

Questions and Answers for solicitation NNA10318925Q – AMM, last received on April 14, 2010.

Question 1:

What is the anticipated period of performance, 90 days?

Answer 1:

The period of performance is for 90 days starting on the day of award.

Question 2:

What is the submission form: electronic or fax?

Answer 2:

The submission form should be electronic.

Question 3: What is the preferred proposal structure?

There are no specific technical requirements for the proposal. The Offeror is free to prepare the report in the most logical and comprehensive manner they see fit.

Question 4:

Will the existing artificial neural network (ANN) be made available to the contractor for analysis? If yes, will we have access to the source code? Can we use our own formulations that correspond to the existing ANN (in terms of hidden layers, neurons per layer, etc)?

Answer 4:

There is no neural network for this set of data; the goal of this offering is for the contractor to develop the NN that represents this new set of data.

Question 5:

There many invocations of ANNs available? What is the type of the existing DDG 1000 ANN: static, fully connected, feed-forward MLP? What training algorithms does it use?

Answer 5:

The goal of this effort is to make a neural network for the new set of data, not an old neural network from an old set of data. The Offeror may employ their own choice of training algorithms.

Question 6:

When you say that the system is a "series of equations", are you referring to how the ANN is specified and/or described mathematically?

Answer 6:

That statement "series of equations" is our generic way of describing a neural net, which is a technique that can replicate discrete data points to degree of accuracy via a series of equations.

Question 7:

When you say "equations composed of 2000 data sets" do you mean that the equations are used to generate the datasets, or do the 2000 data sets exist in a separate file?

Answer 7:

There are no existing equations, just a dataset.

Question 8:

What do you mean by "parameters" that should be used/adjusted for ANN performance optimization? Standard topology parameters such as the number of layers, neurons per layer, and possibly the activation function?

Answer 8:

Neural network parameters that might be used to optimize the neural network include type of neural network, feed-fwd versus feed-back, number of layers, neurons per layer, etc.

Question 9:

Is it sufficient to do the optimization heuristically or do you require the development of an optimization algorithm?

Answer 9:

Heuristic optimization is allowable, as long as the assumptions/limitations of the technique are identified, and are in keeping with shipboard operational constraints. One cannot assume constant temperature across deck, or assume that pitch and roll is known to high accuracy, etc.

Question 10:

Does optimization include training? If so, unless the contractors could use their own codes, they would require access to the source of the existing code to improve the training algorithm.

Answer 10:

The goal of this is for contractors to develop and use their own codes to replicate the data precisely.

Question 11:

Performance typically refers to ANN training and to execution characteristics running in less than 0.001 seconds in MATLAB: is this for training on the 2000 data sets, or execution of one data set?

Answer 11:

Performance speed is execution time, not training time. We understand that training can take significantly longer on large nonlinear datasets such as this.

Question 12:

Does performance include training: i.e. fast convergence to desired error level in minimum time? For that would we need the source code?

Answer 12:

Training time not an evaluation factor in this effort, as long as the system can be trained in less than several hours.

Question 13:

There is a requirement on noisy and sparse data: will this data be provided or do we introduce the noise and sparseness ourselves?

Answer 13:

Noisy and sparse data will be provided as an absolute value, corresponding to sensor measurement uncertainty; in general, for one of the parameters, the noise level is 2-10 times the parameter value at the lower 1/3 of the range of the parameter.

Question 14:

For the statement, "...advantages and disadvantages of variation in each parameter" precisely, what are the parameters to be varied; ANN topology or any other factors?

Answer 14:

The goal of this effort is to develop an optimal description of the dataset. Since various factors that contribute to the overall system accuracy might have associated with them a high "cost" (computational time, accuracy degradation due to noise, problems with some portions of the data set), it is anticipated that the contractor will need to "choose" certain factors; we would like to see the results of that "accuracy and sensitivity tradeoff" in case the resultant neural network turns out to need some tweaking. The Contractor should conduct that trade study for whichever factors appear warranted.

Question 15:

For the statement, "conducted for both baseline and potential optimized variants", in referring to the analysis, what constitutes a "baseline"? Would this be an ANN with a specified topology?

Answer 15:

A baseline neural network does not exist for the dataset. We would like to see the Offeror develop that baseline, and any recommended variants of it for this effort.

Question 16:

Is the baseline ANN trained, and who supplies it, the contractor or the government? How is the baseline determined, heuristically or will the ANN specs be provided, and if provided, what will they be, a topology description?

Answer 16:

We anticipate that the final neural network will be optimized version of some baseline configuration, and would like to see tradeoffs in accuracy afforded by those variations.