

## Neurocomputing: Fundamentals of Computational Neuroscience

**Assignment 6 (Project)** due November 19 in class (40 points)

**Team up with one other student of the class.**

Implement an auto-associative memory for the letters used in the previous assignments.

1. Discuss the memory capacity of the network
2. Discuss the robustness of the network against noise in the pattern.
3. Study a possible modification of the standard Grossberg-Hopfield model (for example, modified learning rules, pre-processing, other architectures, biologically more plausible implementations, ... ) that improves the storage capacity, or, alternatively, argue if this is necessary, or discuss the biological relevance.
4. Study the basin of attraction within these networks.

Write a short paper in a scientific format (think about a conference or journal paper) following the guidelines given below

### Instructions for term paper

The term paper should be in the form of a scientific paper with a strict **page limit of 6 pages**. The type font should be at least 11pt (except the references which could be smaller, e.g. 10pt).

The paper has to include a

- Title
- Name and Address
- Abstract
- References

In the main body of the text you should at least include some section with an

- Introduction
- Presentation of the details
- (Discussion)
- Conclusion

The **introduction** should give some background information, and in particular should state the relevance of the things discussed in the paper (e.g., What is the research? Why is

the topic important? How does it fit in with other similar research or with corresponding areas?, ...)

In the **following chapter(s)** you should outline your work with the necessary details. It is usually a good idea to separate the facts from the interpretations or discussions.

It is sometimes valuable to separate the **discussion** from the facts outline previously in a separate section, although this discussion can sometimes be included in the main text or can be combined with the conclusions. Often papers in computer science include a section with 'related work'. It is up to you how you present your work in this term paper as long as one can see clearly where facts are derived and where interpretations are made.

You should have a section with **conclusions**. This section is very important and should not only summarize your work, but it should in particular discuss the results (e.g. what important findings have been made, further research directions, long or medium term goals that might be achieved). You should avoid stating new important facts that should have been presented before.

You are free to use your own style in the **references**. However, make sure that it is consistent and that enough details are given to locate the references. Strong references are important; I recommend in particular references to refereed publications. Links to web pages should be avoided and used only when essential.