Projects can be done in pairs or individually. The first step is letting me know which one for you, and if you are pairing, who your partner is.

As with training certain neural nets, the projects are conducted as a series of successive approximations.

**Step 1, due Tues. Nov. 6** is a brief exploratory proposal. It is a ½ to 1 page write-up that includes one or more tentative problem statements. It should give at least 2 or 3 references for background. The proposals are then presented in class starting Nov. 6 and the class members are expected to give constructive feedback. Visuals should be used, rather than just a free-form talk.

**Step 2, due Tues. Nov. 20** is a progress report. It is similar to step 1, in that it is a brief write-up on progress, including any modification to the original proposal. Again, progress is shared with the class and members are expected to give feedback.

By the time of step 2, you should also have established a website that gives information relevant to your project.

**Step 3, due Thurs. Dec. 13** is your final presentation. If necessary, we will also use the final exam period to continue these. Your website must be complete by the end of finals week, including any code, data, etc.

Here is some additional information.

1. For a two-person project, the ambition level should be higher, because the expectation level will be.

2. The project does not demand original research (it would be nice, but the timeframe is short); however, there should be some kind of contribution by you, not merely a rehash of existing literature or code. Contributions can take one of the following forms:

   a. An implementation of an application of particular neural network or related approach to a problem or class of problems. This should be an additional challenge over what you have already done. For example, a trivial extension of the Hopfield or backpropagation assignment will not be enough.

   b. A demonstration of an approach for tutorial purposes. The demo should not be a mere replicate of an existing demo, although it can ratify an approach that has previously appeared but for which there is no demo.
c. A critique or competitive analysis of two or more approaches to a class of problems, based on results reported on in the literature and/or computation.

d. A survey of diverse approaches to a given problem. A survey differs from a critique in that it doesn’t necessarily attempt to make value judgments. Consequently, it is assumed that for a given time expenditure, a survey could be broader.

3. Possible project areas:

   a. In class, we present numerous network models. Here is a chance to delve deeper into one or more of those models.

   b. There are some models I haven’t discussed at all (so far, but I will get to some of them), such as:
      i. Independent Component Analysis
      ii. Deep-Belief networks
      iii. Combination of neural nets with evolutionary computation and/or fuzzy logic
      iv. Biological realization of networks
      v. Hardware implementation of networks
      vi. Knowledge extraction from networks
      vii. Kinematic applications
      viii. Application to a field, such as robotics, financial analysis, music, natural language, physics, data mining, etc.

You should begin with a literature survey to see some of what’s “out there” with respect to a tentative topic. A web search is an obvious place to begin, but there is material not found on the web; you may have to use the library.

In addition to a Google search you can make use of many web resources:

   • CiteSeer digital research library: http://citeseer.ist.psu.edu/
   • IEEE Explore: http://ieeexplore.ieee.org/ (Our library pays for a subscription.)
   • ACM Portal: http://portal.acm.org/portal.cfm (We pay for a subscription.)
   • Other on-line journals (We pay for some subscriptions.)
   • Scholarpedia

Some examples of previous projects are listed at:

   http://www.cs.hmc.edu/courses/2012/fall/cs152/previousProjects.html

Remember that if you choose a project involving supervised learning, you will need one or more training sets. Sometimes these are hard to find or create.