T.C
ÜSKÜDAR
ÜNİVERSİTESİ

COME 402
Artificial Neural Networks (ANNs)

By
Dr. Öğr. Üye. Rowanda D. Ahmed

March 2023

Course Syllabus

Üsküdar University
Faculty of Engineering
Department of Computer Engineering

COME402
Artificial Neural Networks (ANNs)

Instructor	**: Rowanda AHMED, Ph.D. Computer Engineering**
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Course Syllabus

Prerequisite : Basic Programming (Python recommended)

Course Syllabus

Grading System	
Midterm Exam (f2f)	40%
Homeworks	20%
Project	40%
(Optional) Scientific Trip(s) Right after midterms exams.	[1 -10] Bouns for Participations.
The grading System can be changed during the semester.	

Office Hours:

Open-door policy, by appointment or as posted.

Textbooks:

For a not-too-mathematical introduction, try

1- *Fausett L., Fundamentals of Neural Networks, Prentice-Hall, 1994. ISBN 0 13 042250 9*

2- *Gurney K., An Introduction to Neural Networks, UCL Press, 1997, ISBN 1 85728 503 4*

3- *Haykin S., Neural Networks , 2nd Edition, Prentice Hall, 1999, ISBN 0 13 273350 1* is a more detailed book, with excellent coverage of the whole subject.

Attendance:

%70 is a must. (After Midterms, most sessions will be via zoom, you can attend at least your slot of time to present your Project progress).

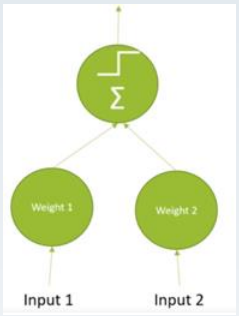
Contents

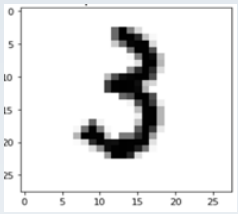
- Introduction to Neural Networks, & The History of Artificial Neural Networks (ANN).
- Single Layer Perceptrons.
- Gradient Descent and Delta Rule.
- Multi-Layer Perceptrons(MLP).
- AND GATE Perceptron Training Rule.
- Supervised, Unsupervised & Reinforcement Learning.
- Back Propagation Algorithm ANN.
- Activation Functions.
- Optimization Functions.
- Overfitting.
- Introducing TensorFlow (~~Handwriting Recognition~~).
- Introducing Keras (Image Classification).
- Convolutional Neural Networks (CNN) (~~Example~~).
- Recurrent Neural Networks (RNN) (~~Sentiment Analysis~~).

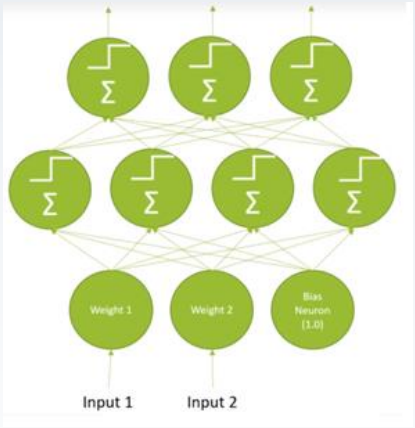
Honor Guests,

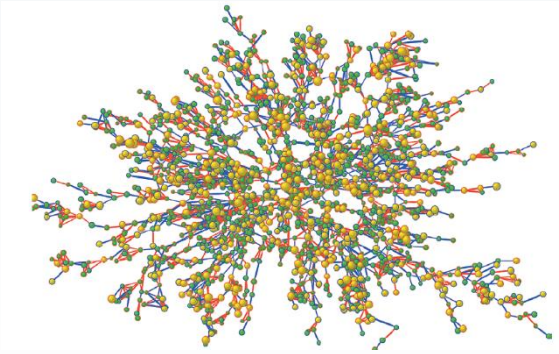
Dr. Aslihan DEMIRKAYA (USA)
Eng. Ahmed Al KASIM (Türkiye)
Eng. Nurbek JURAEV (Türkiye)
Eng. Nikoo ASTARAKI (Türkiye)
Dr. Khalid Al KAJLOOT (Budapest)

Artificial Neural Networks (ANNs)









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•*Haykin S., Neural Networks , 2nd Edition, Prentice Hall, 1999, ISBN 0 13 273350 1*

•"Neural Networks: A Comprehensive Foundation", S. Haykin (very good -theoretical)

•"Pattern Recognition with Neural Networks", C. Bishop (very goodmore accessible)

•"Neural Network Design" by Hagan, Demuth and Beale (introductory)

Lecture Notes

All Announcement: Syllabus, Lecture notes, homeworks, etc. will be on Stix! **Check regularly!**

Artificial Neural Networks (ANNs) References:



Main text books:

- "Neural Networks: A Comprehensive Foundation", S. Haykin (very good -theoretical)
- "Pattern Recognition with Neural Networks", C. Bishop (very goodmore accessible)
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- *Haykin S., "Neural Networks", 2nd Edition, Prentice Hall, 1999, ISBN 0 13 273350 1*

Books emphasizing the practical aspects:

- "Neural Smithing", Reeds and Marks
- "Practical Neural Network Recipees in C++"' T. Masters
- Seminal Paper (but now quite old!): – "Parallel Distributed Processing" Rumelhart and McClelland et al.

Deep Learning books and tutorials:

- http://www.deeplearningbook.org/

Articles:

- R. P. Lippman, "An introduction to Computing with Neural Nets"' IEEE ASP Magazine, 4-22, April 1987.
- T. Kohonen, "An Introduction to Neural Computing", Neural Networks, 1, 3-16, 1988.
- A. K. Jain, J. Mao, K. Mohuiddin, "Artificial Neural Networks: A Tutorial"' IEEE Computer, March 1996' p. 31-44.

Journals:

- IEEE Transactions on NN
- Neural Networks
- Neural Computation
- Biological Cybernetics ...

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