

Research Proposal of PHD

Faculty of

Applicant of

University Malaysia

By:

Passport No:

PROJECT TITLE:

The application of Neural Networks and Genetic Algorithms in optimizing time and cost in management.

Introduction:

Project management is one of the most promising steps in the world of opportunities and by default leads to guaranteed success.

Project management includes:

1. Identifying the requirements.
2. Defining the requirements in an unambiguous manner with clear and achievable objectives
3. Maintaining balance between the triple constraint (Scope, Time, Cost, Quality, Risk and Customer satisfaction).
4. Managing and meeting the customer expectations.

In order to be a good project manager the following skills are needed

1. Communication Skills
2. Organizational and Planning Skills
3. Budgeting Skills
4. Conflict Management Skills
5. Negotiating and Influencing Skills
6. Leadership Skills
7. Team-building and Motivational Skills.

Human mind would not be foolproof in handling all areas of knowledge in project management. The purpose of this dissertation is to apply Neural Networks and Genetic Algorithm to optimize decision making in order to reduce costs and time in different projects with an eye on construction management mainly.

Literature review:

A project is a temporary endeavor undertaken to create a unique product, service, or result. Temporary means that every project has a definite beginning and a definite end. The end is reached when the project's

objectives have been achieved, or it becomes clear that the project objectives will not or cannot be met, or the need for the project no longer exists and the project is terminated.

1 : Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished through processes, using project management knowledge, skills, tools, and techniques that receive inputs and generate outputs.

Project management includes nine area of knowledge which is as follows:

Project Integration Management

Project Scope Management

Project Time Management

Project Cost Management

Project Quality Management

Project Human Resource Management

Project Communications Management

Project Risk Management

Project Procurement Management

Project Time Management includes the processes required to accomplish timely completion of the project.

The Project Time Management processes include the following:

1 **Activity Definition:** identifying the specific schedule activities that needs to be performed to produce the various project deliverables.

2 **Activity Sequencing and documenting:** dependencies among schedule activities.

3 **Activity Resource Estimating:** estimating the type and quantities of resources required to perform each schedule activity.

4 **Activity Duration Estimating:** estimating the number of work periods that will be needed to complete individual schedule activities.

5 **Schedule Development:** analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule.

6 **Schedule Control:** controlling changes to the project schedule.

Project Cost Management includes the processes involved in planning, estimating, budgeting, and controlling costs so that the project can be completed within the approved budget. It includes:

1 **Cost Estimating**: an approximation of the costs of the resources needed to complete project activities.

2 **Cost Budgeting**: aggregating the estimated costs of individual activities or work packages to establish a cost baseline.

3 **Cost Control**: influencing the factors that create cost variances and controlling changes to the project budget. [1]

The most important focus of a project is to minimize the cost and time according to the scope of the project.

Nowadays expert systems are widely used to optimize different systems and rectify human errors in different projects. Neural Networks play an important role in this regard.

Neural networks are composed of simple elements operating in parallel.

These elements are inspired by biological nervous systems. As in nature, the network function is determined largely by the connections between elements.

We can train a neural network

2 to perform a particular function by adjusting the values of the connections (weights) between elements.

Commonly neural networks are adjusted, or trained, so that a particular input leads to a specific target output. Such a situation is shown below. There, the network is adjusted, based on a comparison of the output and the target, until the network output matches the target. Typically many such input/target pairs are needed to train a network

Batch training of a network proceeds by making weight and bias changes based on an entire set (batch) of input vectors. Incremental training changes the weights and biases of a network as needed after presentation of each individual input vector. Incremental training is sometimes referred to as "on line" or "adaptive" training.

Neural networks have been trained to perform complex functions in various fields, including pattern recognition, identification, classification, speech, vision, and control systems

Neural networks are used in different aspects of technology such as manufacturing.

Manufacturing process control, product design and analysis, process and machine diagnosis, real-time particle identification, visual quality inspection systems, beer testing, welding quality analysis, paper quality prediction, computer-chip quality analysis, analysis of grinding operations, chemical product design analysis, machine maintenance analysis, project bidding, planning and management, dynamic modeling of chemical process system.[2][3][4]

Objective:

The primary purpose of the dissertation is to assist project managers, engineers, architects to optimize cost and time according to the scope of the construction projects.

1. Figuring out the optimized management system by using Genetic algorithms.
2. Applying Neural Networks to optimize cost and time.

Methodology:

- 1: studying the current principles of project management.
- 2: careful study of the operational process of project management in construction.
- 3: adaptation of principles of project management and construction.
- 4: optimizing the process by using Genetic algorithms.
- 5: training Neural Networks according to the optimized process.

References:

1. *A Guide to the Project Management Body of Knowledge (PMBOK Guide) Third Edition 2004* Project Management Institute, Four Campus Boulevard, Newtown Square, PA 19073-3299 USA
2. [HDB96] Hagan, M. T., H. B. Demuth, and M. H. Beale, *Neural Network Design*, Boston, MA: PWS Publishing, 1996.
3. [Rose61] Rosenblatt, F., *Principles of Neurodynamics*, Washington D.C.: Spartan Press, 1961.

4. D.E Rumelhart, G.E. Hinton, R.J. Williams, "Learning internal representations by error propagation," D. Rumelhart and J. McClelland, editors. *Parallel Data Processing, Vol. 1, Chapter 8*, the M.I.T. Press, Cambridge, MA 1986