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End-To-End Fully-Informed Network Nodes Associated with 433 MHz Outdoor Propagation Environment

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Abstract

This paper focuses on an end-to-end fully-informed network in a 433 MHz outdoor propagation environment with the intention of studying data flow in a network . This is motivated by the fact that, in a transmission where minimizing delay is critical, maintaining transmission time is influenced by a dataflow. As a result, 433 MHz propagation transmitter is used to analyzed the dataflow within its transmission session. This is meant to answer two questions: "how does transmission delay affect early detection of network failure within this antenna?" and "how quickly is it necessary to recover from a network failure within this antenna?" As a result, a fully informed end-to-end network was designed and built. An experimental analysis of data transmission over a network was carried out. The experimental results show that the antenna height and distance between transmitter and receiver have

the greatest impact on transmission success. Furthermore, above 50 metres, high rate bandwidths have a negative effect on data integrity and total dysfunctionality. The finding can be concluded that in an end-to-end fully-informed network with this specific antenna, data flow greater than 8 KB (at both 57600 bps and 115200 bps) has a disadvantage in the network . However, transmission over 80 metres is the most stable and maintains network data integrity at (9600 bps).

Author keywords

Communicating session; Delay detection; Informed network ; Transmission session

SciVal Topics

References (32)

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1 Wu, M., Wu, Y., Liu, C., Cai, Z., Xiong, N.N., Liu, A., Ma, M.
An effective delay reduction approach through a portion of nodes with a larger duty cycle for industrial WSNs (Open Access)

(2018) *Sensors (Switzerland)*, 18 (5), art. no. 1535. Cited 24 times.
http://www.mdpi.com/1424-8220/18/5/1535/pdf
doi: 10.3390/s18051535

View at Publisher

2 Asokan, R., Natarajan, A.M.
An approach for reducing the end-to-end delay and increasing network lifetime in mobile ad hoc networks
(2008) *Int J Inf Technol*, 4 (2), pp. 121-127. Cited 8 times.

3 Al-Kaseem, B.R., Al-Raweshidyhamed, H.S.
SD-NFV as an Energy Efficient Approach for M2M Networks Using Cloud-Based 6LoWPAN Testbed (Open Access)

(2017) *IEEE Internet of Things Journal*, 4 (5), art. no. 7929277, pp. 1787-1797. Cited 23 times.
http://ieeexplore.ieee.org/servlet/opac?punumber=6488907
doi: 10.1109/JIOT.2017.2704921

View at Publisher

4 Gazis, V.
A Survey of Standards for Machine-to-Machine and the Internet of Things

(2017) *IEEE Communications Surveys and Tutorials*, 19 (1), art. no. 7516570, pp. 482-511. Cited 138 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=9739
doi: 10.1109/COMST.2016.2592948

View at Publisher

5 Al-Fuqaha, A., Guizani, M., Mohammadi, M., Aledhari, M., Ayyash, M.

Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications

(2015) *IEEE Communications Surveys and Tutorials*, 17 (4), pp. 2347-2376. Cited 4450 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=9739
doi: 10.1109/COMST.2015.2444095

View at Publisher

6 Chen, K.-C., Lien, S.-Y.

Machine-to-machine communications: Technologies and challenges

(2014) *Ad Hoc Networks*, 18, pp. 3-23. Cited 138 times.
doi: 10.1016/j.adhoc.2013.03.007

View at Publisher

7 Tuset-Peirõ, P., Anglès-Vazquez, A., Lõpez-Vicario, J., Vilajosana-Guillén, X.

On the suitability of the 433 MHz band for M2M low-power wireless communications: Propagation aspects

(2014) *Transactions on Emerging Telecommunications Technologies*, 25 (12), pp. 1154-1168. Cited 27 times.
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2161-3915
doi: 10.1002/ett.2672

View at Publisher

8 Tuset, P., Adelantado, F., Vilajosana, X., Vázquez-Gallego, F., Alonso-Zárate, J.

On the use of the 433 MHz band to improve the energy efficiency of M2M communications

(2013) *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, PIMRC*, art. no. 6666626, pp. 2813-2818. Cited 5 times.
ISBN: 978-146736235-1
doi: 10.1109/PIMRC.2013.6666626

View at Publisher

9 Althumali, H., Othman, M.

A Survey of Random Access Control Techniques for Machine-to-Machine Communications in LTE/LTE-A Networks
(Open Access)

(2018) *IEEE Access*, 6, art. no. 8552341, pp. 74961-74983. Cited 23 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6287639
doi: 10.1109/ACCESS.2018.2883440

View at Publisher

10 Yuan, J., Shan, H., Huang, A., Quek, T.Q.S., Yao, Y.-D.

Massive machine-to-machine communications in cellular network: Distributed queueing random access meets MIMO
(Open Access)

(2017) *IEEE Access*, 5, art. no. 7857734, pp. 2981-2993. Cited 17 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6287639
doi: 10.1109/ACCESS.2017.2670614

View at Publisher

11 Nguyen, L., Nguyen, H.T.
Mobility based network lifetime in wireless sensor networks: A review (Open Access)

(2020) *Computer Networks*, 174, art. no. 107236. Cited 31 times.
http://www.journals.elsevier.com/computer-networks/
doi: 10.1016/j.comnet.2020.107236

View at Publisher

12 Kalaivani, S., Tharini, C.
Analysis and implementation of novel Rice Golomb coding algorithm for wireless sensor networks

(2020) *Computer Communications*, 150, pp. 463-471. Cited 4 times.
http://www.journals.elsevier.com/computer-communications/
doi: 10.1016/j.comcom.2019.11.046

View at Publisher

13 Pantelaki, K., Panagiotakis, S., Vlissidis, A.
Survey of the IEEE 802.15.4 standard's developments for wireless sensor networking
(2016) *Am. J. Mobile Syst. Appl. Serv*, 2 (1), pp. 13-31. Cited 3 times.

14 Li, M., Richard Yu, F., Si, P., Sun, E., Zhang, Y., Yao, H.
Random Access and Virtual Resource Allocation in Software-Defined Cellular Networks with Machine-to-Machine Communications

(2017) *IEEE Transactions on Vehicular Technology*, 66 (7), art. no. 7762941, pp. 6399-6414. Cited 25 times.
http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=8039128&punumber=25
doi: 10.1109/TVT.2016.2633525

View at Publisher

15 Di, C., Zhang, B., Liang, Q., Li, S., Guo, Y.
Learning Automata-Based Access Class Barring Scheme for Massive Random Access in Machine-to-Machine Communications

(2019) *IEEE Internet of Things Journal*, 6 (4), art. no. 8453000, pp. 6007-6017. Cited 37 times.
http://ieeexplore.ieee.org/servlet/opac?punumber=6488907
doi: 10.1109/JIOT.2018.2867937

View at Publisher

16 Abubakar, A.I., Mohamed, E.E.E., Zeki, A.M.
The Dynamics of Data Packet in Transmission Session (Open Access)

(2017) *IEEE Access*, 5, art. no. 7878579, pp. 4329-4339. Cited 6 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6287639
doi: 10.1109/ACCESS.2017.2682108

View at Publisher

17 Thelen, J., Goense, D., Langendoen, K.
Radio wave propagation in potato fields
(2005) *Proc WiNMee*, 2004, pp. 2-5.

18 Ahmad, K.A., Salleh, M.S., Segaran, J.D., Hashim, F.R.
Impact of foliage on LoRa 433MHz propagation in tropical environment (Open Access)

(2018) *AIP Conference Proceedings*, 1930, art. no. 020009. Cited 16 times.
http://scitation.aip.org/content/aip/proceeding/aipcp
ISBN: 978-073541622-2
doi: 10.1063/1.5022903

View at Publisher

19 Du, D., Zhang, H., Yang, J., Yang, P.
Propagation characteristics of the Underground-to-Aboveground Communication link about 2.4GHz and 433MHz radio wave: An empirical study in the pine forest of Guizhou Province

(2018) *2017 3rd IEEE International Conference on Computer and Communications, ICCC 2017*, 2018-January, pp. 1041-1045. Cited 11 times.
ISBN: 978-150906350-5
doi: 10.1109/CompComm.2017.8322701

View at Publisher

20 Wotherspoon, J., Wolhuter, R., Niesler, T.
Choosing an integrated radio-frequency module for a wildlife monitoring wireless sensor network

(2017) *2017 IEEE AFRICON: Science, Technology and Innovation for Africa, AFRICON 2017*, art. no. 8095501, pp. 314-319. Cited 8 times.
ISBN: 978-153862775-4
doi: 10.1109/AFRCON.2017.8095501

View at Publisher

21 Abdou, A.A., Shaw, A., Mason, A., Al-Shamma'a, A., Cullen, J., Wylie, S.
Electromagnetic (EM) wave propagation for the development of an underwater Wireless Sensor Network (WSN)

(2011) *Proceedings of IEEE Sensors*, art. no. 6127319, pp. 1571-1574. Cited 35 times.
ISBN: 978-142449288-6
doi: 10.1109/ICSENS.2011.6127319

View at Publisher

22 Vershinin, A.S., Usharova, D.N., Anikin, A.S.
The experimental estimate of statistical characteristics of narrowband radio interferences in an urban environment in the frequency range 433 MHz

(2016) *International Conference of Young Specialists on Micro/Nanotechnologies and Electron Devices, EDM*, 2016-August, art. no. 7538722, pp. 191-195.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=6621631
ISBN: 978-150900786-8
doi: 10.1109/EDM.2016.7538722

View at Publisher

23 Trasviña-Moreno, C.A., Blasco, R., Casas, R., Asensio, Á.

A network performance analysis of LoRa modulation for LPWAN sensor devices

(2016) *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 10070 LNCS, pp. 174-181. Cited 28 times.
http://springerlink.com/content/0302-9743/copyright/2005/
ISBN: 978-331948798-4
doi: 10.1007/978-3-319-48799-1_21

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24 Gaelens, J., Van Torre, P., Verhaevert, J., Rogier, H.

Lora mobile-to-base-station channel characterization in the antarctic (Open Access)

(2017) *Sensors (Switzerland)*, 17 (8), art. no. 1903. Cited 31 times.
http://www.mdpi.com/1424-8220/17/8/1903/pdf
doi: 10.3390/s17081903

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25 Taj-Eldin, M., Kuhn, W.B., Fowles, A.H., Natarajan, B., Peterson, G., Alshetaiwi, M., Ouyang, S., (...), Monfort-Nelson, E.

Study of wireless propagation for body area networks inside space suits

(2014) *IEEE Sensors Journal*, 14 (11), art. no. 6860275, pp. 3810-3818. Cited 3 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=7361
doi: 10.1109/JSEN.2014.2341178

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26 Taj-Eldin, M., Kuhn, B., Hodges, A., Natarajan, B., Peterson, G., Alshetaiwi, M., Ouyang, S., (...), Monfort-Nelson, E.

Wireless propagation measurements for astronaut body area network

(2013) *IEEE International Conference on Wireless for Space and Extreme Environments, WiSEE 2013 - Conference Proceedings*, art. no. 6737569. Cited 7 times.
ISBN: 978-147992958-0
doi: 10.1109/WiSEE.2013.6737569

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27 Minhas, U.I., Naqvi, I.H., Qaisar, S., Ali, K., Shahid, S., Aslam, M.A.

A WSN for Monitoring and Event Reporting in Underground Mine Environments

(2018) *IEEE Systems Journal*, 12 (1), pp. 485-496. Cited 46 times.
http://www.ieee.org/products/onlinepubs/news/0806_01.html
doi: 10.1109/JSYST.2016.2644109

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28 Yu, X., Han, W., Zhang, Z.
Overview of transmission characteristics in novel wireless underground sensor networks
(2015) *International Journal of Future Generation Communication and Networking*, 8 (2), pp. 233-242. Cited 2 times.

29 Maslouhi, I., Ar-reyouchi, E.M., Ghoumid, K., Baibai, K.

Analysis of end-to-end packet delay for internet of things in wireless communications (Open Access)

(2018) *International Journal of Advanced Computer Science and Applications*, 9 (9), pp. 338-343. Cited 14 times.
http://thesai.org/Publications/Archives?code=IJACSA
doi: 10.14569/ijacsa.2018.090944

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30 Gomez, C., Arcia-Moret, A., Crowcroft, J.

TCP in the Internet of Things: From Ostracism to Prominence (Open Access)

(2018) *IEEE Internet Computing*, 22 (1), pp. 29-41. Cited 40 times.
doi: 10.1109/MIC.2018.112102200

View at Publisher

31 Sethi, P., Sarangi, S.R.

Internet of Things: Architectures, Protocols, and Applications (Open Access)

(2017) *Journal of Electrical and Computer Engineering*, 2017, art. no. 9324035. Cited 674 times.
http://www.hindawi.com/journals/jece/
doi: 10.1155/2017/9324035

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32 Bosunia, M.R., Hasan, K., Nasir, N.A., Kwon, S., Jeong, S.-H.

Efficient data delivery based on content-centric networking for Internet of Things applications (Open Access)

(2016) *International Journal of Distributed Sensor Networks*, 12 (8). Cited 5 times.
http://journals.sagepub.com/loi/dsn
doi: 10.1177/1550147716665518

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