Project Final Report

Air Quality Prediction In Beijing

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Content

- Introduction
- Model
- Result
- Analysis

Introduction

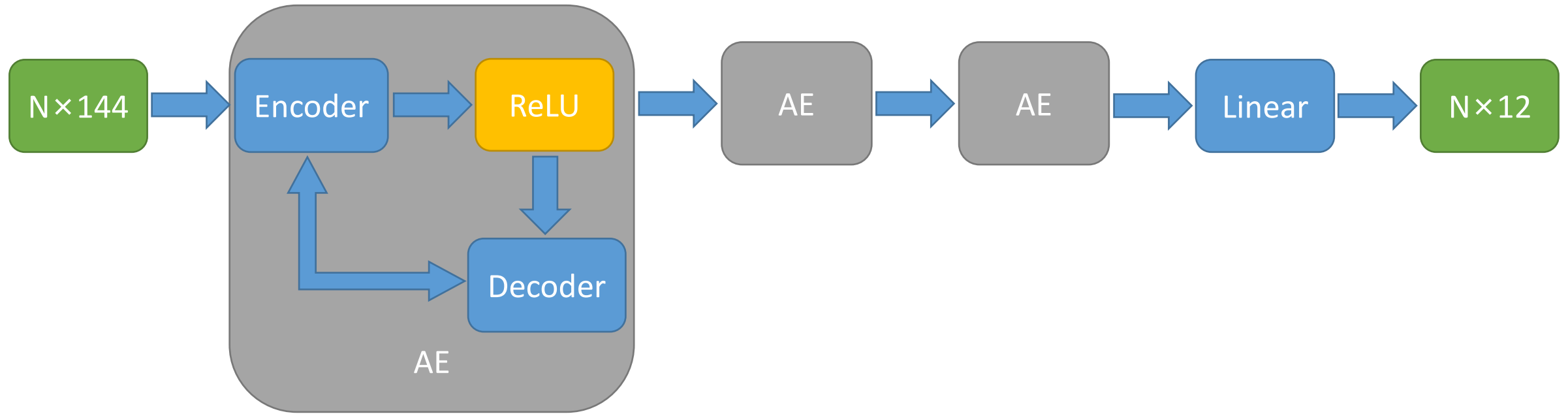- 1. serious environmental issue
- 2.purpose

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- Result
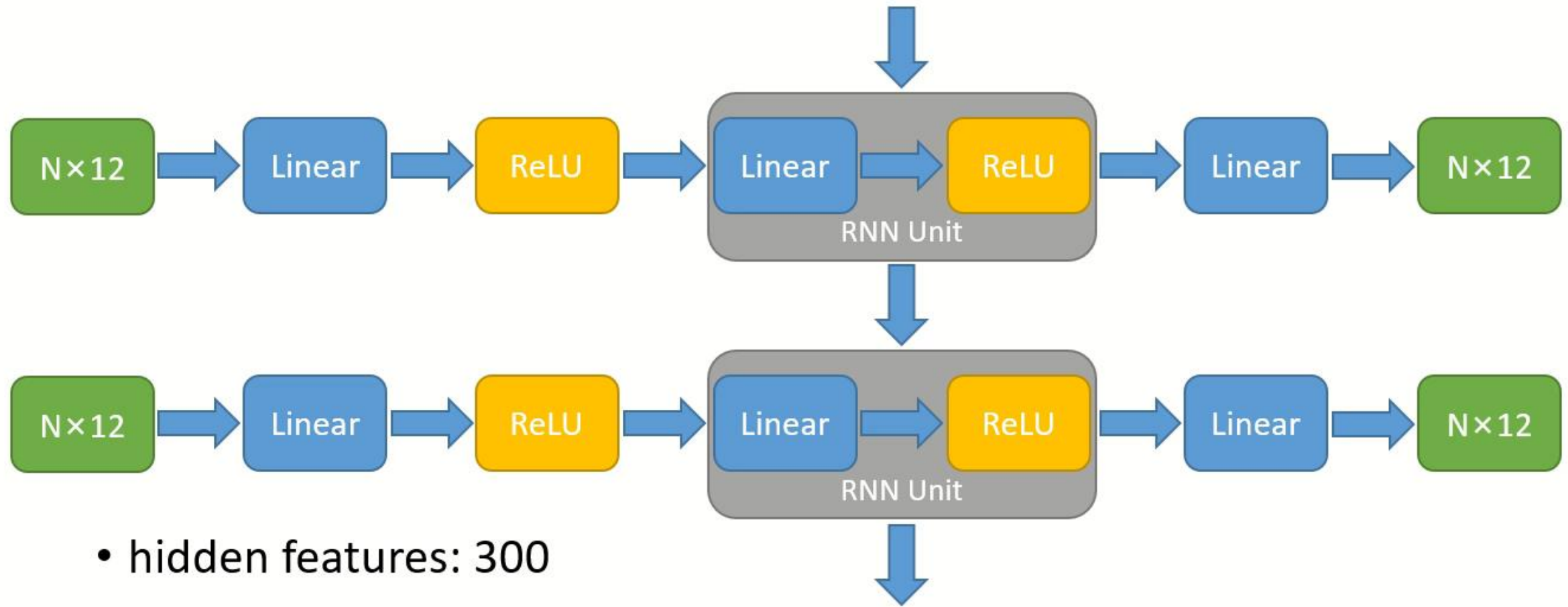- Analysis

MLP (MultiLayer Perceptron)

N×144 → Linear → ReLU → Linear → ReLU → Linear → N×12

- 12 stations, 12 previous values
- hidden features: 300

SAE (Stacked AutoEncoder)

RNN (Recursive Neural Network)
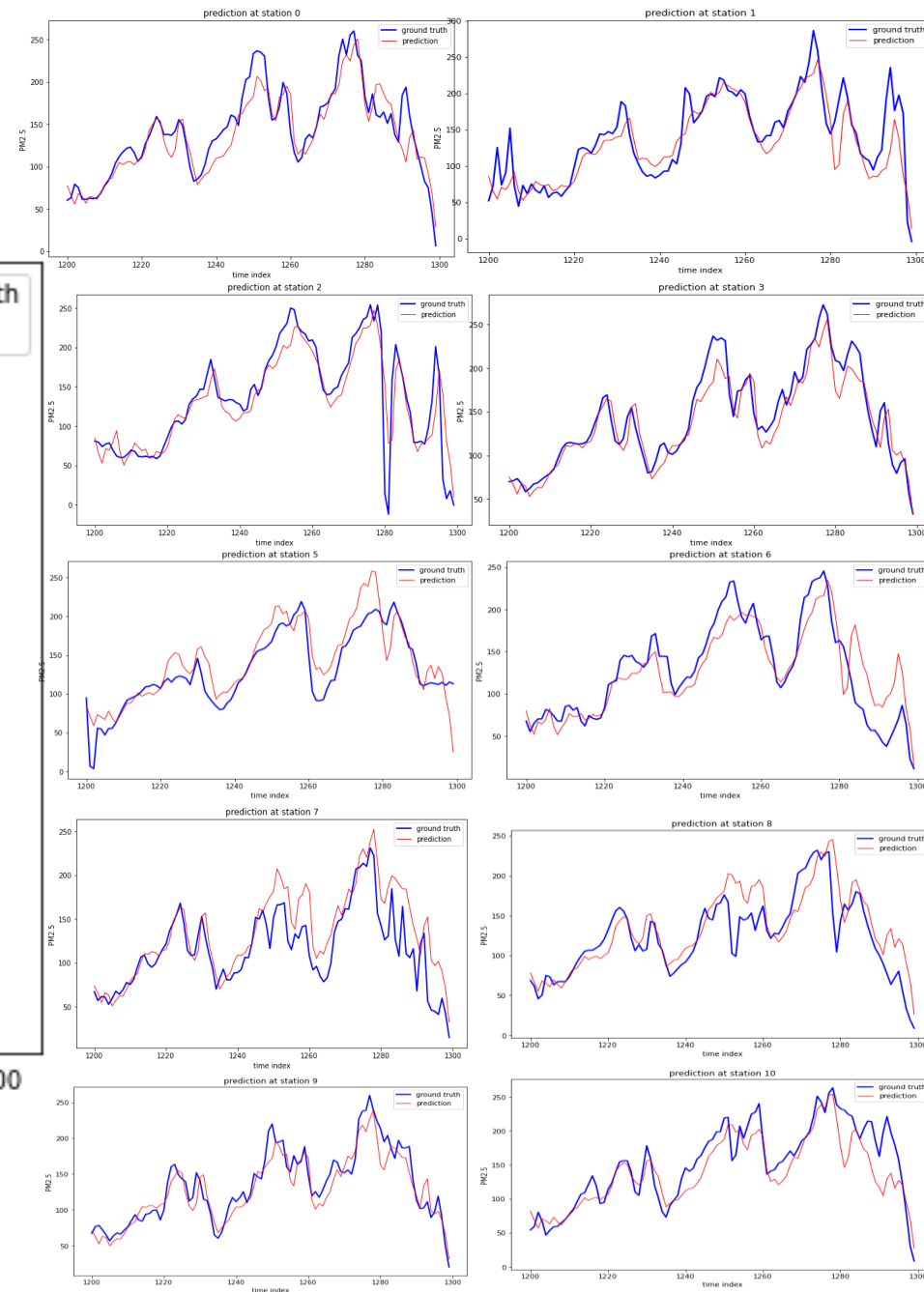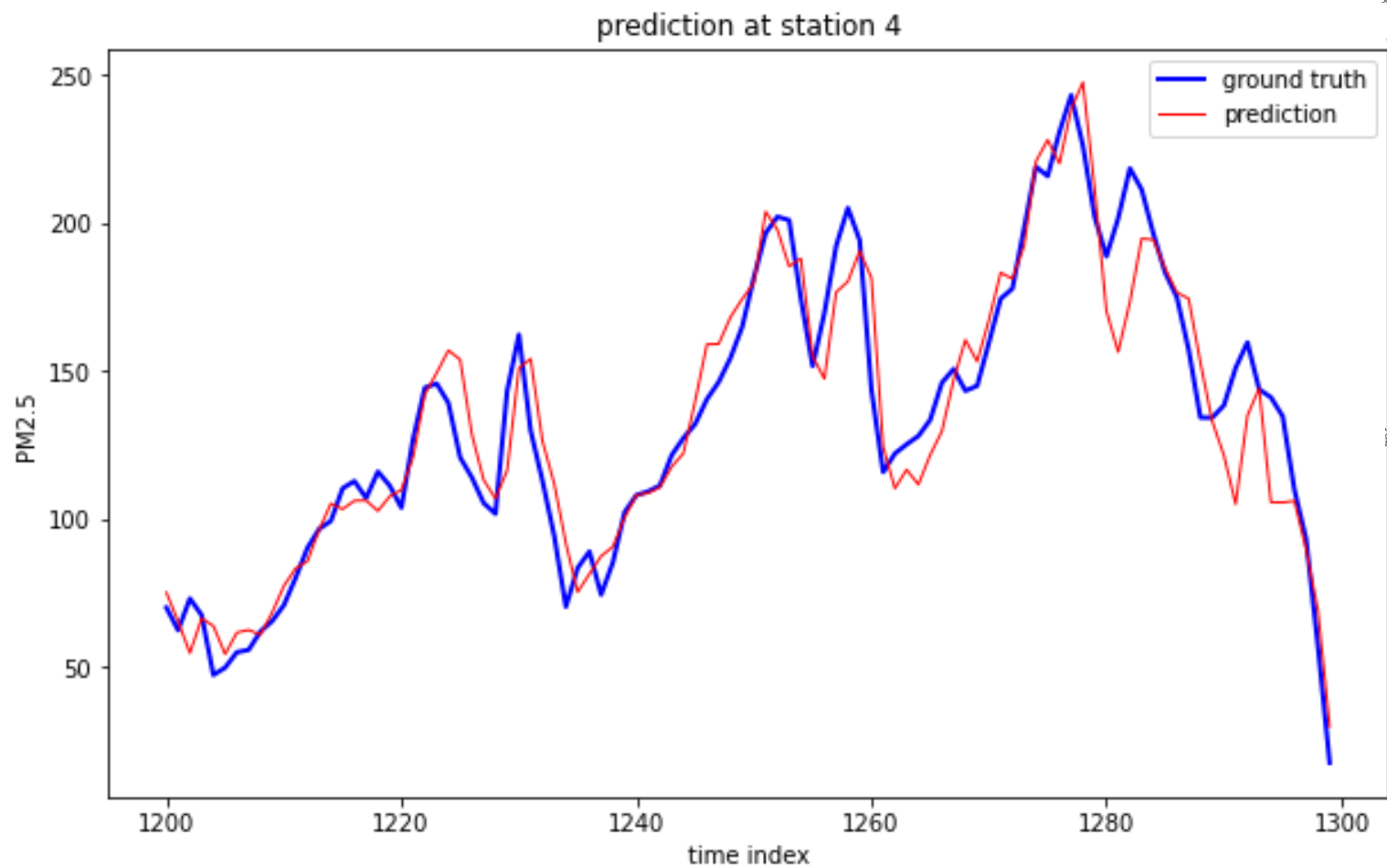

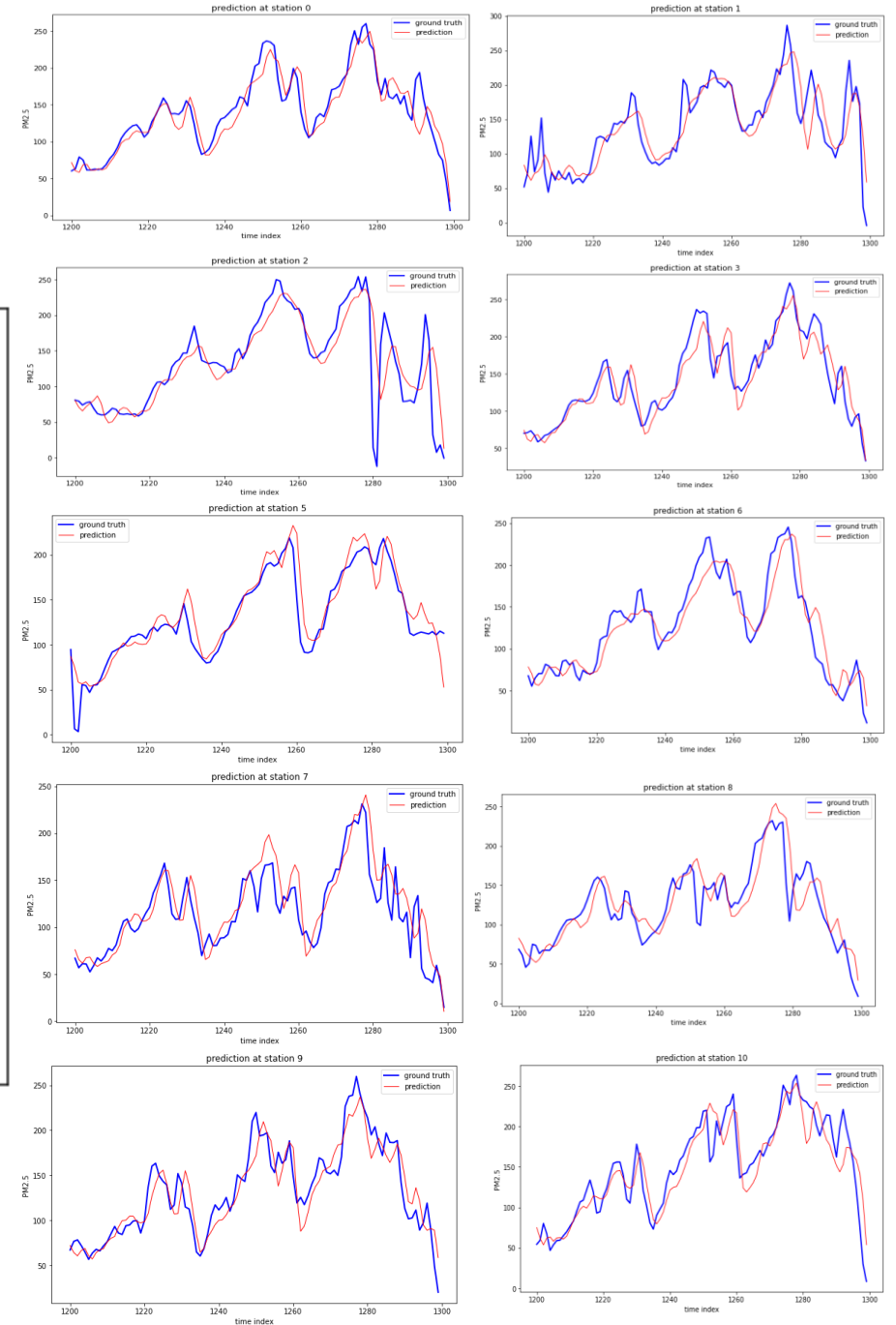- hidden features: 300

Dataset Preprocessing

- Low-pass filter for labels

Content

- Introduction
- Model mlp(baseline), ae, rnn
- Result mlp3 ae123, rnn
- Analysis

MLP3 Result(3 layer)

prediction at station 4

AE3 Result(300 nodes,3 layer)

prediction at station 4
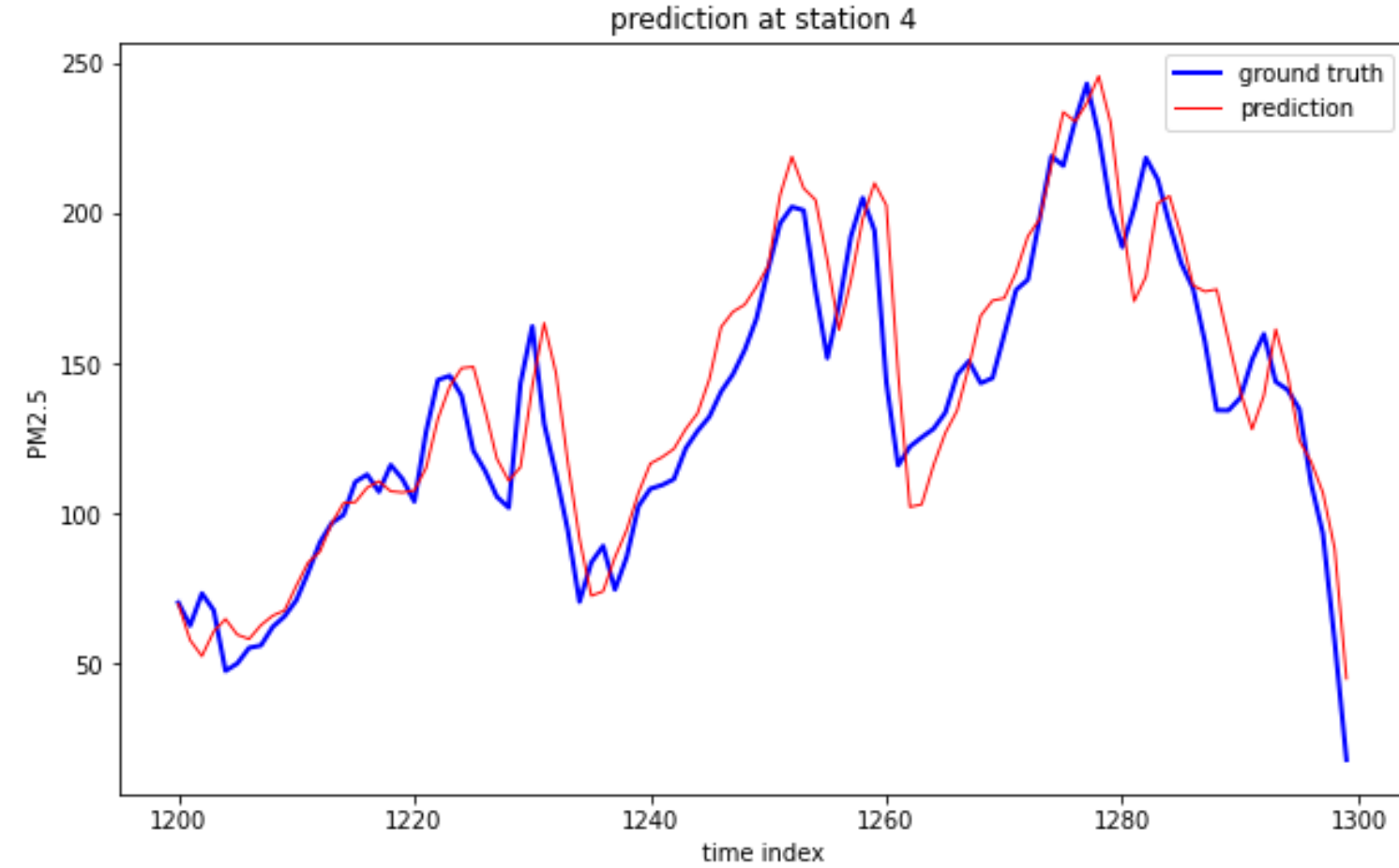
RNN Result

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Analysis

- MLP

MAPE of MLP for training 5 times

Traning times	1	2	3	4	5	average
MAPE	0.2472666	0.2441851	0.2421005	0.2403310	0.2893148	0.2535527

Analysis

- SAE3 Changing Nodes

MAPE of SAE3 for training 5 times

1. 300 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2665027	0.2741183	0.2604889	0.2685385	0.2505041	0.2708702

2. 250nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2559525	0.2571105	0.2871117	0.2717582	0.2666005	0.2706508

3. 200nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2629837	0.2534252	0.2789939	0.2885658	0.2759980	0.2774927

Analysis

- SAE3

MAPE of SAE3 for training 5 times

1. 500 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2746275	0.2772443	0.2518765	0.2955956	0.2798632	0.2817809

2. 400 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2945111	0.2531681	0.2871117	0.2543463	0.2728238	0.2714286

3. 350 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2992366	0.2791446	0.2450891	0.2878846	0.2864657	0.2764869

Analysis

- SAE3 Changing Learning Rate

MAPE of SAE3 for training 5 times

1. 500 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2746275	0.2772443	0.2518765	0.2955956	0.2798632	0.2817809

2. 400 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2945111	0.2531681	0.2871117	0.2543463	0.2728238	0.2714286

3. 350 nodes:

Traning times	1	2	3	4	5	average
MAPE	0.2992366	0.2791446	0.2450891	0.2878846	0.2864657	0.2764869