

# Neural Network Based E-Tendering System

Prof. Sanjay Sonar<sup>1</sup>, Samyak Meshram<sup>2</sup>, Samrudhi Patil<sup>3</sup>, Pranali Patil<sup>4</sup>, Priyanka Pardeshi<sup>5</sup>

<sup>1</sup>Prof.Sanjay.V.Sonar, Electronics and Telecommunications, Konkan Gyanpeeth College of Engg, Maharashtra, India

<sup>2</sup>Mr. Samyak Meshram, Electronics and Telecommunications, Konkan Gyanpeeth College of Engg, Maharashtra, India

<sup>3</sup>Miss Samrudhi Patil, Electronics and Telecommunications, Konkan Gyanpeeth College of Engg, Maharashtra, India

<sup>4</sup>Miss Pranali Patil, Electronics and Telecommunications, Konkan Gyanpeeth College of Engg, Maharashtra, India

<sup>5</sup>Miss Priyanka Pardeshi, Electronics and Telecommunications, Konkan Gyanpeeth College of Engg, Maharashtra, India

## ABSTRACT

*The basic principles of the tendering process have been applied to many business areas, such as purchasing goods, seeking service providers, business consulting, or the selection of main contractors for construction work. Inadequate security brings opportunities for fraud and collusion by parties inside and outside of the tendering process. This leads to corruption in the system which could have disastrous effects. To eliminate this corruption, a vendor selection system is devised to incorporate the most efficient vendor for a particular tender which is passed. This system uses Neural Logics to give a certain weight to a vendor and updates the weight as per the work done and then verified by rightful authority.*

**Keyword:** -Neural, Network ,Tender, Corruption, E-Tender

## 1. INTRODUCTION

Today businesses and governments are largely reliant on information and communication technology to communicate and making contacts. E-tendering is increasingly being adopted through the world. E-tendering in its simplest form is described as the electronic publishing, communicating, accessing, receiving and submitting of all tender related information and documentation via the internet.

Tendering (also referred to as “Bidding” by different stakeholder) is a process to invite Bids for a Project, or to accept a formal Offer. Tendering usually refers to the process whereby governments, financial institutions and corporations issue a Tender and invite Bids for large projects that must be submitted in accordance to the requirements specified and within a finite deadline. Tendering is referred to the procurement process from the perspective of Purchasing Organization or the Procuring Agency. Purchasing Organization may be a corporation interested in procuring material or services for consumption or a department / division of a corporation undertaking a project for which they have to procure material and services. Procuring Agency may be the procurement department of the corporation comprising both; Purchasing Organization and the Procuring Agency, or it may be a Third Party Agency. Bidding is referred to the procurement process from the perspective of Vendors / Suppliers interested in supplying material or providing services to the Procuring Organization. Traditionally this process was conducted manually and it would be a very lengthy and cumbersome process involving huge costs in terms of investment of human resources and facilities required to undertake the procurement process in a systematic and fair manner.

In the existing stages, the companies who are the most favored by the local authority will be selected for these tenders in exchange for money or any other political influences. This corruption in the system leads to numerous problems; the most important being wasting our i.e. common taxpayers’ hard earned money.

The research project is based on the hypothesis statement that an automated solution to facilitate public procurements is cost effective, reduces corruption and procurement lead time. This project aims to create an automated Tender Selection System to ensure true fairness, competitiveness, transparency and value for money in public projects.

## 1.1 PROPOSED SYSTEM

Here we create an application in Visual Basic 6.0 to demonstrate the selection of the rightful vendor. Every vendor will have to register once to get a unique RFID card for authentication purposes. After the basic criteria given by the open tender is met, the most efficient company will be selected on the basis of Reliability or Trust points (weights) gained by that particular enterprise. These trust points will be calculated on the basis of parameters such as

- Minimum cost
- Minimum duration
- Ratings
- Similar successful projects

Based on these points, the company which has the maximum weight and satisfies the criteria will win the bid. Hence, human interaction is void in this process.

A basic neural function is as shown in the figure below.

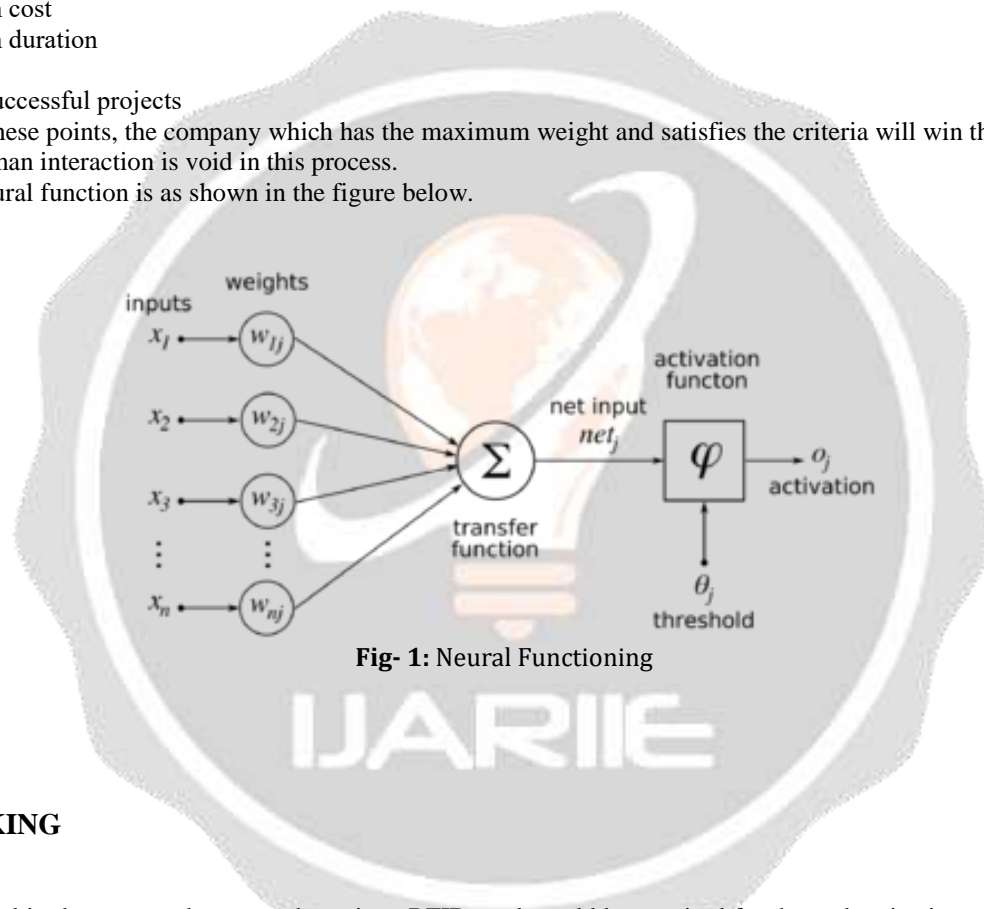


Fig- 1: Neural Functioning

## 2. WORKING

As described in the proposed system, the unique RFID card would be required for the authentication of the tenderer to apply for any tender. After authentication, a list of the vendors who have applied for it would then be shortlisted for the selection procedure. Each registered vendor would have an initial set of quality parameters uploaded by due verification. Here is where the neural algorithm will come in picture and the selection will be done on pro data basis. The activation function and threshold will be set in the application itself. The top scorer in the list will be selected and an SMS will be sent to the vendor through a GSM module included in the system alerting them with the tender number and intimidating them about the documents required. The data flow diagram is as shown below.

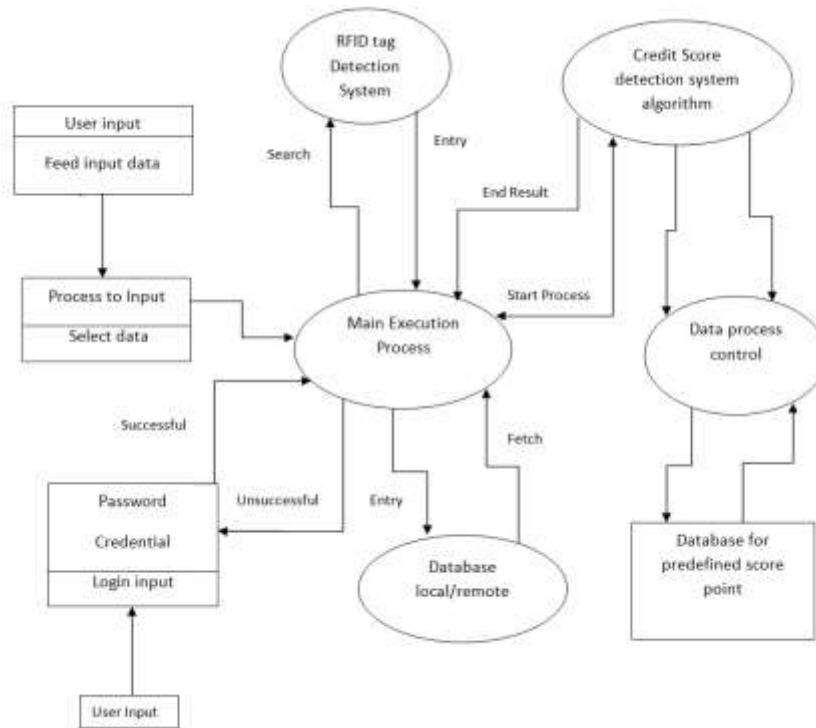


Fig -2: Data Flow Diagram

### 2.1 SYSTEM REQUIREMENTS

The hardware required in this system is used for authentication purposes. The main execution algorithm will be run on the server PC which would be secured with a login ID and password of the authorized official. The hardware is controlled by an Arduino based microcontroller. The complete list is as shown below

Table -1: Hardware components

Component	Voltage Requirement	Description
Arduino AtMega 328P	12 V	Microcontroller
RFID Module	2-5 V	RFID Card Scanning
RS 232 cable	5 V	Serial to USB communication
GSM module	12 V	SMS communication
LCD and Buzzer	5V	Indicates current process flow

## 2.2 Software Requirements

The main part of the system is a software based application. The software used for handling the hardware part is the Arduino IDE which is an open source platform. It uses Embedded C language for programming and has built in libraries for basic hardware components which are used extensively. The execution program is coded in Visual Basic application in the backend. The screenshots of the frontend login and execution pages developed in the software are shown below.

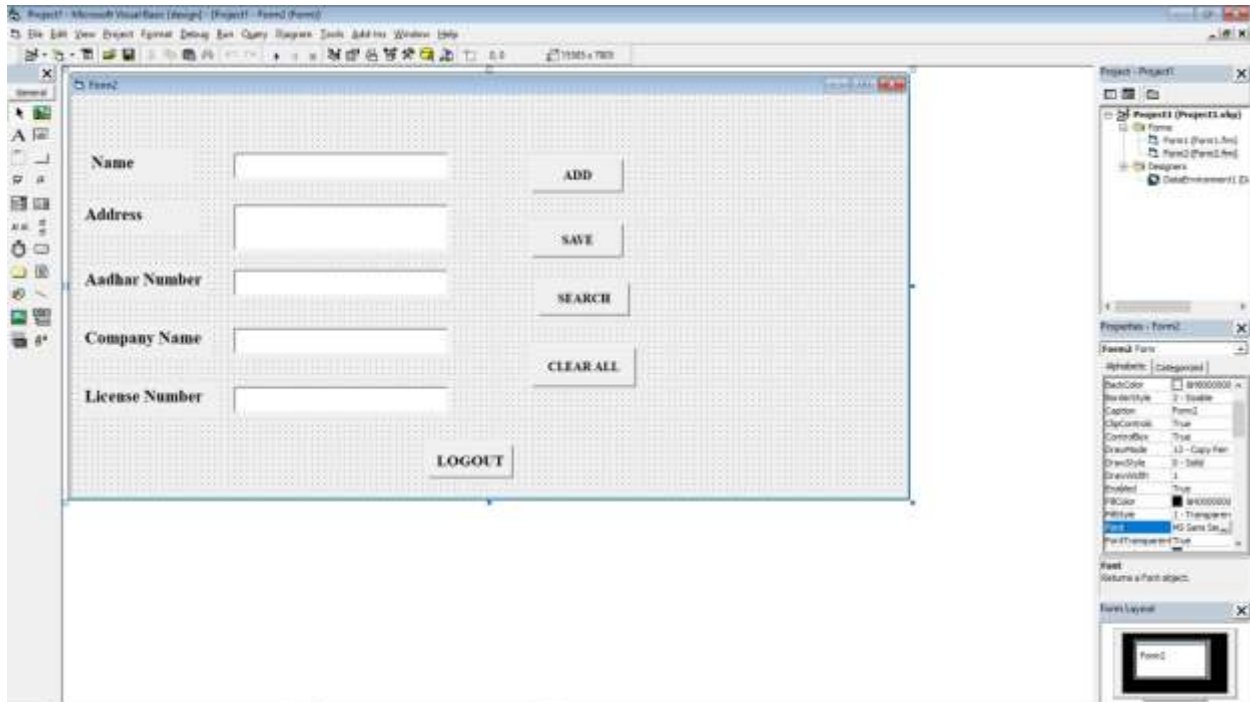
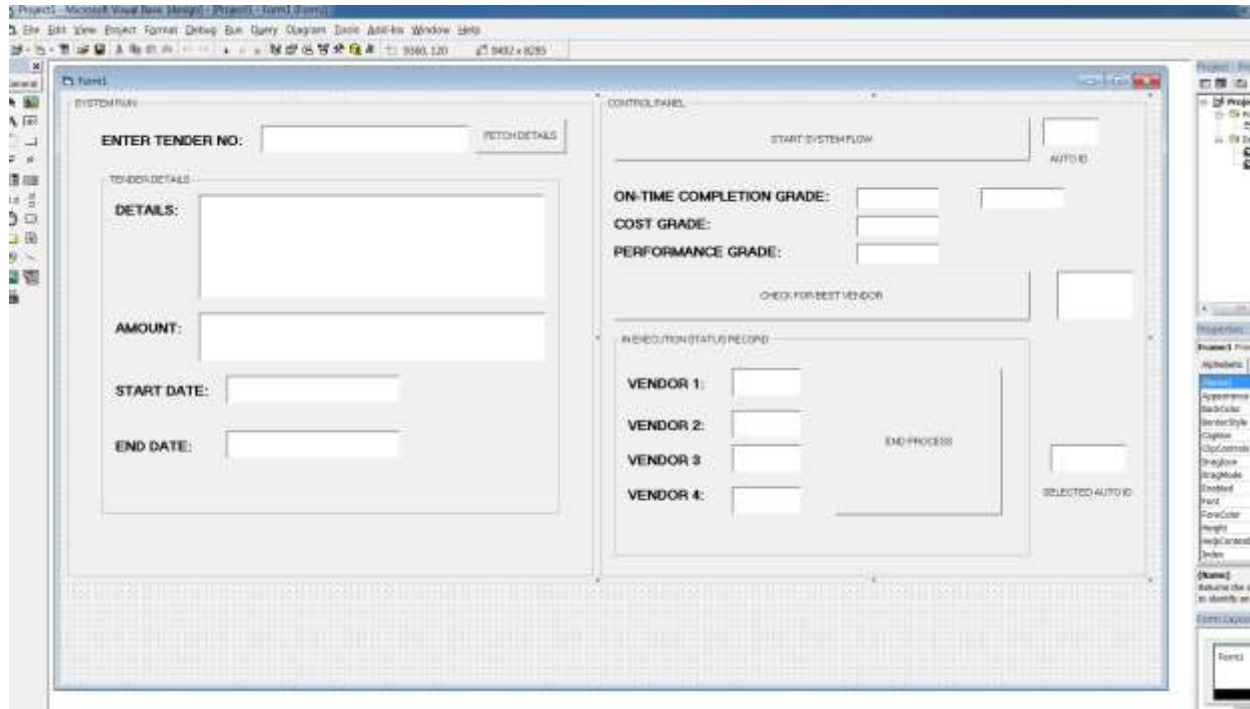


Fig -3: Registration Page

This page will be used to register first time vendors and save the data in a secure Microsoft Access database. The initial data parameters will be fed after successful registration. The execution page is as shown below.



**Fig -4:** Execution Page

After the successful completion of the allocated tender to an organization, the vendor will submit a completion report and the trust points or parameters will be updated as per the norms defined by cross checking the required date, cost and performance which will be verified by the authorized official. This updating will be done in that vendor's database as well for future processes and the updated parameters will then be used for further bidding etc.

### 3. CONCLUSIONS

This system is designed to minimize the corruption that occurs in the distribution and selection of tenders in a system. As the selection process is not done by human interference, which is the main scope in the system, the aim is completed. The time required for selection is reduced and also the paperwork and manual work is reduced. For application on the large scale needs high end secure data servers.

### 5. ACKNOWLEDGEMENT

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