for image recognition, we started searching for Doremon Datasets on Kaggle. At the time of writing this initial report, there are no Doremon-related datasets available on Kaggle. Thus, we are planning to create our own dataset of Doremon cartoons by prioritizing the characters of Doremon, Nobita, and Shizuka.

Context

Doraemon (Japanese: ドラえもん) is a fictional character in the Japanese manga and anime series. He is a male robotic earless cat that travels back in time from the 22nd century to aid a pre-teen boy named Nobita. [More about Doremon.](#)

Data Preparation

We are planning to collect **Images** at a rate of 1 Frame per second (1FPS) from sample videos listed on **Youtube** using OpenCV.

Then, we are planning to label some of the images (training data) according to two categories.

- Name of the Character
 1. Doremon
 2. Nobita
 3. Shizuka
- Emotion of the Character
 1. Angry
 2. Happy
 3. Sad
 4. Surprised

Project Scope

- Detect the **presence** of the Character in any given image (test data).
- Detect the **emotion** of the Character in any given image (test data).

Challenges

Since all the images are manually created and labeled, we are expecting some challenges in the area of distorted size, pixels, etc. We would like to take this as a challenge and record the debugging notes for future purposes such as improving the model score.

Model Selection

We are planning to use CNN with ReLU activation and Softmax because CNN's built-in convolution layer reduces the high dimensionality of images without losing information. Moreover, there is ample opportunity to conduct experiments on a number of hidden layers and hyper-parameters so as to improve model accuracy.

Preliminary Plan

Activity	Responsibility	Oct				Nov			
		Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Creating the data	Santosh								
Data labeling	Rupesh								
Creating the model	Harrison, Santosh, Rupesh								
Training the model	Harrison, Santosh, Rupesh								
Testing	Harrison								
Model enhancement	Harrison, Santosh, Rupesh								
Bonus implementations (if any)	Harrison, Santosh, Rupesh								

References

- [CNN for Image classification](#)
- [A Comparison Between Support Vector Machine \(SVM\) and Convolutional Neural Network \(CNN\) Models For Hyperspectral Image Classifi](#)
- [Fine-tuning CNN for model for image classification.](#)
- [Increasing accuracy of CNN](#)
- [Improved Image Classification Algorithm based on CNN.](#)