

# An Approach for Network Selection Based on Artificial Neural Networks in Heterogeneous Wireless Environments

Pablo Rocha Moreira<sup>1</sup>, Claudio de Castro Monteiro<sup>1</sup>, Mauro Henrique Lima de Boni<sup>1</sup>

<sup>1</sup> Department of Informatics – Federal Institute for Education, Science  
and Technology of Tocantins  
Palmas, Tocantins, Brazil.

prm.gredes@gmail.com, {ccm, mauro}@ifto.edu.br

**Abstract.** *This paper describes a proposal for a NN-based network selection mechanism which is intended to be a piece to be integrated into a handover system environment.*

## 1. Introduction

The concept of Always Best Connected (ABC) is a demand today, and algorithms that come on mobile devices cannot provide that.

During a handover process there are two big parts. They are network selection and the handover itself. Both of them are important once you need to select a network to do the handover, and there is no sense in selecting the best network if you cannot do the handover.

In this work, we shall investigate a new approach for network selection using Neural Networks to classify networks and determine whether is good to change of network or not.

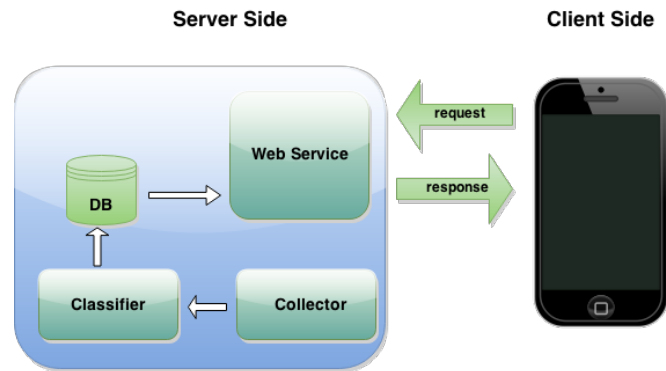
## 2. Related Works

Network Selection is subject of study in several research groups. To solve the network selection problem, support techniques and strategies for decision are found in the literature, such as fuzzy logic, genetic algorithms and MADM (Multiple Attribute Decision Making) methods [Rios 2012].

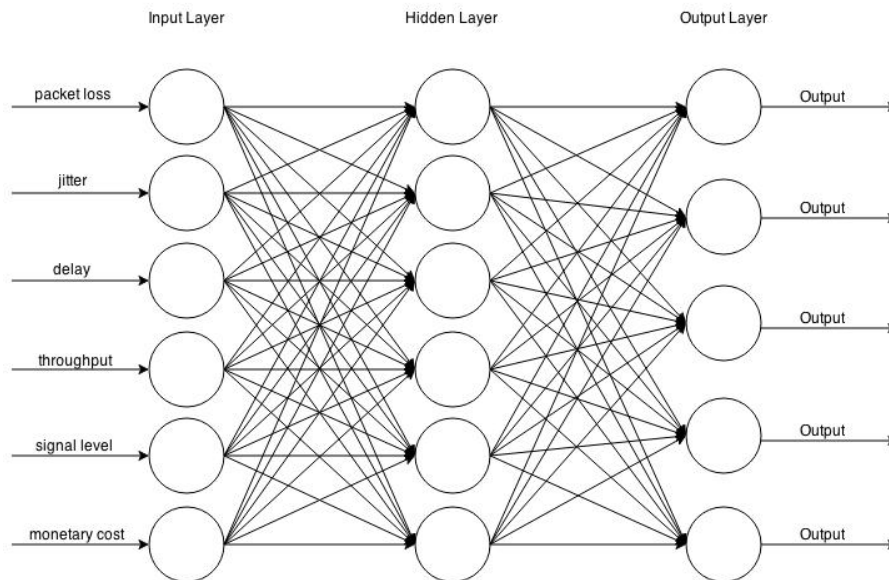
## 3. Proposal

This work aims to suggest a good solution for network selection, this solution must have low computing cost and guarantee an efficient mobility management, and to accomplish that we have chosen a client-server architecture which gathers most of processing on the server side, as can be seen in Figure 1, and the classification process uses an approach based on Neural Networks.

We will work on building and training a Neural Network for a classification problem. The topology of the proposed NN can be seen in Figure 4. This network will handle 6 inputs: jitter, delay, packet loss, signal level, throughput, and cost (monetary), and it is expected to return as result a MOS value between 1 and 5 (1 is the worst possible result, and 5 is the best one) for each wireless network in its range, as can be seen in Table 1.



**Figure 1. System Architecture**



**Figure 2. Topology of the proposed NN**

**Table 1. MOS/Classification values**

MOS value	Classification
1	Bad
2	Insufficient
3	Regular
4	Good
5	Excellent

#### 4. Materials and Methods



Figure 3. Materials

#### 5. Expected Results

We have as target the handover process, we intend to offer a feasible solution for network selection which can be integrated into a mobility management environment and used in a real environment.

#### 6. Schedule

	Activities	March	April	May	June	July
1	Literature review	X	X	X	X	
2	Problem identification		X			
3	Solution modeling		X			
4	Solution implementation			X		
5	Testbed mounting			X		
6	Solution validation				X	X
7	Result reporting					X
8	Paper presentation					X

Figure 4. Schedule

#### References

- da Silva, F. L., Claudio de Castro Monteiro, M. H. L. d. B., and Tolentino, C. H. (2014). Arquitetura de seleção de redes com baixo consumo de recursos computacionais para dispositivos móveis. *ENCompIF - II Encontro Nacional de Computação dos Institutos Federais*:764.767.
- ITU (2014). Ict statistics.
- Monteiro, C. d. C. (2012). *Um ambiente para apoio à integração de redes sem fio heterogêneas*. Doutorado, Departamento de Engenharia Elétrica–Universidade de Brasília. Brasília-DF.
- Rios, V. d. M. (2012). *Seleção de redes sem fio baseada em técnicas de apoio à decisão*. Mestrado, Departamento de Engenharia Elétrica–Universidade de Brasília. Brasília-DF.