International Journal of Advance in Computer Science & its application – IJCSIA 2018
Copyright © Institute of Research Engineers and Doctors , SEEK Digital Library
Volume 7 : Issue 2 [ISSN : 2250-3765] - Publication Date: 25 June , 2018

Methodology of Automated Extraction of Data From Files for Empirical Research in Ubicomp MANETs.

M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY

***Abstract* – The future of ubicomp will undoubtedly proliferate with features of reliability and adaptability well addressed [1]. Ubicomp technology will succeed in business and day-to-day functionalities based on suitably designed metrics and known trends of these metrics, at least from the starting point of simulator. Such work are being forwarded [14-65]. What remains to be put forward to the research community is the methodology that was devised so that the prior work [14-65] could be undertaken. The methodology itself has been novel and required designing and implementing components not formerly produced, nor are available off-the-shelf. The methodology is split into five steps.**

In this paper, the fifth step concerning methodology of automated extraction of data from files for generating final results and reporting the particularities involved. This work is undertaken in TCL over results generated form NS2.

The results of this study will serve in guiding other researchers towards better organising the sequential steps of their research when they reach such a point and use this methodology towards identifying what has to be extracted for analysis. This paper is a retrospective delivery of the fifth of five parts of the methodology developed over which previous work [14-65] was done.

Key terms: Ubicomp- Ubiquitous Computing, CBR- Constant Bit Rate, MANET- Mobile Adhoc Network, NS2- Network Simulator 2, ch_sq→ least reduced Chi-square

M. Kaleem GALAMALI,
University of Technology Mauritius (student)
Mauritius
mkaleemg@gmail.com

Assoc. Prof Nawaz Mohamudally
University of Technology Mauritius,
Mauritius
alimohamudally@umail.utm.ac.mu

1. Introduction

Much of the future of ubicomp is expected to be based on probabilistic metrics-based adaptations to deliver commendable performance in ubicomp topographies. To help in such aims, it is necessary to have the knowledge of applicable metrics and their theoretical trends. A substantial amount of work in this direction has been provided before [14-65]. It would be beneficial to know the methodologies that have been developed, including their design concerns. Availability of such methodologies will accelerate empirical research into further metrics development. As mentioned in prior four papers [66-69], the methodology has been split into five components:

i. Tracking of exact positions of ubicomp MANET nodes.
ii. MANET Route formulation and tracking nodes energy expenditure.
iii. Processing of MANET_Routes_Packets_Per_CBR
iv. MANET Results Generations.
v. Automated Extraction of Data From Files

The work published beforehand [14-65] were based on application of exact location-awareness at per packet transmission level. The first four parts have been developed in previous papers [66-69]. The fifth part of the methodology which is also the smallest of the five, mentioned above, is depicted as a key contribution of this paper is built over the first four parts. Automated extraction concerns opening a file and analyse data algorithmically and obtain results to be saved in different files. This is basically a basic programming skill but is not the intended focus of this paper. The focus is on the two stages for automated extraction devised and what are the data that were observed as extractable and how the saving was done till reaching the final tabulated results for plotting. It is recalled that simulator NS2 has been used with a topography of 300 x 300 m^2 and TCL as programming language. The rest of this paper is organised as follows: section 2: Experimental set-up used, section 3: Methodology Details and Section 4: Conclusion and References.

2. Experimental Set-Up Used.

The same experimental set-up described in prior papers [66- 69] is applied here again.

3. Methodology Details.

Two stages of the methodology have been devised:

i. Automated extraction into datasheet
ii. Automated extraction from datasheet into tabular display

This section derives its importance of illustrating the methodology of dealing with massive amounts of data being generated for such a study. The potential methods of working with such data were data mining techniques, storage into database for further processing and

automated extraction of data into datasheets and files. The process of automated extraction has been chosen due to its simplicity, effectiveness and easy applicability over several sets of extraction with very minor modifications. The report hereunder give good details of what data were needed to be extracted and be presented in suitable form towards successful plotting.

More importantly this section describes the final steps required towards reaching the objective intended in which enabled previous studies [14-65].

3.1 Energy Consumption Considerations.

Several data files have been generated for studying previously explained metrics. However, more precise sets of processed data was felt necessary for further processing before plotting on gnuplot. Examples of required information (directly retrieved from files or processed with data from the files) for each node_number includes:

i. Peak value.
ii. Next peak value.
iii. Rightmost outlier.
iv. Previous to rightmost outlier.
v. Smallest of first 5 values in plot.
The above parts (i – v) can be accompanied with coordinates, line at which they occur and number of nodes or CBR represented by the y-value.
vi. Effective x-range.
vii. Effective y-range.
viii. % CBR/readings within predictable range.
ix. Minimum values in plots for y-axis.
x. Number of plots on right of peak value.
xi. Number of plots on left of peak value.
xii. Limits within which 95% of plots lie.
xiii. Total number of plots.

The problem was that visual extraction of these data would be extremely time consuming and error-prone. The only solution was to write appropriate programs for reading the data files and output/save the required data into appropriate files. The naming convention adopted here, preceding the metrics name "mn" was "Extracting_data_*mn*.ns" files for the program and "Extracted_data_*mn*.dat" for the saved file; examples are "Extracting_data_max_ratio.ns" and "Extracted_data_max_ratio.dat". For each node number, at the end of each extracted data, the projected equations of tendencies observed could also be written and space left for jotting down the parameter and reduced chi-square values on the printed version.

Writing an "Extracting_data_mn.ns" file took on an average about 6 hours for writing, testing and executing. There has been 16 such files to write. Of course, code re-use with amendments has been vital. This work has been very feasible since the process described in previous paper [68] was most time consuming at this stage and process described in previous paper [69] and further extraction of data over completed nodes in previous paper [68] could be done in parallel.

The results are shown in **figure 1**. The values of a, b and ch_sq will be obtained while performing plotting and fitting of best line in gnuplot.

3.2 Packets Per Distance Considerations.

Following the data produced and described in section 3.1 of this paper for each node number, a similar strategy for assembling particular data for parameters of equations and of this paper, critical values have been performed. The strategy was simple: just look for the line with a particularly identified starting fields and copy the lines and perform appropriate concatenations into another file for tabular display. An example is taken from a portion of a file for "max_FP" parameters of equations and shown in **figure 2**. Each line starts with "`max_fp node_number`"

From the table produced above, graphical plotting is facilitated since values of node number in each line occupies exactly the same field position in each line, just as each parameter. Some minor manual intervention had to be performed to insert a space between the equal to sign "=" and the particular value. This has been easy by using the "find and replace" utility in "gedit" and has taken little additional time.

4. Conclusion.

This piece of report, though quite short, has explained the details of the last step of a novel methodology and implementation of a method for automated extraction of data from files for empirical research in ubicomp MANETs over a topography of 300 x 300 m^2. The implementation was done in TCL programming language. Processed data were stored and rounded to appropriate decimal places. Such a methodology with modifications/refinements may be applied by other researchers performing empirical research in ubicomp to formulate new metrics and reliability features. The part described in this paper has been the last of five steps of a novel methodology since such components were not pre-existing. The previous empirical work [14-65] have been carried out using this methodology.

```
overall_energy_savings node_num 7
total_num_CBR: 6300
minimum_value_of_OES : -1392
leftmost plot: ( -1392 , 0.079365079365079361 ) i.e 5 CBRS
rightmost plot : ( 90 , 0.079365079365079361 ) represent 5 CBRS
total_num_plots : 198
num_CBRS_negative_Energy_savings : 735 represent percentage: 11.666666666666666
num_plots_less_than_zero: 108 of 198
num_CBRS_zero_Energy_savings : 5 represent percentage: 0.079365079365079361
num_CBRS_positive_Energy_savings : 5560 represent percentage: 88.253968253968253
num_plots_greater_than_zero: 89 of 198
peak value: ( 65 , 2.6984126984126986 ) i.e. num_CBRS: 170 at line 174
adjusted x_coord of peak value:

num_CBR_x_coord_less_than_peak_value : 4600 represent % 73.015873015873012
num_plots_left_of_peak_value : 173 of 198
num_plots_right_of_peak_value: 24 of 198
num_CBR_x_coord_greater_than_peak_value : 1530 represent % 24.285714285714285
percent_savings_top95 as from: -68 num_CBRs_greater_equal_for_top95: 5985
percent_CBrs_greater_equal_for_top95: 95.0 line_num_top95: 68 numPlots_top95: 131 of 198
x_coord for Symmetric Left_point, Peak , right point : ((40 , 65 , 90 )  giving interval width of
50
observed width: from :_________  to ___________

num_cbr_symmetric_range: 4218  percent_cbr_symmetric_range: 66.952380952380949
num_plots_symmetric_range: 50
num_cbr_previous_to_symmetric_range: 2082 percent_cbr_previous_to_symmetric_range:
33.047619047619051 num_plots_previous_symmetric_range: 148
start_limit: -1500 end_limit: -1000 total_cbrs: 10 %_CBR_in_range: 0.15873015873015872
num_plots_in_range: 3
start_limit: -1000 end_limit: -500 total_cbrs: 20 %_CBR_in_range: 0.31746031746031744
num_plots_in_range: 7
start_limit: -500 end_limit: 0 total_cbrs: 705 %_CBR_in_range: 11.19047619047619
num_plots_in_range: 98

***** Predictability eqn  : F(x) = b * (1/(a*sqrt(2*pi)))* exp(-(x-___)*(x-___)/2*a*a)
a =                    b=                         ch_sq=
```

figure 1: An example of extracted data for overall_energy savings in node num 7

```
max_fp node_number 7 G(x) = (a) * exp (b * (x- 1.8 )) + c a =
8.54055129432197 b = -1.19129672743036 c = 0.156900557106651 d =
16.4852607709757 f = -21.4595616024197
max_fp node_number 8 G(x) = (a) * exp ((b) * (x- 2.1 )) + (c) a =
7.1907 b = -1.05364 c = 0.14835 d = 0.999865837891495 f =
12.1605948969841
max_fp node_number 9 G(x) = (a) * exp ((b) * (x- 2.1 )) + (c) a =
6.8712 b = -1.01343 c = 0.12066 d = 10.4365079365084 f = -
14.8809523809533
max_fp node_number 10 G(x) = (a) * exp ((b) * (x- 2.0 )) + (c) a =
6.9223 b = -0.8821 c = 0.0727 d = 8.69047613065646 f = -
11.7380951359448
```

figure 2: An example from a portion of a file for "max_FP" parameters of equations

This methodology was designed without concern for nodes in the MANET being supplied as infrastructure or not. It is also assumed that all nodes behave well in the concerned topography. The programming language used has been TCL. Researchers may adopt the methodology using other programming languages. The results of this study will serve in guiding other researchers for better organising the sequential steps of their research when they reach to the need of such a methodology and also to better identify what has to be extracted for analysis.

This paper is a retrospective delivery of the methodology developed over which previous work [14-65], which would have been the future work of this paper, have already been carried out and published.

References

[1] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Towards Dependable Pervasive Systems-A Position and Vision Paper, CEET 2014

[2] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Energy Savings achievable with Location-aware Node-to-Node Transmission in

UbiComp , CEET 2014

[3] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Energy Savings achievable with Location-aware Node-to-Node Transmission in UbiComp Using Location Refresh Intervals, CEET 2014

[4] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Energy Savings achievable with Location-aware Transmission in UbiComp Using Relays, CEET 2014

[5] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Mathematical modeling of need of exact number of relays to ensure seamless mobility in mobile computing, CEET 2014

[6] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Modelling of need for multiple relays for ensuring seamless mobility, CEET 2014

[7] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Investigation of prominence of placements of relays in a ubicomp topography,

[8] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of energy savings achievable with location-aware transmission in ubicomp using optimised number of relays.

[9] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Investigation of Prominence of Placements of Optimised Number of Relays in a Ubicomp Topography using Location-Aware Transmission, CEET 2015.

[10] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Node Battery Availability in Ubicomp with Location-Aware Transmission, CEET 2015.

[11] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Node Battery Availability in Ubicomp with Location-Aware Transmission using Location Refresh Intervals, CEET 2015.

[12] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Node Battery Availability in Ubicomp with Location-Aware Transmission using Uniformly Placed Relays, CEET 2015.

[13] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Node Battery Availability in Ubicomp with Location-Aware Transmission Using Optimally Placed Relays, CEET 2015.

[14] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Sender Node Energy Savings Achievable with Location-Aware MANET Transmission in Ubicomp. ACCN 2016

[15] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Overall Node Energy Savings Achievable with Location-Aware MANET Transmission in Ubicomp. ACCN 2016

[16] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Sender Node Extra Energy Savings Achievable in MANET Against Direct Node-to-Node Transmission Using Location-Aware Transmission in Ubicomp. ACCN 2016

[17] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Overall Node Extra Energy Savings Achievable in MANET against Direct Node-to-Node Transmission Using Location-Aware Transmission in Ubicomp. ACCN 2016

[18] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Energy Consumption Ratio Achievable in MANET Using Location-Aware Transmission in Ubicomp. ACCN 2016

[19] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Minimum Energy Consumption Ratio Achievable in MANET Using Location-Aware Transmission in Ubicomp. ACCN 2016

[20] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Maximum Energy Consumption Ratio Achievable in MANET Using Location-Aware Transmission in Ubicomp. ACCN 2016

[21] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Overall Energy Consumption Fairness Ratio Achievable in MANET Using Location-Aware Transmission in Ubicomp. ACCN 2016

[22] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Overall Energy Consumption Fairness Proportion Achievable in MANET Using Location-Aware Transmission for Ubicomp, CEET 2016

[23] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Minimum Fairness Proportion Achievable in MANET Using Location-Aware Transmission for Ubicomp, CEET 2016

[24] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Maximum Fairness Proportion Achievable in MANET Using Location-Aware Transmission for Ubicomp, CEET 2016

[25] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Sender Fairness Proportion Achievable in MANET Using Location-Aware Transmission for Ubicomp, CEET 2016

[26] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Distance Travelled by packets in MANETs using Location-Aware Transmission for Ubicomp, CEET 2016

[27] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Maximum CBR Distance Travelled by packets in MANETs using Location-Aware Transmission for Ubicomp, CEET 2016

[28] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Minimum CBR Distance Travelled by packets in MANETs using Location-Aware Transmission for Ubicomp, CEET 2016

[29] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Model of Range CBR Distance Experienced by Transmissions in MANETs using Location-Aware Transmission for Ubicomp, CEET 2016

[30] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Sender Node Energy Savings Achievable in ubicomp MANETs using Location-Aware Transmission, ACCN 2017.

[31] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Overall Node Energy Savings Achievable in ubicomp MANETs using Location-Aware Transmission, ACCN 2017.

[32] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Sender Node Extra Energy Savings Achievable in MANET against Direct Node-to-Node Location-Aware Transmission, ACCN 2017.

[33] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Overall Nodes Extra Energy Savings Achievable in MANET against Direct Node-to-Node Location-Aware Transmission, ACCN 2017.

[34] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Energy Consumption Ratio Achievable in Ubicomp MANET Using Location-Aware Transmission, ACCN 2017.

[35] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Minimum Energy Consumption Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission, ACCN 2017.

[36] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Maximum Energy Consumption Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission, ACCN 2017.

[37] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Overall Fairness Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission, ACCN 2017.

[38] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Energy Consumption Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[39] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Minimum Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[40] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of

Equations for Maximum Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[41] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Sender Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[42] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Packets Per Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[43] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Maximum CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[44] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Minimum CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[45] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Parameters of Equations for Range CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[46] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Sender Node Energy Savings Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[47] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Overall Node Energy Savings Achievable in Ubicomp MANETs Using Location-Aware Transmission, CEET 2017

[48] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Sender Node Extra Energy Savings Achievable in Ubicomp MANET Against Direct Node-to-Node Location-Aware Transmission, CEET 2017

[49] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Overall Nodes Extra Energy Savings Achievable in Ubicomp MANET Against Direct Node-to-Node Location-Aware Transmission, CEET 2017

[50] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Energy Consumption Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, CEET 2017

[51] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Minimum Energy Consumption Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, CEET 2017

[52] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Maximum Energy Consumption Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, CEET 2017

[53] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Overall Fairness Ratio Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, CEET 2017

[54] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Energy Consumption Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[55] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Minimum Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[56] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Maximum Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[57] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Sender Fairness Proportion Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[58] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Packets Per Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[59] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Maximum CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[60] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Minimum CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[61] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Trend Analyses of Critical Values Obtained for Range CBR Distance Achievable in Ubicomp MANETs Using Location-Aware Transmission Strategies, ACCN 2017.

[62] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Sender Node Battery Availability in Ubicomp with Location-Aware MANET Transmission, ACCN 2017.

[63] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extending Overall Node Battery Availability in Ubicomp with Location-Aware MANET Transmission, ACCN 2017.

[64] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extension of Sender Node Battery Extra Availability in Ubicomp with Location-Aware MANET Transmission Compared to Direct Node-To-Node Transmission, ACCN 2017.

[65] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Extension of Overall Node Battery Extra Availability in Ubicomp with Location-Aware MANET Transmission Compared to Direct Node-To-Node Transmission, ACCN 2017.

[66] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Methodology Formulation for Exact Location Tracking of Node Positions in Ubicomp MANETs Using NS2, ACCN 2017.

[67] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Methodology of MANET Route Formulation and Tracking Nodes Energy Expenditure in Ubicomp MANETs Using NS2, ACCN 2017.

[68] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Methodology of Processing MANET Routes for each Transmission Packet of a CBR in Ubicomp MANETs Using NS2, ACCN 2017.

[69] M. Kaleem GALAMALI, Assoc. Prof Nawaz MOHAMUDALLY, Methodology Formulation for Generating MANET Results for Energy Consumption and Packet Distance Considerations in Ubicomp MANETs, ACCN 2017.

[70] Mohammed Humayun Kabir, Syful Islam, Md. Javed Hossain, Sazzad Hossain, Detail Comparison of Network Simulators, International Journal of Scientific & Engineering Research, Volume 5, Issue 10, October-2014

[71] Arun Gupta, Web site blog "http://arungupta.co.in/blog/?p=37", title "segmentation fault in NS-2, 24th June 2012, accessed on 13th March 2014

About Author (s):

Associate Professor Nawaz Mohamudally works at University of Technology, Mauritius (UTM) and has undertaken supervision of MPhil/PhD Students for many years.

M. Kaleem Galamali is a part-time student (achieved M Phil Transfer on 28.10.2014, currently PhD student) at UTM under supervision of A.P. Nawaz Mohamudally.