

# Police Alert System using Wireless Heterogeneous Networks



G Aloy Anuja Mary, Hiran Kumar Singh

**Abstract:** The heterogeneous networks which are mainly termed as the hetnets are used when there is a need for the wireless methodologies to transmit the signal though the antenna is located at the center of the circumference of a circular path but it is mostly known as the cell because of considering the circumference around the antenna as the hexagonal shape and sometimes it may also be defined as the cellular cell that type of mode is currently used for the cellular mobile communications[1]. There were various papers that has been enhancing in various ways to develop the most easiest manner in order to decrease the complexity of the transmission of the signals through the hetnet methodology. These hetnets are at present used in the field of 5G, LTE, LTE-3GPP, this not only provides the 5G but also the beyond communication the researchers have been trying hard to achieve this by 2020 and to make the user friendly communication service it is even used for the optical wireless communication there may also be the scope of the using these technologies completely along with the desired cells[2]. This paper mainly deals with the wireless interconnection between the police protection force and the common people to overcome the several issues that has been evolving in this current generation.

**Keywords:** Micro cells, Macro cells, Pico cells, Femto cells, Wi-Fi, Hetnets

## I. INTRODUCTION

The introduction of the hetnets are put into the existence because ,as the number of mobile phone users have been increasing the number of nodes for the data transmission also increases then as the number of nodes increases the power consumption increases automatically the radiation also increases so as to avoid these difficulties the architecture of the hetnets are designed[3].

The design of these hetnets are mainly consist of the micro cells, macro cells,femto cells, pico cells and wi-fi[6]. As each of them perform their own role for user free interface such as the macro cells that are used to facilitate the coverage and the micro cells and the pico cells are use to improve the capacity of the coverage in huge traffic zones or heavy crowded areas[4]. The femto cells and the wi-fi used to provide their support in the homes and office areas the size of the cell

competes to provide the desired and robust data transmission as these many cells are contributing to their own extent [8].To meet the limitations of one from the another[5].The basic structure of the heterogeneous network for the organization of the cells is as shown in the fig 1

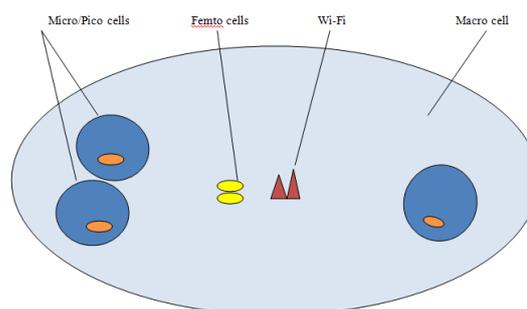


Fig 1: HETNET design architecture

**A.Macro cell:** The macro cell is the largest one through which the coverage can be provided and through this and the remaining sub parameters gather the data from this . Hence it is here acting as the base point of the entire system.

**B.Micro cell:** The Micro cell is next to that of the macro cell the information that is gathered by the macro cell is then provided towards the Micro cell to enhance the capability of the source to become more compatible.

**C.Pico cell:** The Pico cells are also used for the same purpose to not to deploy the strength and hence to densify the strength of the signal to support the users and a risk free environment these are used most widely in the crowded areas, on roads etc., whereas the Micro cell is also used for the same purpose as both of them try to enhance the capability of the source information obtained from the Macro cell.

**D.Femto cell:** The Femto cells are use for the places where the compatibility requirement is when less prior to that of the Micro cell and Pico cell and hence these are used for home purposes.

**E.Wi-Fi:** As the name indicates this is the wireless fidelity whereas we too require the wireless systematic approach for the heterogeneous network which is mainly chosen for the wireless and the complexity less purpose so as to made to reduce the complexity involved in the design circuit as well as the speed ,accuracy and also the limited band specification this Wi-Fi is also for the same purpose of the Femto cell that is to provide the easy access to the homes and offices the Femto cell is also used for the office purposes.

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## II. HETNETS USING RELAYS THAT ARE USED FOR 3GPP AND 5G

The above design structure only represents the cell structure and there is no representation of the relay which will be seen into the depth realization now.

The following figure represents the cell consideration within the circumference of an antenna as shown in the fig 2:

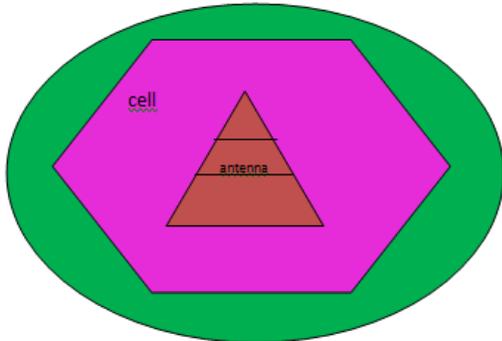


Fig 2: The antenna within the cell

From the introduction we have come to know about that few parameters of mostly the cells have participated their lead to promote the heterogeneous network to promote the basic development of the concept where as with the introduction of the relays the methods that are applicable to the version of GSM can also be applied without any much background that is required and not only that to an information the concept of hetnets with the modifications has been deeply revolving around the 3GPP LTE and 5G. The hetnets with use of relays is as shown in the following figure 3[3]

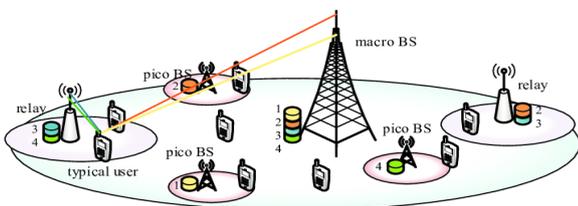


Fig 3 : hetnets with the complete organization

The working with each and every hetnet cell is same whereas the wireless technology methods are different through optical way, cognitive manner etc.,[7].The phenomenon of utilizing these hetnets with the relays is to be explored whereas the other parameters in the design are known in previous introduction part along with the basis of the optical methodologies.

**A RELAY:** There is a relay used because for the most of the wireless communication purposes these relays are used between the source and the destination through few nodes and these nodes are nothing but the Macro cell, Micro cell, Pico cell, Femto cell and Wi-Fi. This is connected externally and to improve the external capacity of the cellular system. The upper and the lower nodes are used to gather the desired frequencies from the operator and then facilitate it to the next sequential step.

## III. LITERATURE SURVEY

1.Optimisation and analysis of Probabilistic caching in N-tier heterogeneous network by Kuikuili ,Chenchen yang, Mexia tao

- ❖ They gives the overview about the Cache enabled wireless networks that it is used to avoid the interferences while the user has been selecting the desired network and also this is cache that is located to provide the ease access for providing the quality of service to the user to avoid the back haul and also that the optimal performance of the network depends on the cache size and base station densities.

2.Telecom ABC has written the TELECOM ABC-H where “H” is Heterogeneous network (hetnet).

- ❖ In this paper they have detailed about the heterogeneous network parameters such as the number of cells and the transmission of the signals and there is only the brief and the clear cut examination with just the diagrams about what define the hetnets phenomenona

3. SNR- based adaptive spectrum sensing for cognitive radio networks by Waleed Wjaz, Najam UI Hasan,Hyung Seok Kim Adaptive local spectrum sensing scheme

- ❖ In this paper the author cited about the minimum sensing time for the cognitive radio networks which can be deduced by using either energy networks or by the one order cyclostationary schemes as shown in the graph that the adaptive spectrum is lesser than that of the one order cyclostationary.

4. Heterogeneous networks in 3GPP LTE—by Jeanette wannstrom ,masaterlte faster.com and keith mallinson, wiseharbor

- ❖ The following figure –g describes the entire 3GPP LTE network

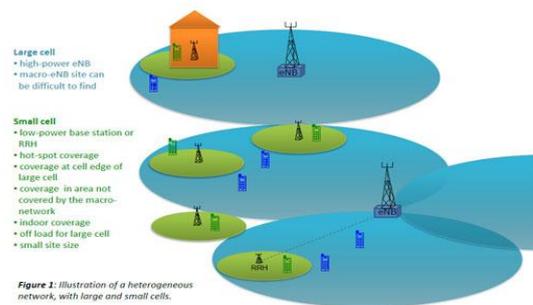


Figure 1: Illustration of a heterogeneous network, with large and small cells.

Fig 3:GPP LTE network

The above figure represents that how the 3GPP LTE network can be made to be work with along the GSM network model but there are some linear interferences that have cleared with the usage and the enhancement of the large cell and the small cell as shown.

5.Analysis and optimization of probabilistic caching in multi antenna small cell networks by xianzhe xu and meixia tao in arXiv 1709.00664v2[CS.IT] 13 sep 2017

- ❖ The paper that is explained about that the user centric clustering model of SBS it says that the user can select the required SB in that cluster and that provides the two beam forming schemes one is ZF and the other one is MF

where ZF represents the Zero Forcing scheme which is used to avoid the interference while selecting the  $k$  network by the user from the cluster and the  $M_f$  is the matched filter which always applies the perfection of resembling with each of the SB this is an uncoordinated cluster whereas ZF is the coordinate cluster

6. A cognitive femto cell access point in hetnets to mitigate interference—by K.viswanathan ,Ramamurthy .G mainly summarises about the cross-tier and co-tier interference without any information from macro cell base station.

❖ In this paper the author mainly cited about the need of cognitive femto cells to overcome the use of the micro cells to be embedded on the macro cells using the algorithm is as follows

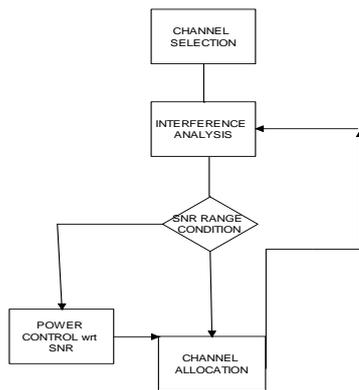


Fig 4: CFAP follows this algorithm

7. In this paper the author, K.Murali.etc.al [9] mainly focused on the necessity of the HetNets in wireless echo friendly communication systems for efficient operation of the networks,

IV. PROPOSED MODEL

The proposed model of this paper is the three alarming keys which is completely wireless here in this concept the main operating system that is nothing but the commissioner office and the macro cell is the base station and the micro cell is the connected substation that links up the ministration of police department and this is also connected to the houses of the locality the block diagram of the propose model is as show in the figure 5

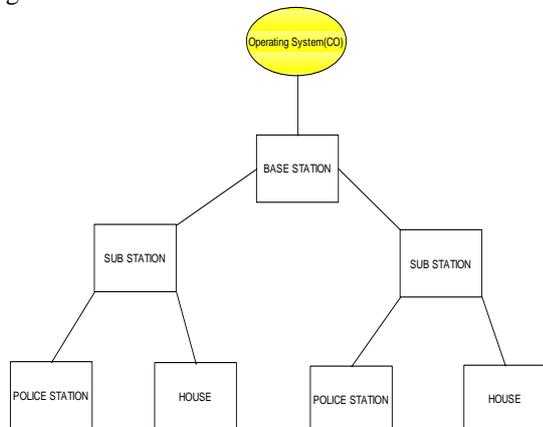


Fig 5: Block diagram representing the proposed model

4.1 IMPLEMENTATION: The proposed model is consisting of the app with the three alarming keys consisting of R,E, and D which represents the that R-reconnaissance ,E-

emergency and D- danger to an obvious clearance consider a city of having the few houses and the police stations to their respective divisions of the city and then these police stations and the houses are interconnected to the nearby substation and also with them too whereas this sub-station is connected with the base station as explained in the block diagram and the phenomenon as said that it runs wirelessly that when the user pressed any one of the key in their mobile phones among the three alarming keys(R,E,D)then depending on the key police troop start to respond if it is 'R' it means reconnaissance then they start to monitor the user house as the user also activates his door camera then they visualize everything so that the police can catch the thief without any delay as they get an immediate information similarly danger button incase of any fire accident etc they can click 'D' and in case of the medical aid need then they has to click on 'E' then they can send the nearby hospital members to that location immediately. There will be less time delay and then the band of spectrum to that entire city will be completely small then they can provide the radiation free environment and then the power consumption is also less with much accuracy. The implementation of the model layout is as shown in the following figure 5

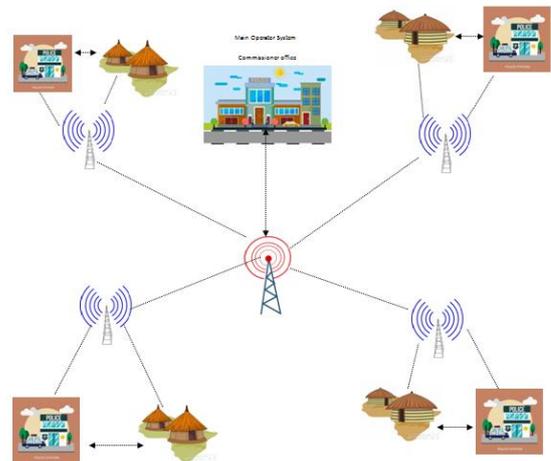


Fig 6: The implementation of the proposed model of the three alarming keys

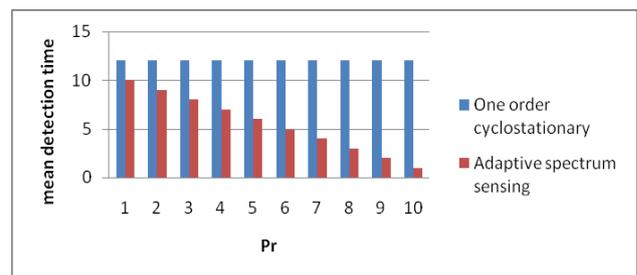


Fig 7: Mean detection by varying Pr

V. CONCLUSION

The paper deals with of how the people can be easily interfaced towards the wireless networks and how does the security get improvised can be done is the main aspiration of this concept as the band of the spectrum must be limited so as to avoid the health generating problems and also to reduce the crime rate within that city as per the above explanation.



These wireless networks cannot be disturbed or there is a no chance of interference to the maximum extent and the utilization is comfortable for the user. The CFAP required algorithm can also be used incase of the idea of reduction of the complexity

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