

# Comparison of Multiclass Kernel Support Vector Machines and Neural Networks for Image Classification

Kernel-based Machine Learning and Multivariate Modeling - project

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December 21, 2016

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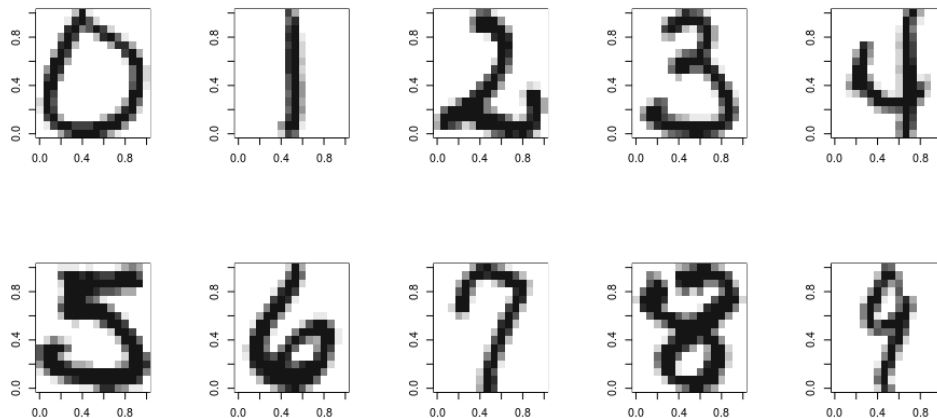


Figure 1: Example images of the 10 classes of the ZIP dataset.

## 1 Introduction

### 1.1 Task

### 1.2 Datasets

#### 1.2.1 ZIP

#### 1.2.2 MNIST

#### 1.2.3 CIFAR10

## 2 Neural Networks

### 2.1 architectures

All the network architectures are inspired by [LeCun et al., 1998].

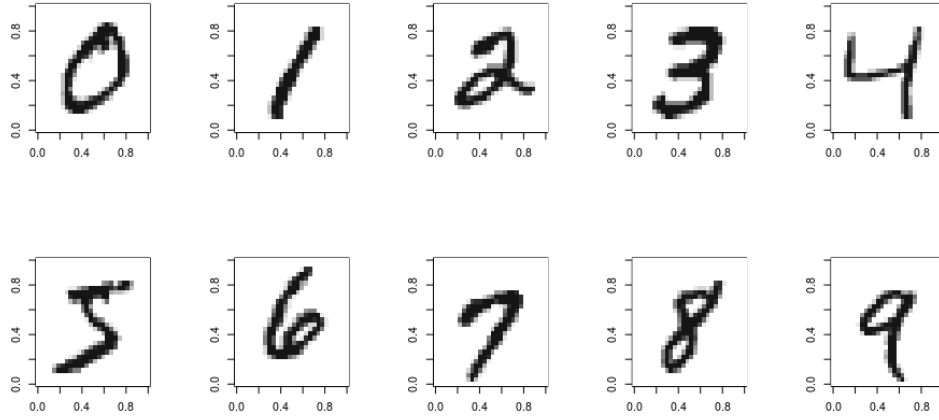


Figure 2: Example images of the 10 classes of the MNIST dataset.

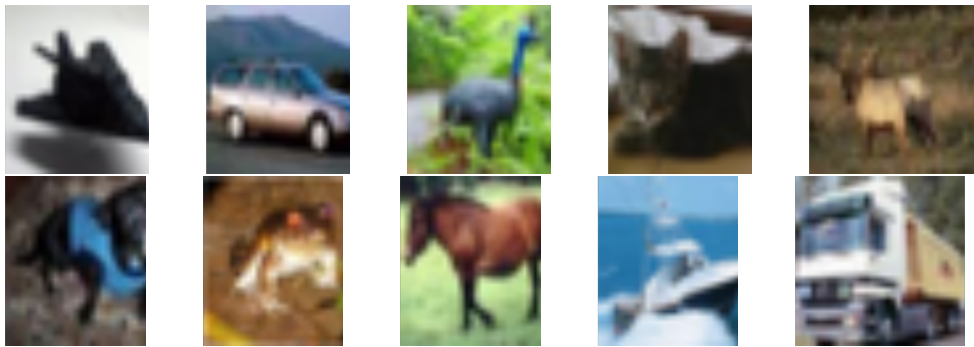
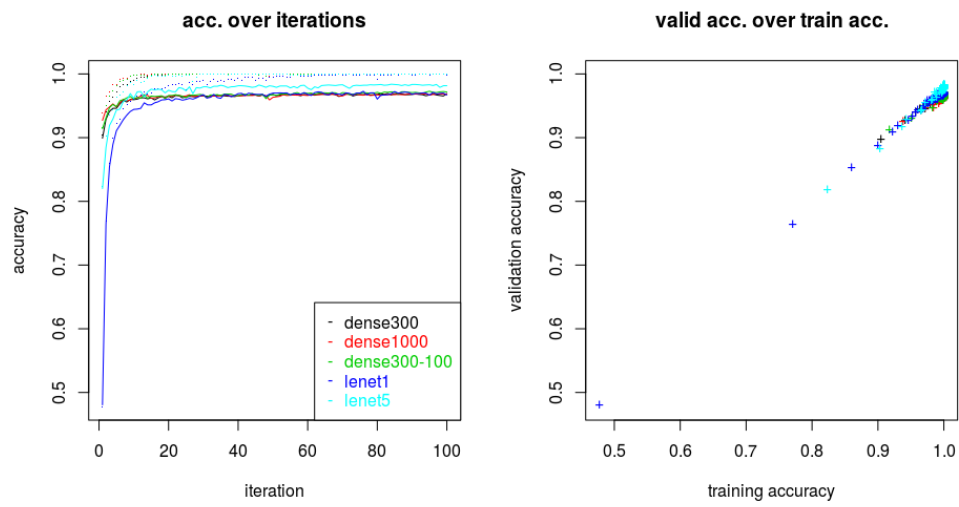


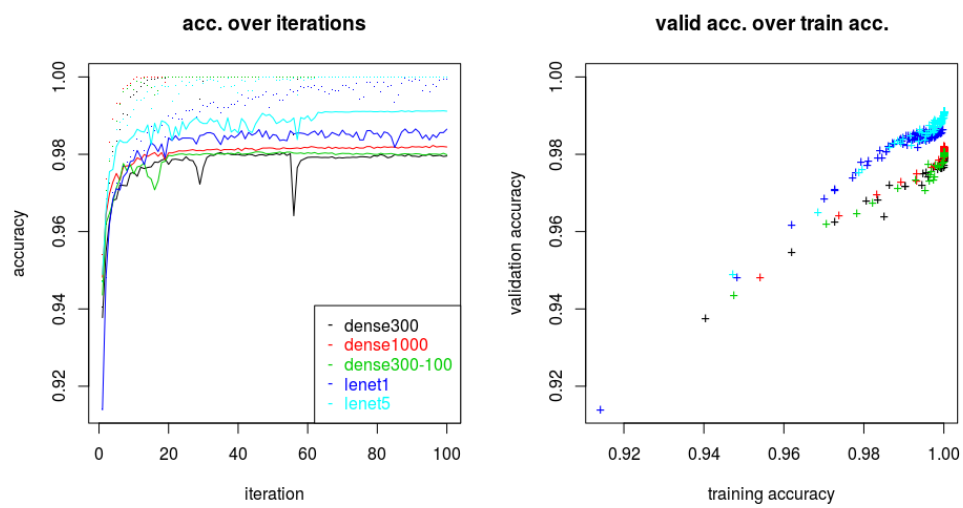
Figure 3: Example images for the 10 classes of the CIFAR10 dataset.

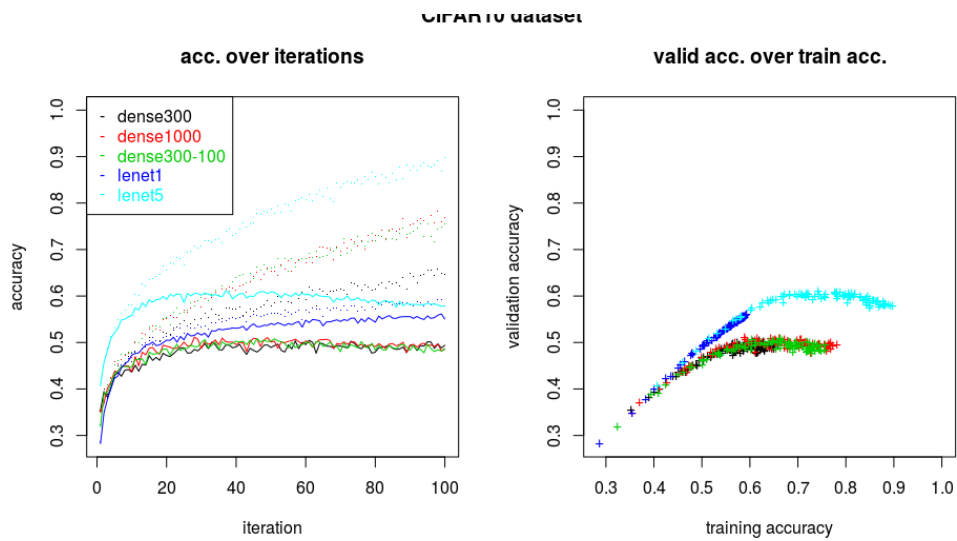
## 2.2 results

**ZIP dataset**



**MNIST dataset**





## 2.3 state of the art

# 3 Multiclass Kernel SVMs

## 3.1 Multiclass SVM strategies

## 3.2 Parameter optimization

## 3.3 Results

# 4 Conclusions

## 4.1 Difficulties of the datasets

## 4.2 Comparison of Neural Networks and SVMs

# 5 Application

## 5.1 Description

## 5.2 Manual

# References

[LeCun et al., 1998] Y. LeCun, L. Bottou, Y. Bengio, P. Haffner, *Gradient-Based Learning Applied to Document Recognition*, Proc. of the IEEE, November 1998.