

Development of a traffic analysis system based on neural networks.

Performed by a student of the IKTY-68
group

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СПб ГУТ)))

- **The purpose of this work: developing an intelligent system for analyzing and further predicting traffic**
- **Relevance: as a result of the work, we get an intelligent system that can predict the number of connections according to the trained data.**

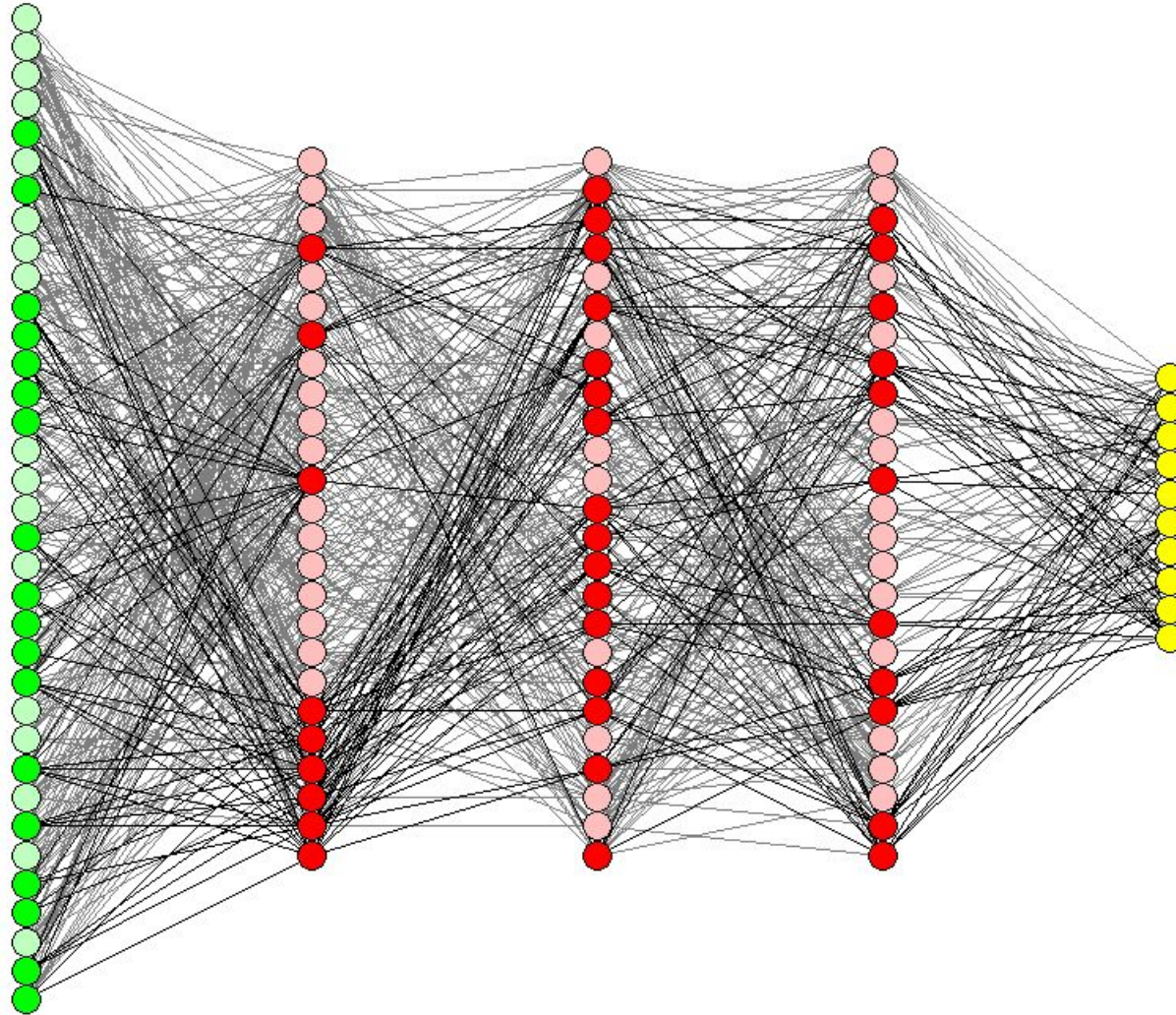
Main tasks:

- **Creating and implementing a system based on neural networks**
- **Conducting experiments**
- **Analysis of the obtained data**

The subject of research is the analysis of network traffic

The object of research is a neural network system for analyzing and predicting traffic

Neural network



Original data

```
2014-09-23 10:11:25,f7e51a539efbd93bc438ac4f9012ee493a576361,Bldg11AP21
2014-09-23 10:11:25,b84c89810c8c99845c7df1b837fa6130a42ad0a1,Bldg39AP1
2014-09-23 10:11:25,27f9d2253294b9bc2c6fcba9f744325e6c2ffc9,Bldg3AP35
2014-09-23 10:11:25,72361410984824e73520c428a6fcf5c8a99b4824,Bldg8AP23
```

Tuesday 23 September 2014 at 10 hours 11 minutes and 25 seconds several connections were recorded:

- клиент:f7e51a539efbd93bc438ac4f9012ee493a576361
подключился к станции Bldg11AP21
- клиент:b84c89810c8c99845c7df1b837fa6130a42ad0a1
подключился к станции Bldg39AP1
- клиент:27f9d2253294b9bc2c6fcba9f744325e6c2ffc9
подключился к станции Bldg3AP35
- клиент:72361410984824e73520c428a6fcf5c8a99b4824
подключился к станции Bldg8AP23

```
# загрузить в список тестовый набор данных
train_data_file = open("training.csv", 'r')
train_data_list = train_data_file.readlines()
train_data_file.close()
```

```
# загрузка тест набора
test_data_file = open("test.csv", 'r')
test_data_list = test_data_file.readlines()
test_data_file.close()
```

RESULTS

| № эпохи | Эксперимент 1 $\sum (t - x)$ | Эксперимент 2 $\sum (t - x)^2$ | Эксперимент 3 $\sum \arctg^2(t - x)$ |
|---------|---------------------------------|-----------------------------------|---|
| 1 | 0,0996 | 0,9397 | 0,9167 |
| 2 | 0,0993 | 0,9573 | 0,9397 |
| 3 | 0,0992 | 0,9682 | 0,9521 |
| 4 | 0,0992 | 0,9702 | 0,9628 |
| 5 | 0,099 | 0,9729 | 0,9655 |
| 6 | 0,0998 | 0,9751 | 0,9679 |
| 7 | 0,0994 | 0,9753 | 0,9697 |
| 8 | 0,0998 | 0,9769 | 0,9711 |
| 9 | 0,0995 | 0,9771 | 0,9725 |
| 10 | 0,0999 | 0,9784 | 0,9741 |
| 11 | 0,0999 | 0,9795 | 0,9752 |
| 12 | 0,1001 | 0,9797 | 0,9754 |
| 13 | 0,1 | 0,9801 | 0,9759 |
| 14 | 0,1001 | 0,9801 | 0,9763 |
| 15 | 0,1 | 0,9804 | 0,9763 |
| 16 | 0,1002 | 0,9808 | 0,9767 |
| 17 | 0,1003 | 0,981 | 0,9768 |
| 18 | 0,1005 | 0,9816 | 0,9768 |
| 19 | 0,1005 | 0,9813 | 0,9769 |
| 20 | 0,1007 | 0,9819 | 0,9771 |
| 21 | 0,1006 | 0,9817 | 0,9771 |



```
C:\Anaconda3\envs\test\python.exe
which day? wed
holiday? yes
which BS? Bldg26AP13

will be about 516
```

Bldg26AP13

Результатов: 1 из 505

2014-08-13 00:19:57,193925d8475777c1fb15235df093fa2d3b3f5fa8,Bldg26AP13

2014-08-13 22:06:37,5ece9b2a813872d42d73f7ce12490f7f284f7042,Bldg26AP13

Conclusion

- The work carried out includes a system that can predict the network load.
- The intelligent system aims to assist in predicting network load.
- The experiments of learning efficiency of this model, which showed that the best choice of method as a function of an error, a method called the method of least squares, namely the sum (for each node in the output layer) of the squared difference between the target and actual values of output nodes in the output layer.

Thank you for your attention!