Radio Resource Optimization using k-NN Algorithm

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Abstract: Conventional network optimization technology in-actively change the network configurations in light of network0 s congestion proportion, decreases rate, protection holes and so on, main to sub-ultimate user studies. As a result, the target is getting the proper network position, customer requires and utility application sharing in light of the real time data to optimize the network configurations. The data mining method is acquainted with expect the useful resource limit construct absolutely in light of totally of historic dimension facts. In the direction of discover the dynamic conveyance of person require and utility request, a weighted k-Nearest Neighbours (k-NN) replica is used to calculate intermittent features of network traffics, denote temporal and spatial patterns of radio resource limits. Not like the conventional inactive network optimization methods, the radio assets can be reconfigured dynamically to satisfy the active pattern of traffic loads with the help of the usage of the proposed radio resource optimization using k-NN algorithm.

Index Terms - Data Mining, k-NN, Radio resource margin, Resource reconfiguration.

I. INTRODUCTION

The most important network quality, taking into consideration the cellular network as an instance, are budding considerably, like the same as rising request for high data speed benefits as well as thickly dispersed traffics. For this reason, network administrators are before the tremendous difficulties on the best way to improve the network ability and decrease the scope hole by network configuration optimization method in efficient manner [2]. To be exact, so as to acquire the dynamic nature of radio asset requests, a weighted k-NN replica has been proposed in view of a past informational index from cell administrators networks. To discover the most right input time arrangement information and k value for the pro-posed k-NN replica by using Mixed Genetic along with Cross Validation algorithm. Likewise, the optimization algorithm is put forward to reconfigure radio assets in abundance of the whole system in view of the traffic load

II.LITERATURE REVIEW

Among the current enlargement of data mining strategies, the algebraic knowledge methods can be utilized to represent the huge data collection of clients and investigate the course of action. The capacities in examining the information from dis-similar perspective to gain the helpful network system data, thedata mining innovation has been more valuable for its applications in both scholarly world and industry world. Researchers include planned data mining methodology for traffic evaluation along with network optimization. Bi et al. in [3] describe the difficulties and potential outcomes of versatile remote strategies to contain the enormous information and number of exciting study exertion. In addition, the geospatial progression of software utilization in a 3G network were categorized and the outcomes would be adjusting network limit [4]. Shafiq et al. in [5] calculated to how the execution of the cellular network despoiled for the period of swarming proceedings and examined the causes used for experimental execution poverty. Also, the equality between asset tradition designs was find between neighbouring cells in the spatial connection between cell traffic loads was disclosed by dissecting single week data traffic in a countrywide network. [6]. Willkomm et al. in [7] which describe the research outcomes about for access the dynamic range. The data traffic flow was contemplated in [8] and [9], which measured regarding in cooperation contributor and cellular network device. Though, no any method inside existing exploration works has been confirmed with amount of outcomes. Also, Velayos et al. in [10] depict a method for client device of over-burden access points (APs) to offer up to other under-loaded APs, to get the load adjust and show signs of improvement the aggregate throughput for covering WLAN. The traffic load adjust between WLAN was investigated and the uneven load was once lightened through wisely connect. APs not like the stronger acquired signal technique. Pillekeit et al. [12] discuss a strength based between framework surrender ways to deal with get a load adjusts in various network. A significant estimation investigation of the dynamic model of radio asset limits considered in cellular networks. Together voice and information traffics are collected more than fifteen months to explore the extended time period useful resource limits pattern. Additionally, conventional network improve-ment methodology brings about a jumble between traffic requests and radio assets. So, the data mining strategies are utilized to find every temporal and spatial parts of radio helpful resource limits to improve the load adjust. However no one of previous mechanism has apply the improve schemes during the authentic network among amount of outcomes. In dissimilarity, proposed significant amount outcomes about investigation in the administrators network and a particular optimization algorithm for dynamic radio asset re-configurations.Following are three commitments are review.

A. Temporal and Spatial Skewness Study

Toward create a complete use of information composed from number of base stations through novel framework and the algebraic approaches are used to examine temporal and spatial features of radio resource limits[1]. The results illustrate to the incompetence during resource uses, which inspires to suggest a network-wide radio resource re-configuration structure to construct an improved make use of radio resource limitations.

B. Dynamic Resource Reconfiguration Framework Using Data Mining

The prototype and feature underneath the information be able to capture via data mining method, also, a dynamic radio asset re-configuration structure is projected. As a result, operators know how to find the harms ahead of the network stop working and with strength of the network to get better the superiority of overhaul knowledge. Outcome give you an idea about that higher asset usage and an improve load adjust more than the entire network is able to accomplished by utilizing the projected structure.

C. Reduce Time Complexity Using Clustering Cells

The traffic loads elements can be portrayed by the in distinguishable model in light of the fact that the traffic load progression are parallel in a couple of cells other than are diverse in promote cells. Subsequently, various models are utilized to separate the progression of traffic load in differing cells. The cells are first isolated into more than a couple of clusters to lessen the quantity of models and the time complexity..

II. PROPOSED SYSTEM

The main network features, allowing for the cellular net-work as an instance, are mounting considerably, like as the growing difficulty intended for high information rate benefits and compactly spread traffic. For this reason, network administrators are in front of the huge challenges going on the most proficient method to improve the network capacity and lessen the scope holes by network design optimization method in a competent way [2]. Common network optimization strategies, which inertly control the network parameters centered on net-works congestion proportion, decreases rate, protection holes and so on, and are not applicable as extended during the active altering wireless network setting. In addition, the selection of services as well as individual make active, the radio resource deficiency and service command are dispersed unequally in dissimilar location also vary severely in excess of diverse time periods. Previous network optimization technologies inertly alter the network configurations located on networks congestion proportion, decreases rate, protection holes and so on. Consequently to optimize the network configurations through getting the precise network position, client requires and application. The proposed radio resource optimization architecture as shown in Fig. 1.

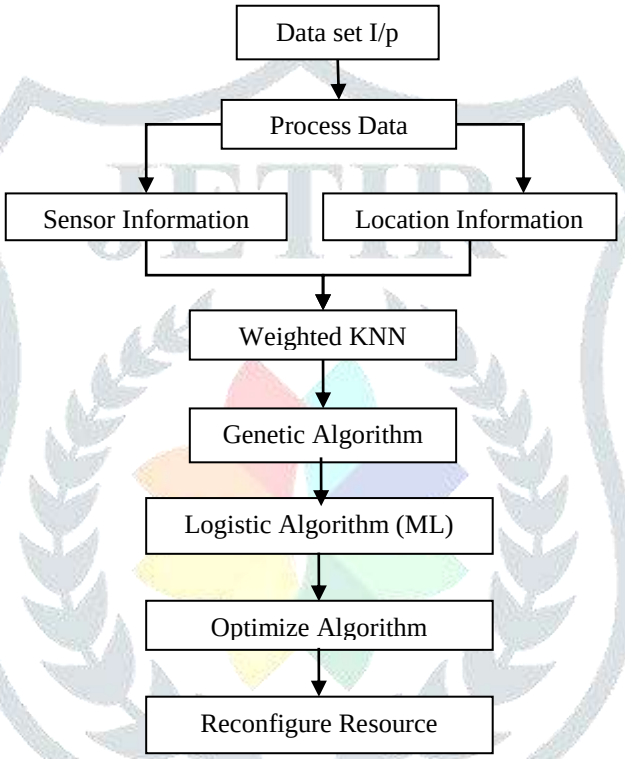

Fig.1. Radio Resource Optimization Architecture

A. Traffic Load Prediction Model

For the arrangement undertaking [16], the k-NN estimates model is effectual and uncomplicated, for the reason that samples among parallel inputs give up parallel outputs. The Euclidean distance is useful because metric toward choose the adjacent neighbour. As well as the evaluation of the production of weighted standard significance of the entire k adjacent neighbours, this is definite as the weighted k-NN model. It is accurate, on the off chance that the informational collection is gathered of (xi, yi), where xi is n-dimensional input value and yi is output value.

B. Genetic Algorithm based Weighted k-NN Model

Both input selection and k value determination are key issues to construct the weighted k-NN model. The value k is decided by diverse model structure selection techniques, such as m-fold cross validation, leave-one-out (LOO) and Bootstraps. In this paper, the m-fold cross validation is used to select the best value k. To obtain the best input set, the exhaustive search scheme among all possible combinations of inputs is too time consuming and complex to be used in practice. If L is the number of candidate inputs, there will be input combinations. To reduce the computational complexity, a mixed genetic and cross-validation algorithm is proposed to obtain the optimal input set and k value for the weighted k-NN model.

C. Dynamic Resource Reconfiguration Optimization

To make a better use of radio resource margins temporally and spatially over the whole network, both the dynamics of the traffic load in each cell and the resource reconfiguration are vital and indispensable, which are two main components of the proposed dynamic resource reconfiguration framework as shown in Fig. 2. First, the daily peak-hour traffic load is recorded. Then, historical records with diurnal patterns are used to train the k-NN model which can predict the traffic load for the next day. Finally, the daily

peak-hour traffic load is predicted by using the k-NN model, and the radio resources are reconfigured daily over the whole network by using the optimization algorithms to meet resource demands in each cell. In practice, the resource reconfiguration deployment in cellular networks can be accomplished remotely by using the software in [15]. Therefore, the channel utilization of the whole network can be improved when the traffic load balance is achieved. The proposed weighted k-NN model and resource reconfiguration optimization algorithm can also be applied to other cellular networks with minor modifications. And the time granularity of resource reconfigurations can be adjusted dynamically to meet practical demands hourly or weekly. In this paper, the resource reconfiguration is performed daily considering about the trade-off between the efficiency of resource utilizations and the cost of frequent resource reconfigurations.

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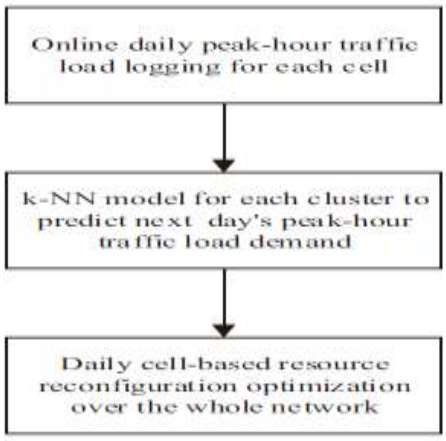

Fig. 2. Dynamic Resource Reconfiguration Framework

III. RESULT ANALYSIS

In the experiment, the expected result is based on the optimization algorithm result. With the help of this resource reconfiguration optimization algorithm, the throughput of this network is improved. Fig:3 shows before and after the optimizations for blocked cells.The Fig.4.Shows, the comparison of existing system and proposed system of cells with respect to the average channel utilization before and after the resource reconfiguration optimization.

Fig. 3.Throughput comparison before and After Optimization

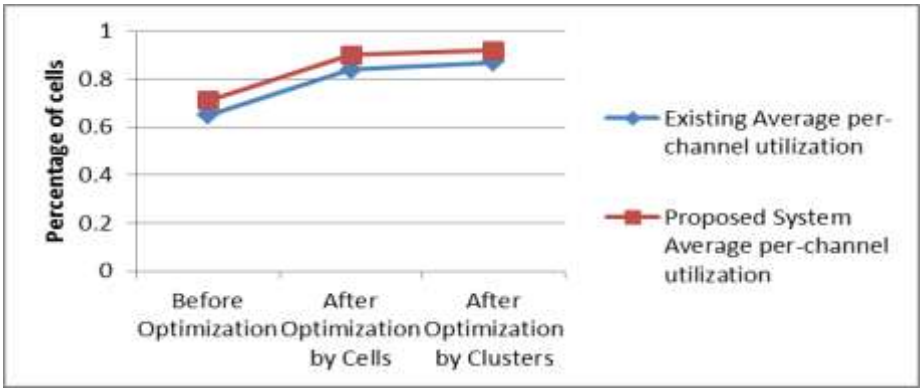

Fig:4 Statistics in one day of Moderate use

TABLE I: RESOURCE OPTIMIZATION

Optimization	Existing Average per-channel utilization	Proposed System Average per-channel utilization
Before Optimization	0.65	0.71
After Optimization by Cells	0.84	0.9
After Optimization by Clusters	0.87	0.92

Table 1: Shows the efficiency of resource utilization is improved significantly after the optimization.

IV. CONCLUSION AND FUTURE WORK

This paper proposed a Radio Resource Optimization using k-NN Algorithm. The dynamic distribution of user demand and application request, a weighted k-Nearest Neighbours (k-NN) model is proposed to predict periodic characteristics of network traffics, denoting one-of-a-kind temporal and spatial patterns of radio resource margins. By applying proposed optimization algorithm throughput of network is increases and the radio resources can be reconfigured actively to satisfy the dynamic pattern of traffic loads with the aid of the usage of the proposed a Radio Resource Optimization using k-NN Algorithm.
As our future works, by using other of data mining algorithm configurations the performance of proposed resource optimization model can be further improved.

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