

Resource Management Scheme in Heterogeneous Networks

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ABSTRACT— Joint Radio Resource Management (JRRM) has been used for an effective use of radio resources in heterogeneous networks. The efficiency and function of this method of management will be better than radio independent resources management in any radio access technology. In this paper, we introduce new management which its function is based on data analysis on the basis of Big Data technology. In our proposed scheme, we choose the most appropriate RAT considering various parameters including service type, the information relevant to the user's location, the user's type of movement and service costs and also by considering few statistical indices. It is predicted that aside from the increase in the decision-making's correctness in choosing RAT and the ideal distribution of network load, the proposed method provides fewer service for the operators

KEYWORDS: Resource Management, Radio Access Technology, Roaming, Decision Making

Introduction

Process of vertical transit occurs under effect of user's relocation, improving the quality of service or reducing cost. Suggested algorithm VHO contains two stages:

- 1) JRRM always verifies periodically all of meetings under itself so that recognizes the change of their conditions.
- 2) If a user changed its condition, so that moved from an area of hot point to the out of that area, and if it was using technology IEEE 802.11, it occurs due to the power level of received signal from IEEE 802.11, an intersystem transit from IEEE 802.11 to CDMA. But if user relocates from the out of area of hot point into area, with regard to kind of user's service, a suitable RAT is choose for doing the transit action. For non-real time services that are belonged to vehicular user, there is not a transit until to prevent the repeated vertical transits, in contrast, for a non-vehicular user, due to reducing service cost and increasing operational power, an inter system transit occurs from CDMA 2000 to IEEE 802.11. For real time services that are sensitive to time, stability of service is more important than the cost of service and operational power. So, decisions of continual vertical transit in a real time service, information of predicting the condition of user is used so that if it has been predicted that user, in its period of time meeting will be relocated from area of hot point, any transit will not be occurred. Otherwise, a vertical transit will be done to IEEE802.11. For becoming better the method of performance of algorithm VHO, its flowchart has been brought in the following.

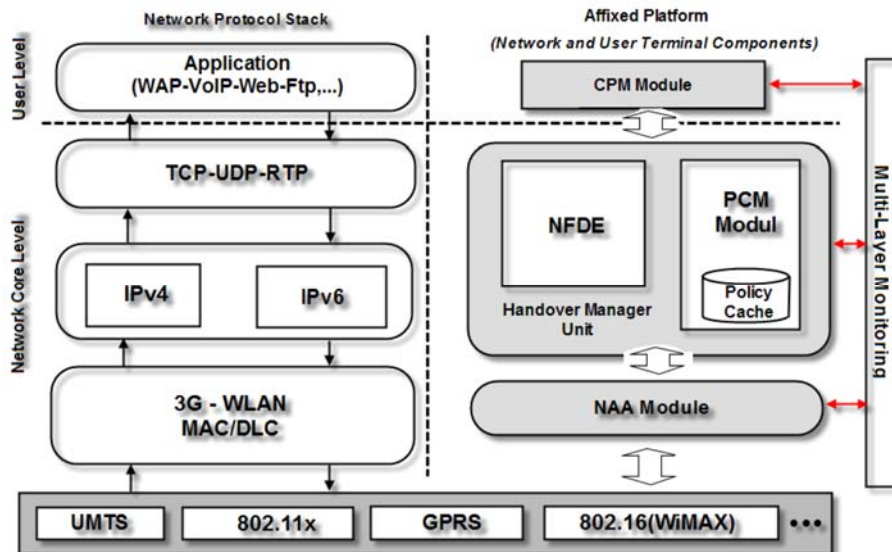


Figure 1. Flowchart of algorithm method

When each of above accidents occur, the algorithm of choosing access channel is used: (A) a new service demand to be created; (B) user to change his or her choice; (C) terminal of mobile phone along with accessibility to new channel is recognized; (D) strongly weak signal or complete downfall of signal to be occurred in the present radio relation. The parameters that are used for algorithm of choosing access network contain the power of signal (S) cover area of channel(A), data rate(D), cost service(C), reliability(R), security(E) power of battery(P), speed of mobile terminal (V) dormancy of the channel(L). The main purpose of algorithm of choosing network, defining and choosing access channel of wireless or optimized cellular for a certain service needs high quality so that provide the following purposes. In the continuance, we define the effective parameters in the manner of pattern performance based on phase decision making as following:

- *Good power of signal*: power of signal is used for indicating reliability of a channel and if the signal power of the channel to be good that network will be found.
- *Good coverage of the network*: alternative handoffs cause delay and wastage of packages. If a network has coverage big area, users of mobile will prevent repeated handoffs; because in this area, they will become under the coverage of rooming.
- *Optimized rate of data*: network that can transfer the signals in a high speed, it is preferred, because it reduces maximum data rate of delivering time of services for unreal services, and improves matching service of quality with real services.
- *Less cost of service*: the presented cost of service is important for the users, and it may affect the choosing accessibility channel of the user, and as a result decision making for handoff. May be, by cheapest channel, a user wants to have relationship with accessible network so that to reduce the cost of services.
- *High reliability*: in the network reliability, there is no mistake, and so, we can rely on the performance of its high quality in delivering packages.
- *Powerful security*: powerful security improves the union and arrangement of information. In the time of exchanging secret information, a network with high coding is preferred.
- *Good speed of mobile terminal*: when a transferring is done with high speed, handoff is interested in a combined network in the covering structure of non-matched networks. In very short periods that a mobile terminal leaves combined networks, there will be handoff in the main network.
- *Conditions of lees power of battery*: consumption of battery must be minimum; because mobile sets have limited battery capabilities. When the level of battery reduces, the best decision making will be handoff in a network with conditions of less battery.
- *less latency of the network*: high latency of the network reduces applied programs and transferring. The algorithm of handoff should be so faster that disconnection mobile set does not experience decays of service or disconnection. Every above mentioned parameter, with different coefficient effect, can directly do the necessary effects on decision making related to choose changing hands. As it has been posed in surveying suggested performance pattern, using concept of huge data is our basic findings for getting optimization in the network. The effect of some parameters that we mention them, are observable in defining the limit of threshold in the network and also we can analyze some effects of these parameters in a phase form.

Effective Parameters

- Index of calendar

In introducing this index, we can say that calendar mentions to the events that has high effect on population distribution of an area, city or country and also motivating use of special telecommunication service for a certain group in a period of time that these events are repeated periodically.

- Moving direction of the customers

For decision making of the real time in mobile systems, operators should have glance to the method of movement of the customers so that to certain the method of population distribution and to devote the best resources. Then, self-optimization technology in these kinds of networks will be proposed and technology of huge data will be discussed as a tool in making intelligent of network in decision making. So, in addition to KPI parameters that we introduced, we use other parameters that in the next, we will survey them:

- Index of traffic distribution in night and day (phenomenon of day and night)

In providing capability and devoting the sources in mobile networks, we should pay attention the period of time that so many users use different services that are called busy hours, and also the hours of days and night that are at least using rate of different services.

- Environmental effects

• Stating modern solutions in presenting a self-optimization model in multi-carrier, based on structural characteristics of networks of new generation of mobile, can be very useful. But, mentioning this point is necessary that, in order to making realistic of this design, we will also face with a lot of challenges. In the continuance, in a case, we will pay attention stating of this kind of challenges.

• The first step in modeling a self-optimization system is finding and collecting suitable information about the complex of user's data [2]. Therefore, it is necessary, by using an automatic system, to find and clarify information related to existences, and by a suitable format to enter to system of data analysis. Collecting this information is one of basic challenges in the field of analysis according with huge data. So, for collecting information related to existences, also it is necessary for a responsible system, to have necessary dynamism.

Due to completing this design and also approaching the design to real conditions, it is necessary to use self-optimization design that also to have performance ability in the networks of new generation of mobile. On the other hand, according to presented standards in global union of telecommunications, the rate of delay in these networks is very low. Therefore, our presented self-optimization pattern should be like a real time. Namely, it is necessary to have a proactive son self-optimization model. And in this case it is necessary to have prediction capability in the design of self-optimization. With regard to this point that approximately all of posed discussions in past works are around self-optimization is unreal time, it is thought that presenting a different design with supporting capability of online services to be along with a lot of problems.

Being modern of using the methods of data analysis in optimizing mobile networks and entering parameters related to occurrences and without telecommunication statistical parameters along with KPI characteristics, is very important in making intelligence of our self-optimization system. At the moment, this idea is stated only a descriptive idea, and practically we cannot find a design, that by using this method, to gain a framework for making more efficient of mobile networks.

In this paper, for obtaining to a valuable and modern, we tried to use the modern tools in new networks of mobile. In this regard, telecommunication new discussions are used such as 5G that will be commercial from 2020 and also technology of new data that is called a huge revolution of the era of information technology will be commercial. Combining of these new discussions can, also, be along with problems that in performing this design, we will face with them.

Proposed Method

In this paper, by using the methods of huge data analysis, our purpose will be obtaining to the self-optimization limitation in multi carrier networks. After surveying the presented models, it will be tried to present solutions for some present challenges in the mobile networks field of new generation. We will pay attention the suggested model. In this model, we have tried to cover the present defects in past designs. General framework of this design has been formed from different parts that have linked like block diagram to each other. These parts can be interpreted in relation with a self-organized system with the technology of huge data. But, in continuance, we will pay attention for complete surveying of suggested idea in the framework of this diagram block. It should be noticed that because our work field is mobile networks of new generation, so, it is natural that also our way of receiving information will be the way of Up Link of network from linked things to Femtosels and also different users till the core network [3]. All of received information will be used for analyzing of determination of rate accuracy of dedicated sources till we have suitable control on internal and external interference rate. Next, we will survey physical model of Femtosellayer. In this study, we have tried to present an approximate model of optimization relation that has been used in the layer structure of multi carrier network. The next step in self-optimization networks, by certain approaches that there is measuring management and is able for learning, will be introduced based on past and present observations. This is the method of self-organized networks that

are not limited by pre-introduced algorithm and in this pattern, one part of the network are able to arrange any sudden conditions. In this design, we have observed a capability that has been introduced according with this new approach till the nodes of a network also can have the ability of teaching. With performing the algorithms of machine learning, they will be able for exchanging information and teaching each other that will accelerate the process of self-teaching and will cause to faster convergence. Movement towards the changes of fifth generation not only there is in accessible radio network but also there is the section of core of network that its new approach makes possible the designing needed network for presenting services accordance with the users and increasing sets. The trend is like this that separating hardware and software and the movement of functions is one second. In order to extending the presented model to real conditions, it is necessary to observe the network obligations in different conditions and different periods. As we observed in surveying past works, the affairs that have been posed in the field of optimizing mobile networks and presenting a self-optimization model, it performs the intelligence of network only through analyzing KPI telecommunication efficiency parameters, and they neglect effective non-telecommunication parameters in distributing network traffic and transferring network bar, and based on, the destructive outcomes that there are in mobile networks due to environmental and social factors, will not be considered in this kind of designs. In order to implement the plan to self-optimization based on data analysis, we divide the self- parameters into two general following categories. Our purpose is reaching to the self-optimization pattern that in this design one part of the network, based on supervision on the parameters of these two groups, can predict the conditions of is future and to estimate the rate of its needed sources according network bar in every part of the network. The pattern that we will present from self-optimization will contain two parts of three parts in performance of self-organized systems.

- Self-optimization
- Self-healing

Three features that distinguish our suggested design from common SON technology framework are as following:

- Complete information about the present condition of the network
- Prediction capability of the user's behavior
- Dynamic Capability of reply connection of network to the network parameters

These three capabilities can prepare solutions for designing the self-organized network that is accordance with the needs of new generations of mobile. Operation of performance blocks in the framework of algorithm of huge data in the design of self-optimization is as following stages:

- Collecting data from informational sources into mass data collection, big data
- Massive data conversion to the correct data by developing its plan
- Model: preparing a model of network behavior with learning from accurate data from two-steps
- Performing the engine of self-organizational network: using self-organizational network in model
- Validation: if new NP5 can be prepared by operator's previous knowledge or experience, it will be changed. Otherwise, it simulates the behavior of network for new NPs. If the behavior of stimulation to be according to the observed behavior, new NPs will be accepted.
- Retraining/improvement: if validation to be failed in the fifth stage, the process of changing parameters will be blocked and it will update the behavioral model even if giving validation have positive outcome, blocking will be occurred periodically to keep the accuracy of the model.

Mentioning this point is necessary that progressed plan in our model is significant from this point of view that by camping a UE on a cell, any more, for creating voice communication with other cells, there is no need to increase the bar of signaling, and only that UE is enough to demand for creating conversation to the same cell that simultaneously receives from that PS services.

In the continuance, we will survey the number successful and unsuccessful different conditions that will be naturally effective on the rate of effectiveness of the network. Also, in the next stage, we will survey the effect of movement model as a one of phase parameters.

Conclusion

In this paper, a new method of Joint Radio Resource Management was proposed which aside from providing a desirable service quality, decreases the vertical handover rate and service cost. In the considered scenario, both the immediate and non-immediate services are considered. In this paper, we tried to deal with optimization of traffic distribution in heterogeneous networks on two levels. On the first level, this issue will be done by selecting an appropriate RAT and on the second level, by establishing the user connection to the specified Femtocell's cells during the process of optimization. Using Big Data technique will have tremendous effects on prediction feasibility and better future decision-making about network load distribution which this decision-making will be done during user-level and network-level processing.

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