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Dns Based On Handover Decision Process Using Mcdm Techniques

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***ABSTRACT**: Dynamic network selection algorithm selects the appropriate network for single or group of calls from multi mode terminal in heterogeneous networks. Network selection support for a single call is the existing solution available, in this paper a Dynamic. In this paper a Dynamic network algorithm is used to addresses the Fuzzy Analytical Hierarchy Process (FAHP). FAHP algorithm is to assign the weight on all other networks and ranked (prioritised) by TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) with reduce the number of handoff for long distance communication. The performance measure of proposed algorithm improves the vertical handoff decision process and the simulated results shows effectiveness of the algorithm compared with existing system by Ns2.*

***KEYWORDS** - Dynamic Network selection, FAHP, TOPSIS, NS2.*

I. INTRODUCTION

Handoff is the process of transferring a mobile user from one channel or base station to another handoff occur when received signal level drops below a certain threshold level(coverage area) at this time , handoff process changing the channel (frequency, time slot or combination of them) associated with the current connection when the call initiate. Goal of handoff are Low latency, less packet loss, Mobility User preferences. In Cellular communication, wireless networks depends on network coverage area classified as follow Vertical handoff and Horizontal handoff. In vertical handoff Network coverage between two different network access point (Heterogeneous networks) (e.g., GSM, WI-FI between network access).

In recent years, the multimode terminal (mobile) equipped with several wireless access network such technologies as (802.11) and cellular networks (GPRS, UMTS, HSDPA, LTE, etc.). The evolution of these technologies will allow the users to access the services simultaneously from these networks.

1.1 Handover Types:

There are two types of handoff. In soft hand-off, the connection with the target station is made before the connection with the source is broken, so we can also called as make-before-break. Here, both the cells from source and target are connected in parallel during hand-off. A hard handoff is essentially a “break before make” connection. Under the control of the MSC, the Base station hands off the MS’s call to another cell and then drop the call. In a hard handoff, the link to the previous BS is terminated before or as the user is transferred to the new cell’s BS; the MS is linked to no more than one BS at any given time.

II. RELATED WORK

Traditional radio access technology Network-selection algorithms for heterogeneous wireless networks do not consider the problem of group of calls from a mobile .Multimode terminals have the capability to support two or more types of call simultaneously.

In [3], Giupponi and Perez-Romero proposed a JRRM algorithm based on fuzzy neural approach for selecting the most appropriate RAT for an incoming call in HWNs.In [4], Alkhawlani and Hussein proposed an intelligent RAT-selection algorithm for next generation wireless networks. The proposed algorithm uses a combined parallel fuzzy logic control and multi-criteria decision-making technique to select the most appropriate RAT for an incoming call in HWNs. In [5], Zhang proposed a fuzzy multiple attribute decision-making (MADM) RAT-selection algorithm that uses fuzzy logic to represent imprecise information of some RAT-selection criteria. The fuzzy MADM method operates in two steps. The first step is to convert the imprecise fuzzy variables to crisp numbers. The second step is to use classical MADM technique to determine the ranking order of the candidate networks. The highest-ranking RAT is then selected for the call. In [6], Xavier et al. presented a Markovian approach for RAT selection in an HWN. They developed an analytical model for a RAT-selection algorithm in an HWN comprising GSM/EGDE and UMTS. The proposed algorithm selects just one RAT for each incoming call. In [7], Guo et al. proposed a RAT selection algorithm that uses a fuzzy multiple objective decision-making techniques to select the most suitable RAT for each incoming call in an HWN. In [8], Wu and Sandrasegaran conducted a study of RAT selection algorithm in a heterogeneous UMTS-GSM network.

The entire Network selection algorithms reviewed above were designed to select the most suitable Network for just one incoming call in HWNs. None of the Network -selection algorithms considered the problem of Network selection for a group of calls (multiple calls) from a multimode terminal (MT) in HWNs.

2.1.TRADITIONAL DIFFERENT SUITABLE NETWORK SELECTION TO SINGLE CALL HANDLING

In traditional method the number of handoff and individual network can handle only one call at a time in multi mode terminal because mobiles have to support multicall (high data rate) at a time in heterogeneous network. So there is no integration of increasing network capacity and num of hand off reduction, high data rate call handling at same time in existing network selection scheme.

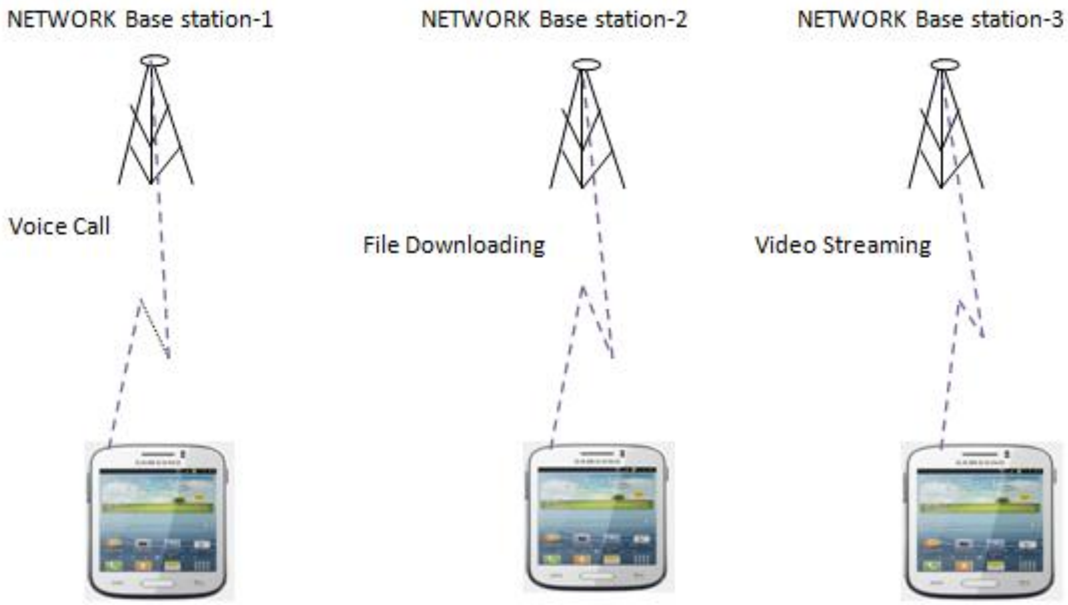

Fig. 1 Same Multi Mode Terminal but Multi Data Rate Call Handling by Dynamic Network at Different Instant of Time.

III. PROPOSED WORK

- When a new call is initiated on an MT already having an ongoing call in an HWN, the current network may no longer be suitable for the two calls (incoming call and the existing call). So we need to handle multiple calls at same time.
- The optimal solution of this problem is to choose suitable network for multiple calls management and provision of long possible radio link. So we need i integrate a multiple calls used as long as for successful communication. This possible way is to integrate the network capacity as well as reducing number of handoffs.
- The following are some reasons why it may be necessary to select a single Network for multiple calls from a multi-mode terminal in HWNs:
  (1) To reduce handoff complexity,
  (2) To reduce signaling overhead,
  (3) To reduce battery power consumption,
  (4) To accommodate low-capability mobiles.
- If multiples calls from an MT are admitted into different Networks in an HWN, coordination of handover procedure among the different Networks will be complicated, and incur excessive signaling overhead. Moreover, multiple Network interfaces of the multimode mobile terminals will be activated, which may increase the overall battery power consumption of the multimode terminal.

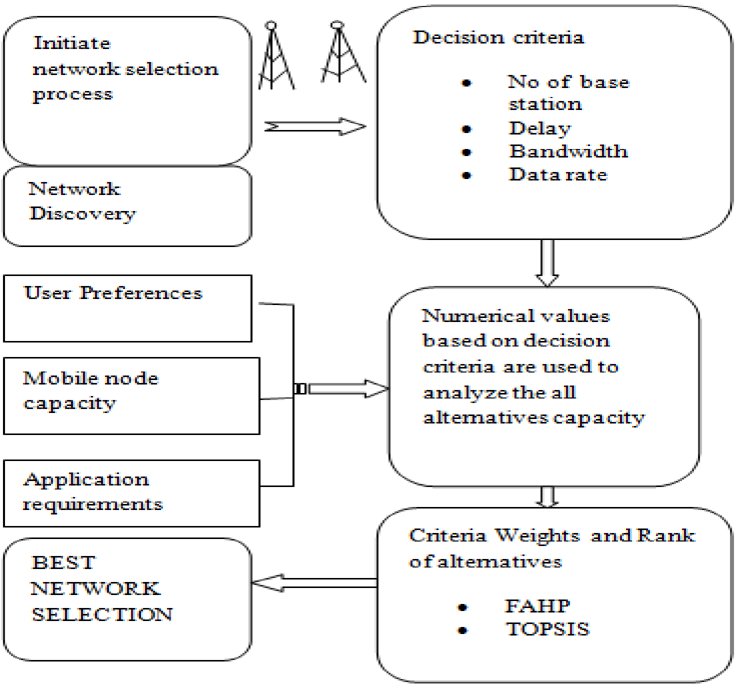

Fig.2 Network Selection System Model

- In addition, some multimode terminals can be connected to only one Network at a time. If these low-capability multimode terminals are to support multiple services, group decision is inevitable. Thus, it is necessary to develop an algorithm that will select the most suitable Network for a group of calls from an MT in HWNs.

3.1 Proposed Algorithms:

The objective of this project is to develop a dynamic Network -selection algorithm for making group call Network -selection decisions in HWNs.

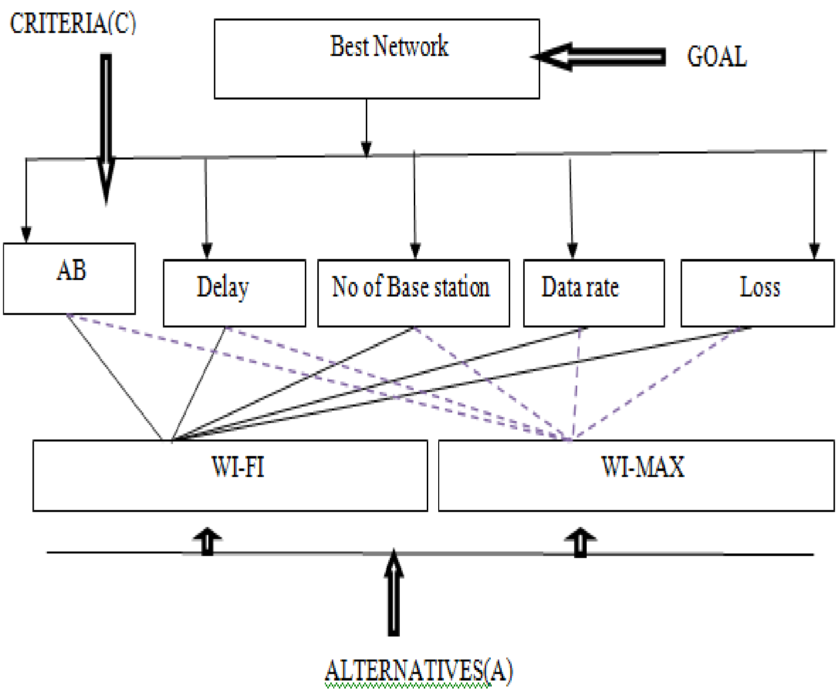

Fig. 3 Parameter Analyses

- The first is the conceptualization of group-call Network selection problem in HWNs.
- The second contribution is the development of a dynamic Network selection algorithm and application of the TOPSIS group decision technique to solve the problem of Network selection for multiple calls in HWNs.
- The third contribution is the investigation of the effect of Network preference margin on the frequency of vertical handoff in HWNs.
- We propose an intelligent network selection approach based on weight estimation technique Fuzzy Analytical Hierarchy Process (FAHP), the Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS).
- The FAHP method is used to determine a weight for each criterion, and the TOPSIS method is applied to rank the alternatives.

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3.2 Fuzzy Analytical Hierarchy Process:

Multi Attribute based Decision Making (MADM) algorithm used to calculate the weight of each criteria using decision based techniques [2].

Steps*:*

1. Construct the structuring of alternatives and criteria matrix
2. Construct the comparisons of max and min value in the column matrix
3. Calculating the weights of criterion by decision making techniques.

Step 1: Construct the numerical matrix by using both alternatives and criteria. **(i.e.)** criteria as C_i where i=1, 2, 3, 4…..N and alternatives as Ai where i=1, 2, 3……N

$$A = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ . \\ . \\ A_N \end{array} \begin{array}{c} C_1 \; C_2 \; C_3 \ldots\ldots\ldots\ldots \; C_N \\ \left[\begin{array}{ccccc} a_{11} & a_{12} & a_{13} & \ldots\ldots & a_{1N} \\ a_{21} & a_{22} & a_{23} & \ldots\ldots & a_{2N} \\ a_{31} & a_{32} & a_{33} & \ldots\ldots & a_{3N} \\ . & . & & & . \\ . & . & & & . \\ & & & & \end{array} \right] \end{array}$$

Find the ... val ... and a_{ij}^-

Determi... ivid ... ision matrix by using max, min value Following as

$$X_{ij} = \frac{a_{ji} - a_{ij}^*}{a_{ij}^* - a_{ij}^-} \quad \forall \; i,j$$

Now the calcu... n matrix following as

$$X' = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ . \\ A_N \end{array} \begin{array}{c} C_1 \; C_2 \; C_3 \; C_4 \ldots\ldots C_N \\ \left[\begin{array}{cccc} x_{11} & x_{12} & x_{13} \ldots & x_{1N} \\ x_{21} & x_{22} & x_{23} \ldots\ldots & x_{2N} \\ . & & & . \\ . & & & . \\ x_{N1} & \ldots\ldots\ldots\ldots & & x_{NN} \end{array} \right] \end{array}$$

Step 2: Construct the comparisons of max and min value in column matrix from assigned decision matrix, and have to find M and S1, S2 parameter.

$$Mij = \frac{1+ xij}{\sum_{i=1}^{N} (1+ xij')}$$

Where i
j = 1, 2, 3 ….
After calculating the ... ion matrix for calculate S1 and S2 parameters,
Step 3: Calculating ... g FAHP techniques

$$W_j = \frac{S2j}{\sum_{i=1}^{n} S2j}$$

Where $S1j = -\sum_{i=1}^{m} (mij \times \ln(mij))$ and $S2j = 1- S1j$

3.3 Technique for Order Preference by Similarity to Ideal Solution (TOPSIS):

Technique for order preferences by similarity to an ideal solution (TOPSIS), known as a classical multiple attribute decision-making (MADM) method is to order the Rank based on calculated weight [2].

The TOPSIS method evaluates the following decision matrix which refers to *N* alternatives which are evaluated using FAHP.

Step 1: Refer the criteria decision matrix and also Weight from evaluated value of FAHP Technique.
Step 2: Construct the Normalized Decision Matrix.

An element *rij* of the normalized decision matrix **(R)** can be calculated as follows.

$$Rij = \frac{aij}{\sqrt{(\sum^{n} a^2ij)}}$$

Step 3: Construct the Weighted Normalized Decision Matrix.

A set of weights W = (w1, w2, w3... wN), (where: $\sum_{i=1} w_i = 1$) defined by the decision maker is accumulated to the decision matrix to generate the weighted normalized matrix D

D = Matrix of R × unit matrix of W

Step 4: Determine the Ideal and the Negative-ideal Solutions

B*(**Ideal) = { (max** d_{ij} **|** $j \in J$**), (min** d_{ij} **|** $j \in J$**)|** $i = 1,2,3, ..., M$**}** $i = \{1, 2, 3, ..., M\}$

B* = maximum value of each columns matrix (d1*, d2*, d3*,…….dm*)

B **'(non-ideal)= { (min** d_{ij} **|** $j \in J$**), (max** d_{ij} **|** $j \in J$**)|** $i = 1, 2, 3, ..., M$**}**

B' = minimum value of each columns matrix(d1', d2',d3',..dm')

Step 5: Calculation of the similarity distance.

The *N*-dimensional Euclidean distance method is next applied to measure the separation distances of each alter

$Si^* = (\sum (d_{ij} - d_j^*)2)1/2, i = 1,2,3, ..., M,$

Where S_i^* is the separation (in the Euclidean sense) of each alternative to the ideal solution and negative-ideal solution.

$S_i' = (\sum(d_{ij} - d_j')2)1/2, i = 1,2,3, ..., M,$

where S_i' is the separation (in the Euclidean sense) of each alternative from the negative-ideal solution.
native to the ideal solution and negative-ideal solution

Step 6: Calculate the Relative Closeness to the Ideal Solution.

$C_i^* = S_i' (S_i^* + S_i'), 0 \leq C_i^* \leq 1,$
$i = 1, 2, 3, ..., M.$

$C_i^* = 1$, **if** $B_i = B^*$, **and** $Ci' = 0$, **if** $B_i = B'$.

The best satisfied alternative can now be decided according to preference rank order of *Ci**. Therefore, the best alternative is the one that has the shortest distance to the ideal solution (Decreasing Order**).** The relationship of alternatives reveals that any alternative which has the shortest distance to the ideal solution is guaranteed to have the longest distance to the negative-ideal solution.

3.4 Comparison between different algorithms is evaluated for dynamic network selection:

TABLE I: Comparison between different algorithms is evaluate to dynamic network selection

FAHP,TOPSIS Algorithms (Network Selection Based Vertical Handoff In Heterogeneous Wireless Network) [2]	**Multi Criteria Group Decision Making, TOPSIS Algorithms (Dynamic Network Seletion Based Vertical Handoff In Heterogeneous Wireless Networks) [1]**
INPUT PARAMETRES: 1. Terminalside: Battery, Velocity. 2. Serviceside: Qos(AB,D,J,L),Security.	INPUT PARAMETRES: 1.Terminalside: Battery,Velocity 2.Serviceside:Data Rate,Security,Service Cost.
OUTPUT PARAMETRES: Blocking Probability During Traffic(Streaming,Interactive) Reduction, Weight Association Criteria,Rank Assignment Comparison.	INPUT PARAMETRES: Increasing Preference Margin, Blocking Probability During Traffic (Streaming,Interactive) Reduction, Weight Association Criteria, Rank Assignment Ccomparision.
Objective: Reducing Number Of Vertical Handoff.	Objective: Multiple Call Handling.
Considering Networks: Wifi,Wi-Max.	Considering Netwoks: Wifi,Wi-Max.

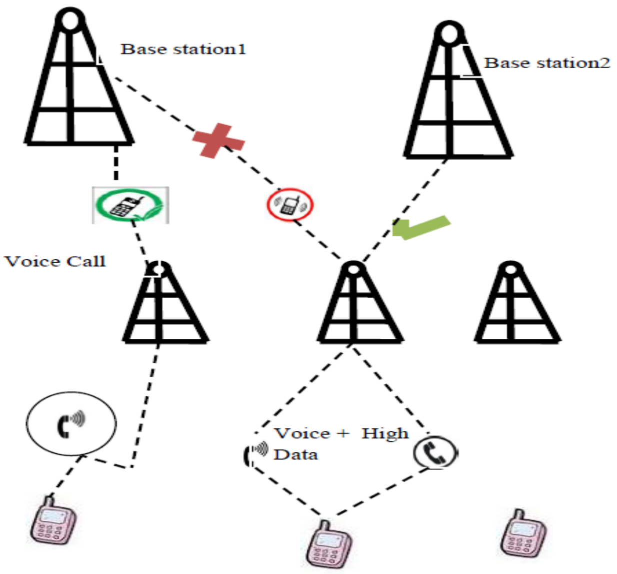


Fig. 4 Dynamic Network selection for high data rate call.

IV. RESULT ANALYSIS

4.1 NETWORK PERFORMANCE ANALYSIS:

The graphical result in figure shows that the handoff vs network performance. The plot is for during processing of multicall handling the handoff and network performance relationship using FAHP method. As can be seen from the figure that the handoff reduction with throughput increment.. Hence by this the multicall handling and handoff reduction is done successfully be the algorithms.

4.2 FAHP:

The graphical result shows the relationship between the number of handoff and throughput during multicall handling using FAHP method. As can be seen from the figure that the handoff reduction with throughput increment.

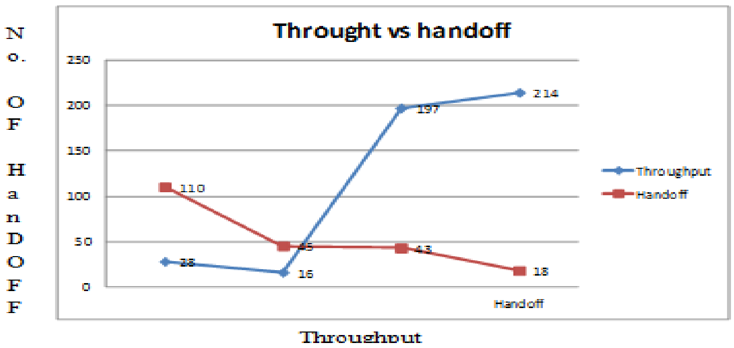


Fig. 5 Number of Handoff VS Throughput FAHP Method.

4.3 TOPSIS:

In the below graph the number of handoff with throughput of the network is analyzed and the result shows the performance increases as the number of handoff decreases.

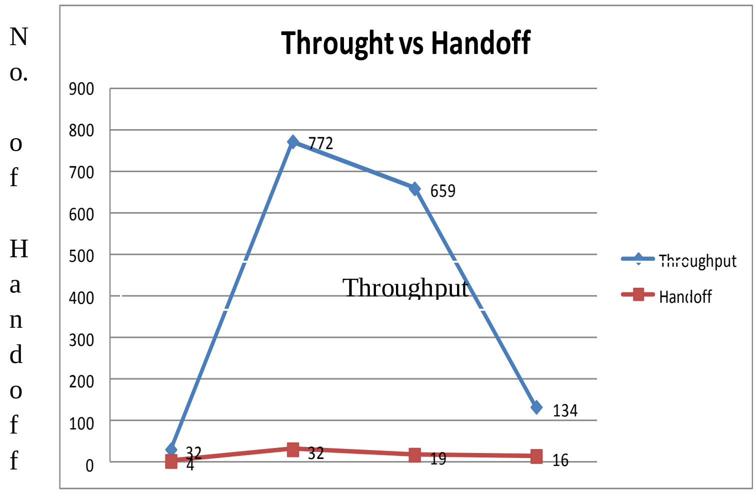
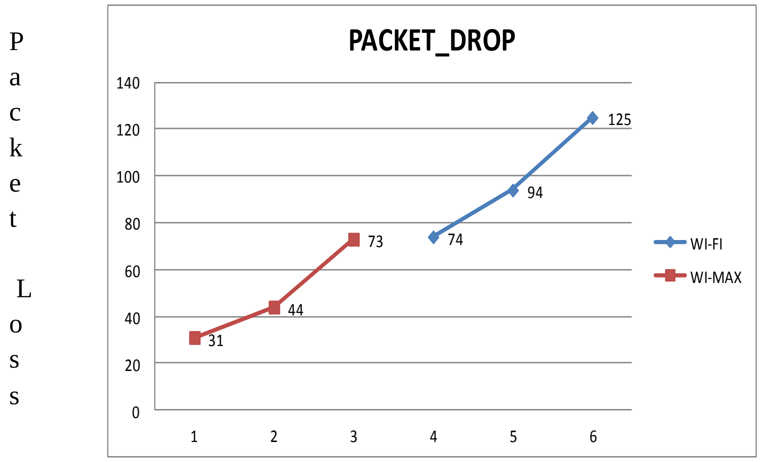


Fig. 6 Number of Handoff VS Throughput TOPSIS method.

In the below graph packet drop ratio for a dynamic network is considered. During multicall handling packet is dropped when the data rate exceeds the level of network weight.



No. of Handoff

Fig. 7 Number of Handoff VS Packet Loss TOPSIS method.

4.4 MTOPSIS (FAHP+TOPSIS):

The graphical result shows the relationship between handoff and throughput during multicall handling using MTOPSIS method. It can be seen from the figure that the handoff reduction results in throughput increment. Generally the MTOPSIS method recommends the network weight and rank assignment as effectively. We are considering two networks (wi-fi, wi-max) and its packet loss gives the each network capacity. It helps to analyze energy awareness as well as distance between two are more base station.

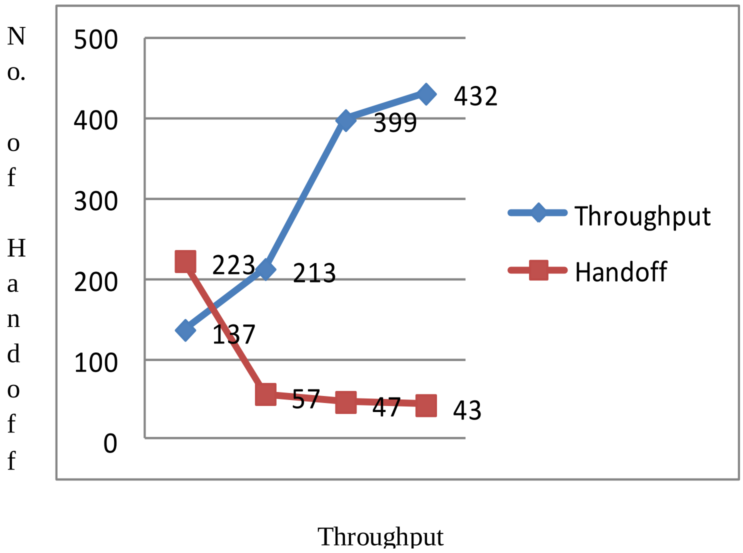


Fig. 8 Number of Handoff VS Throughput MTOPSIS method.

In the below graph packet drop ratio for a dynamic network is considered. During multicall handling packet is dropped when the data rate exceeds the level of network weight.

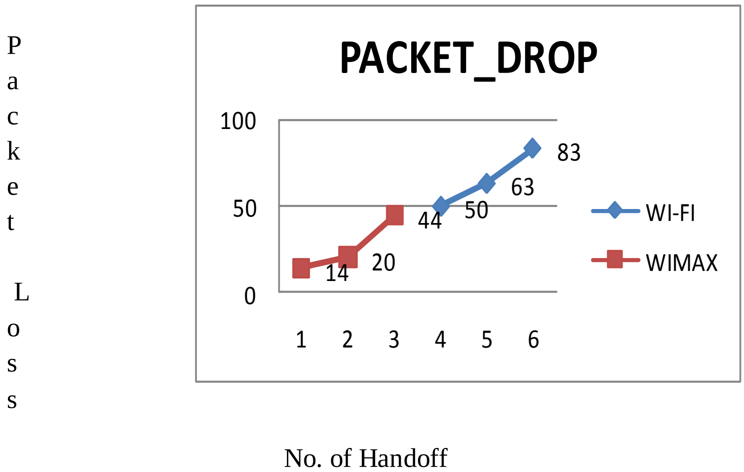


Fig. 9 Number of Handoff VS Packet Loss MTOPSIS method.

V. CONCLUSION

In this project we have presented the weight factor estimation technique for vertical handoff decision algorithms. In the traditional handoff techniques the number of handoff takes place was more. We are analyzing FAHP and TOPSIS techniques to reduce the number of vertical handoff but in the traditional handoff techniques the number of handoff takes place was more and only handling single high data rate call at a time by dynamic networks. The analyzed FAHP technique to reduce the number of vertical handoff. By implementing these techniques to reduce the number of handoff and also handles the multiple high data rate calls at the same time using different available network selection.So FAHP is designed and implemented and the results are shown in simulation using graph.

In future FAHP and TOPSIS techniques are design and their results are separately simulated and also focusing on reverse billing concept, the simulation values are compared in graph by using the group decision making algorithms.

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