

**The Experiment Report of**

***Machine Learning***

**College Software College**

**Subject Software Engineering**

**Members**

**Student ID 201530613719**

**E-mail g2369969039@gmail.com**

**Tutor**   **Mingkui Tan**

**Date submitted** **2017.12.03**

**1. Topic:**

LinearRegression& Linear Classification & Gradient Descent

**2. Time:**

2017.12.2 AM 9:00-12:00

**3. Reporter:**

Ziwei Zhang

**4. Purposes:**

* Train a linear regression model to predict house price.
* Train a linear classifier model to classify

**5. Data sets and data analysis:**

**6. Experimental steps:**

* Load and preprocess data
* Implement Linear regression/classification loss function
* Perform gradient check using numerical gradient
* Compare the performation of naive implementation and vertorized implementation of gradient computing.
* Perform Gradient Descent to train a model and visualize the result
* Perform cross-validation to tune hyperparameter

**7. Code:**

(Fill in the contents of 8-12 respectively for linear regression and linear classification)

**8. Selection of validation (hold-out, cross-validation, k-folds cross-validation, etc.):**

hold-out

**9. The initialization method of model parameters:**

Zero initialization.

**10. The selected loss function and its derivatives:**

Linear Regression:

Linear Classification:

**11. Experimental results and curve:**

## Linear Regression:

## Hyper-parameter selection (η, epoch, etc.):

## λ =

## lr =

## epoch =

## Assessment Results (based on selected validation):

## Predicted Results (Best Results):

## Loss curve:

## Linear Classifier:

## Hyper-parameter selection (η, epoch, etc.):

## Assessment Results (based on selected validation):

## Predicted Results (Best Results):

## Loss curve:

**12. Results analysis:**

This two methods perform well on Houing dataset and Australian dataset seperatively.

Linear regression model reaches almost its best result after 25 iterations, while the linear classification model reaches almost its best result after 100 iterations.

**13. Similarities and differences between linear regression and linear classification:**

**14. Summary:**