Psinergy Intro Class on the **Human Biofield** **ALWAYS FREE**

"The photon generating dna wave propogating electrical homeostasis facilitating body part formerly known as the 'aura' is 80% of the Immune System and 40-60% of the Endocrine system."

Biophotons as defined in NIH :
Int J Yoga. 2017 May-Aug; 10(2): 57–58.
doi: 10.4103/ijoy.IJOY_18_17
PMCID: PMC5433113
PMID: 28546674

Biophotons as Subtle Energy Carriers

In the tangible domain, two subtle energy carriers come to mind: biophotons and bioelectrons. **Biophotons are photons (light particles) that are generated within the body, and these could be measured as they emanate from the skin.** Similarly, bioelectrons are available from within the body; these are measured in instruments such as electro-photonic imaging. This aspect will be taken in a later presentation.

https://m.youtube.com/watch?v=6mCdYkvmFRo&list=PLzF3Q5i4GIcyUenX0ol3pe2ko5efTdBXm&pp=iAQB

anti nano frequency example – let it run at least 3 times its full cycle and feel for that cycle as practice ~

American Journal of Bioinformatics Research
p-ISSN: 2167-6992 e-ISSN: 2167-6976
2021; 11(1): 1-31
doi:10.5923/j.bioinformatics.20211101.01
Received: Jan. 16, 2021; Accepted: Feb. 20, 2021; Published: Mar. 3, 2021

Effect of Coronavirus Worldwide through Misusing of Wireless Sensor Networks

4.14. Recommendations

The study commends to be very vigilant to stay healthy from the misuse of sensor technology. That is why there are some recommendations in the field of awareness, which we can all benefit from following, such as:

(a) Individual should close eyes with wearing sunglasses and quick-change body boundary without uttering 5-10 minutes.

(b) When meeting all acquaintances / strangers, including office assistants and housekeepers, make sure that the smartphone or electronic device of the person concerned is turned off or 6 feet away. You can't meet with your own or someone else's mobile phone.

(c) Avoid audio-video, talking and use of all kinds with smart mobile phones in and around the bed in open eyes.

(d) The sleeping room must be without network and sensor free, no person or animal in that room can ever use the wireless network, only to be damaged.

(e) The patient's bed and mosquito net should be anti-radiation category at home and hospital.

(f) To have peace of mind and not to stay in one place or bed, to move regularly and to keep occasional body movements.

(g) If the effects of corona disease are widespread in a geographical area, the local, regional and international mobile and sensor networks in that areas should be disconnected for 5 to 10 minutes or suitable time.

(h) The higher health authority should formulate the dynamic global health policy on the priority of cutting-edge sensor technology.

http://article.sapub.org/10.5923.j.bioinformatics.20211101.01.html#SecAppendix

Md. Rahimullah Miah[1], AAM Shazzadur Rahman[2], Md. Shahariar Khan[3], Mohammad Abdul Hannan[4], Md. Sabbir Hossain[5], Chowdhury Shadman Shahriar[6], S. A. M. Imran Hossain[7], Mohammad Taimur Hossain Talukdar[8], Alamgir Adil Samdany[9], Mohammad Shamsul Alam[10], Mohammad Basir Uddin[11], Alexander Kiew Sayok[12], Shahriar Hussain Chowdhury[13]

[1]Department of Information Technology in Health and Research Associate, Northeast Medical Pvt. Limited, Sylhet, Bangladesh and Former PhD Student, IBEC, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia
[2]Department of Medicine, Northeast Medical College, Sylhet, Bangladesh
[3]Department of Paediatrics, Northeast Medical College & Hospital, Sylhet, Bangladesh
[4]Department of Endocrinology, Northeast Medical College & Hospital, Sylhet, Bangladesh
[5]Department of Pathology, North East Medical College and Hospital, Sylhet, Bangladesh
[6]USMLE Student, USA and Ex-student of North East Medical College, Sylhet, Bangladesh
[7]Department of Oral and Maxillofacial Surgery, North East Medical College and Hospital, Sylhet
[8]Department of Clinical Oncology, North East Medical College and Hospital, Sylhet, Bangladesh
[9]Department of Orthopedics, Northeast Medical College, Sylhet, Bangladesh
[10]Department of Forensic Medicine, Northeast Medical College and Hospital, Sylhet
[11]Department of Paediatrics, Northeast Medical College and Hospital, Sylhet, Bangladesh
[12]IBEC, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia
[13]Department of Dermatology, Northeast Medical College, Sylhet, Bangladesh

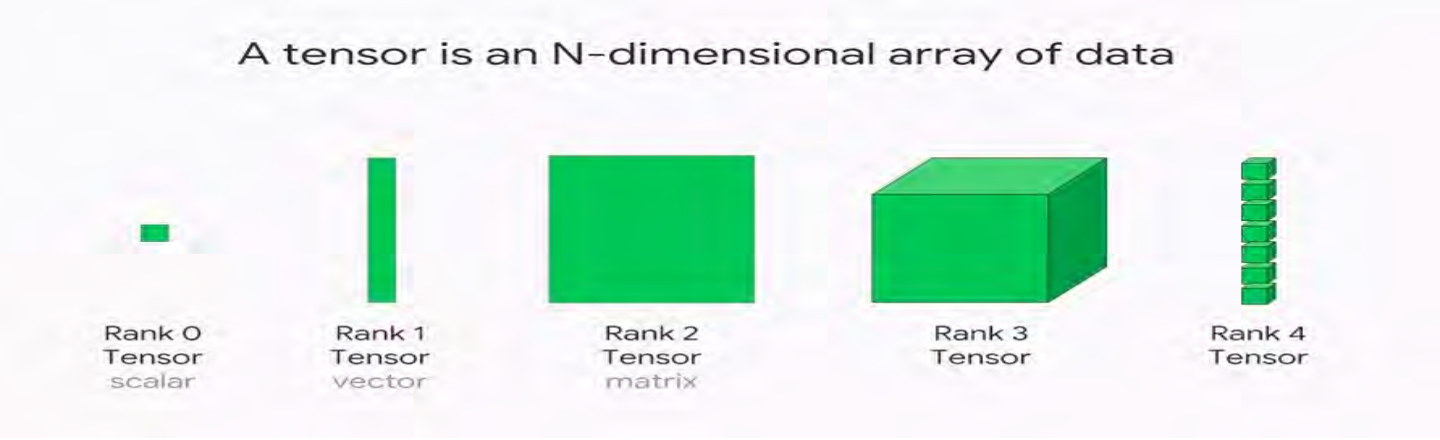
Correspondence to: Md. Rahimullah Miah, Department of Information Technology in Health and Research Associate, Northeast Medical Pvt. Limited, Sylhet, Bangladesh and Former PhD Student, IBEC, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia.

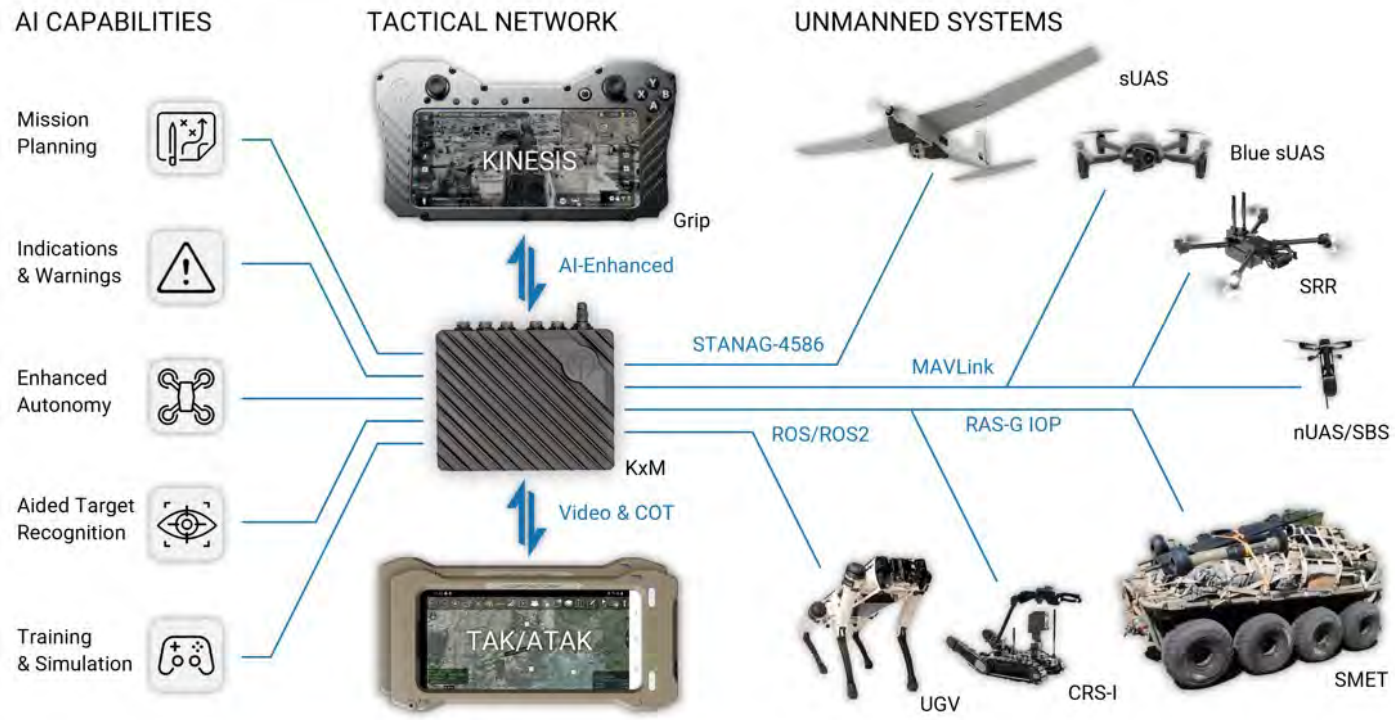
Abstract

Corona is a non-communicable sensor disease spreading worldwide through misusing of processed radio frequency. So far higher authorities of health services are facing the undesirable escalating causes of coronavirus towards human beings as a very scientific puzzle comprehensive issue. The study aims to evaluate the maltreating of wireless sensor networks that affect individuals within the body boundary area. Wireless sensor data were collected from individual's profile, diagnosis and sensor node records at laboratory experiments. The study shows the effect of processed sensor nodes among individual's body organs to compare with the existing environments. The study illustrates all individuals suffer from sensor disease due to reflecting of wavered sensors at open eyes sights with high speed electromagnetic-radio tracking systems. The overweight and obesity patients are sick from corona disease at less sensor time in a dark environment than that of light conditions. These findings replicate the severe global one health security that the expert provides in active eyes within geographic locations. Systematic healthcare awareness is essential for treatment with medical technological devices but such consciousness is poorly recognized and medication supports are still below par. The study suggests upcoming healthcare paths of a new dynamic alternative approach to promote global public health security concerning Sensor Health Policy and Sustainable Development Goals 2030.

Keywords: Corona virus, Sensor node, Obese, Dark environment, Health security

Cite this paper: Md. Rahimullah Miah, AAM Shazzadur Rahman, Md. Shahariar Khan, Mohammad Abdul Hannan, Md. Sabbir Hossain, Chowdhury Shadman Shahriar, S. A. M. Imran Hossain, Mohammad Taimur Hossain Talukdar, Alamgir Adil Samdany, Mohammad Shamsul Alam, Mohammad Basir Uddin, Alexander Kiew Sayok, Shahriar Hussain Chowdhury, Effect of Coronavirus Worldwide through Misusing of Wireless Sensor Networks, *American Journal of Bioinformatics Research*, Vol. 11 No. 1, 2021, pp. 1-31. doi: 10.5923/j.bioinformatics.20211101.01.





Supervised Machine Learning Algorithms for Bioelectromagnetics: Prediction Models and Feature Selection Techniques Using Data from Weak Radiofrequency Radiation Effect on Human and Animals Cells

Department of Electrical and Electronic Engineering, The University of Melbourne, Parkville, VIC 3010, Australia
Int. J. Environ. Res. Public Health **2020**, *17*(12), 4595; **https://doi.org/10.3390/ijerph17124595**
Received: 31 March 2020 / Revised: 10 June 2020 / Accepted: 18 June 2020 / Published: 26 June 2020
(This article belongs to the Special Issue **Machine Learning, Stochastic Modelling and Applied Statistics for EMF Exposure Assessment**)---→Abstract

The emergence of **new technologies to incorporate and analyze data with high-performance computing has expanded our capability to accurately predict any incident.** Supervised Machine learning (ML) can be utilized for a fast and consistent prediction, and to obtain the underlying pattern of the data better. We develop a prediction strategy, for the first time, using supervised ML to observe the possible impact of **weak radiofrequency electromagnetic field (RF-EMF) on human and animal cells without performing in-vitro laboratory experiments.** We extracted laboratory experimental data from 300 peer-reviewed scientific publications (1990–2015) describing 1127 experimental case studies of human and animal cells response to RF-EMF. We used domain knowledge, Principal Component Analysis (PCA), and the Chi-squared feature selection techniques to select six optimal features for computation and cost-efficiency. We then develop grouping or clustering strategies to allocate these selected features into five different laboratory experiment scenarios. The dataset has been tested with ten different classifiers, and the outputs are estimated using the k-fold cross-validation method. The assessment of a classifier's

prediction performance is critical for assessing its suitability. Hence, a detailed comparison of the percentage of the model accuracy (PCC), Root Mean Squared Error (RMSE), precision, sensitivity (recall), 1 − specificity, Area under the ROC Curve (AUC), and precision-recall (PRC Area) for each classification method were observed. Our findings suggest that the Random Forest algorithm exceeds in all groups in terms of all performance measures and shows AUC = 0.903 where k-fold = 60. A robust correlation was observed in the **specific absorption rate (SAR) with frequency and cumulative effect or exposure** time with SAR×time (impact of accumulated SAR within the exposure time) of RF-EMF. In contrast, the relationship between frequency and exposure time was not significant. In future, with more experimental data, the sample size can be increased, leading to more accurate work.

Keywords:
RF-EMF exposure assessment; machine learning; supervised learning; **Bioelectromagnetics**; human and animal cells; in-vitro studies

REFERENCE ON THE INTERNET IS FROM MDPI – JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH
Journals

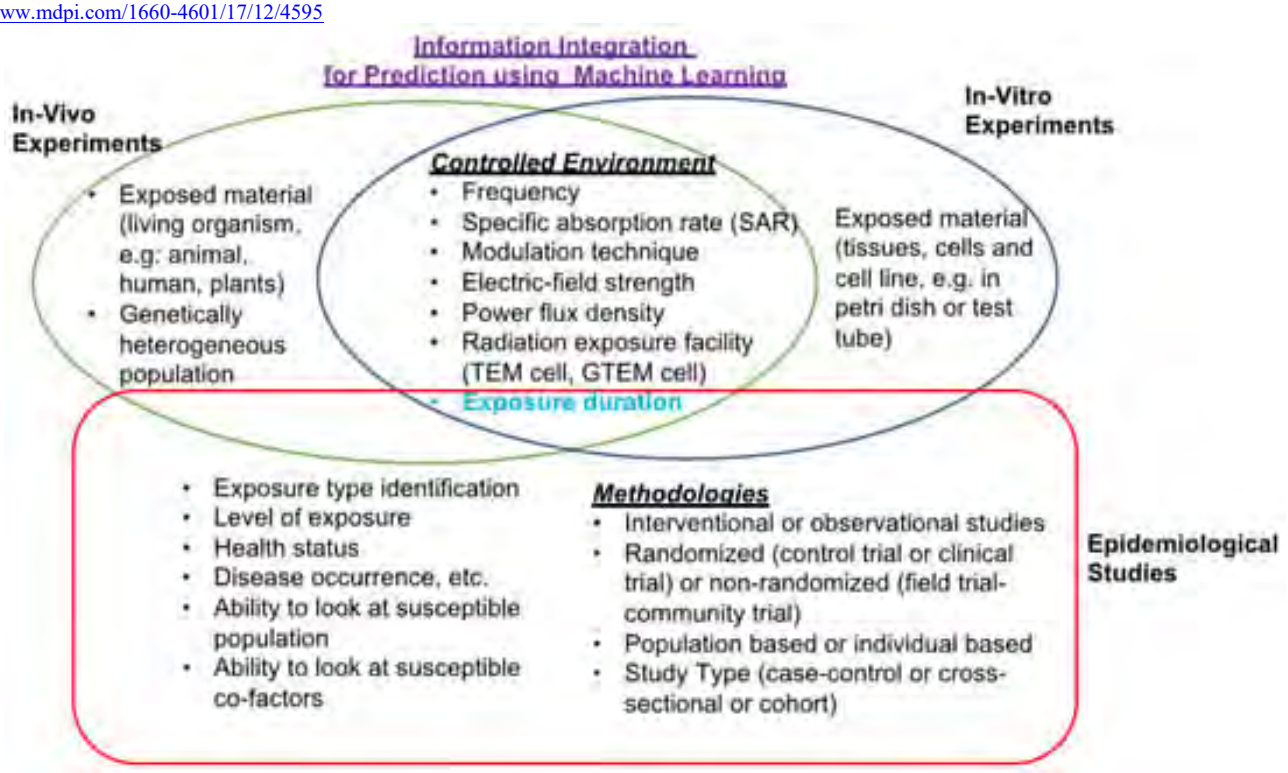
IJERPH

Volume 17

Issue 12

10.3390/ijerph17124595

https://www.mdpi.com/1660-4601/17/12/4595



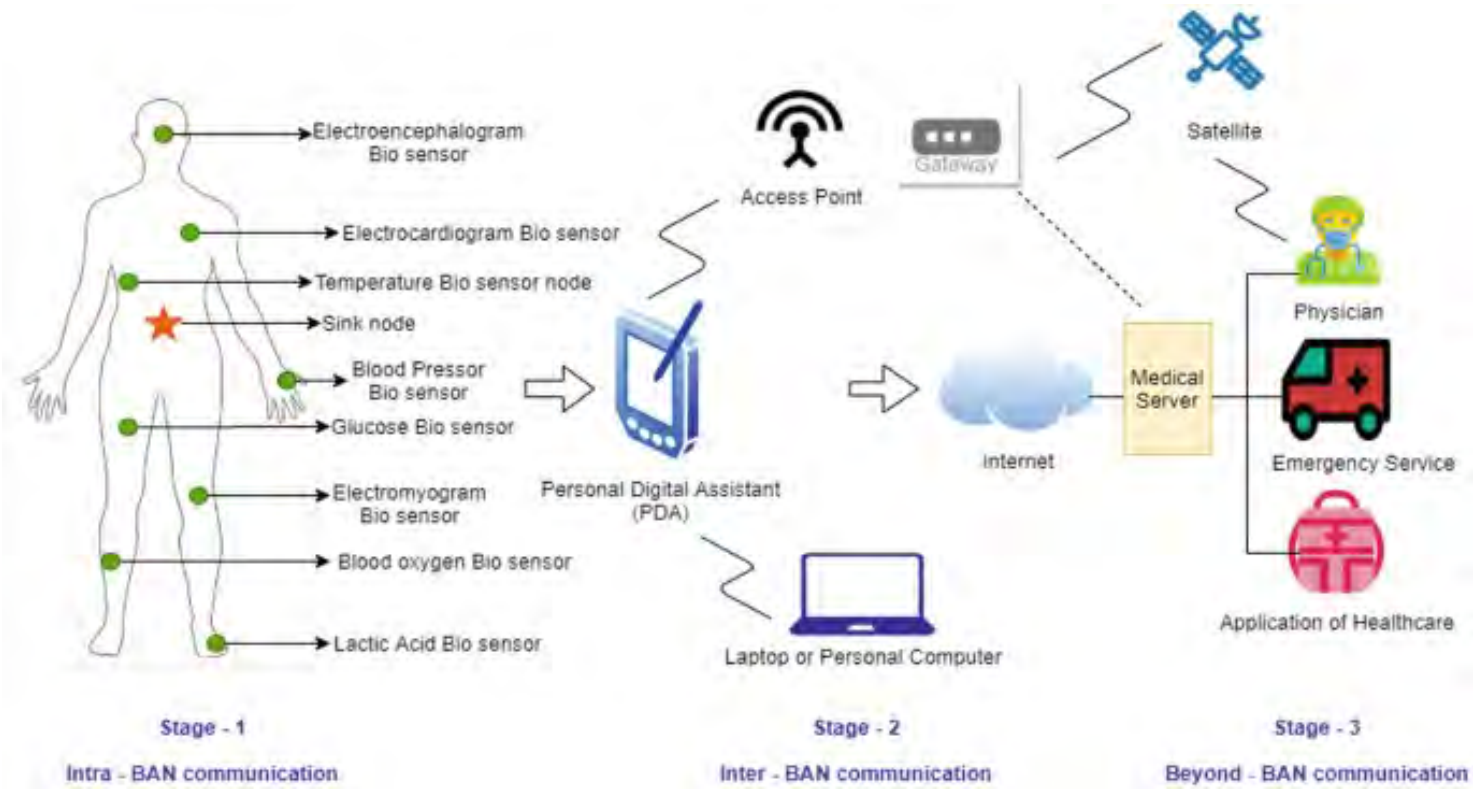
The ten supervised ML algorithms that were used for this analysis are (Table A1 in Appendix A): **Random Forest, Bagging, J48, Decision Table, BayesNet, k-Nearest Neighbour (kNN), JRip, Support Vector Machine (SVM), Naive Bayes and Logistic Regression, and six different features (species, frequency of RF-EMF, SAR, exposure time, SAR×exposure time, and cellular response (presence or**

absence)). By applying dimensionally reduction techniques or feature selection methods, six major features were chosen out of all collected features. We removed two features or attributes using (i) domain knowledge, (ii) Principal Component Analysis (PCA), and (iii) the Chi-squared feature selection method. Using these techniques, we aim to gain more profound insights into the features (such as year, species, frequency of weak RF-EMF, SAR, exposure time, SAR×exposure time, and cellular response (presence or absence)) of weak RF-EMF exposure scenarios on human and animal cells. The outputs are estimated using the k-fold cross-validation method for each classifier. The most efficient classifiers have been chosen by considering the prediction accuracy and computation time.

54. Allen, D.M. The Relationship between Variable Selection and Data Agumentation and a Method for Prediction. *Technometrics* **1974**, *16*, 125–127. [Google Scholar] [CrossRef]
55. LaRegina, M.; Moros, E.; Pickard, W.; Straube, W.; Baty, J.; Roti, J. The effect of chronic exposure to 835.62 MHz FDMA or 847.74 MHz CDMA radiofrequency radiation on the incidence of spontaneous tumors in rats. *Radiat. Res.* **2003**, *160*, 143–151. [Google Scholar] [CrossRef]

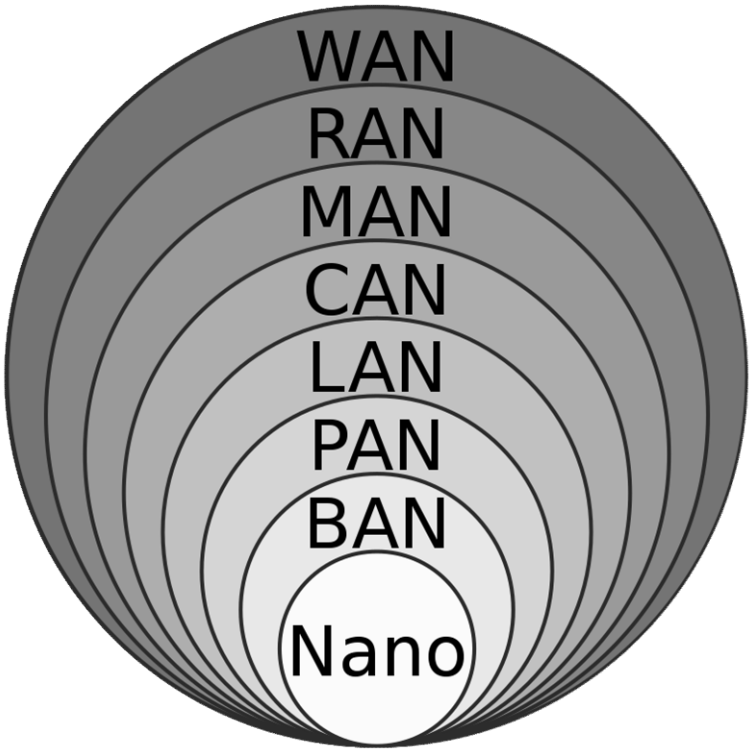
References

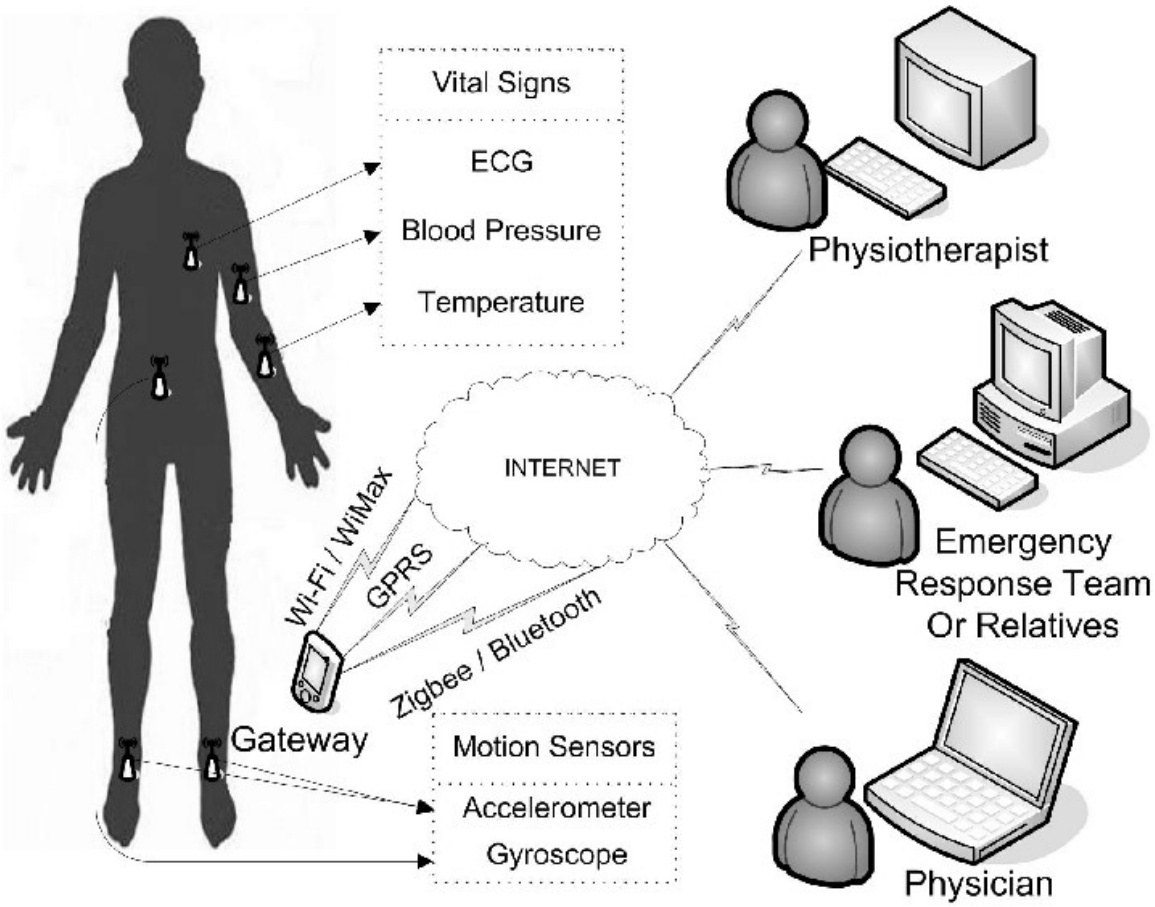
1. World Health Organization (WHO). *WHO Research Agenda for Radiofrequency Fields*; Technical Report; **World Health Organization (WHO): Geneva, Switzerland, 2010.** [Google Scholar]

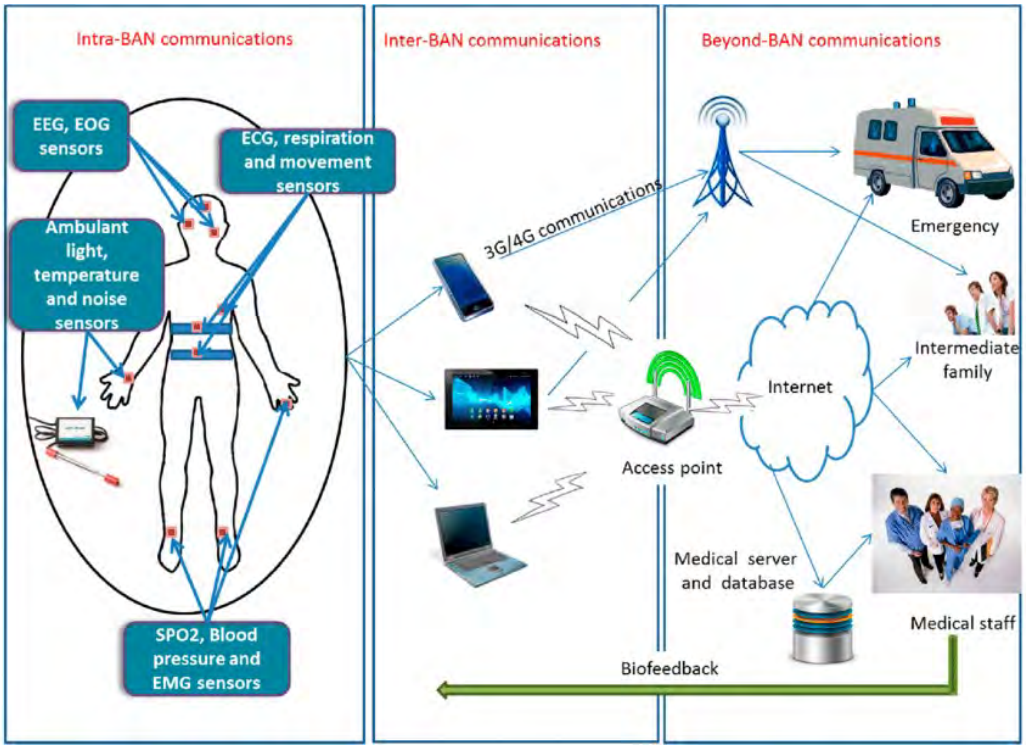


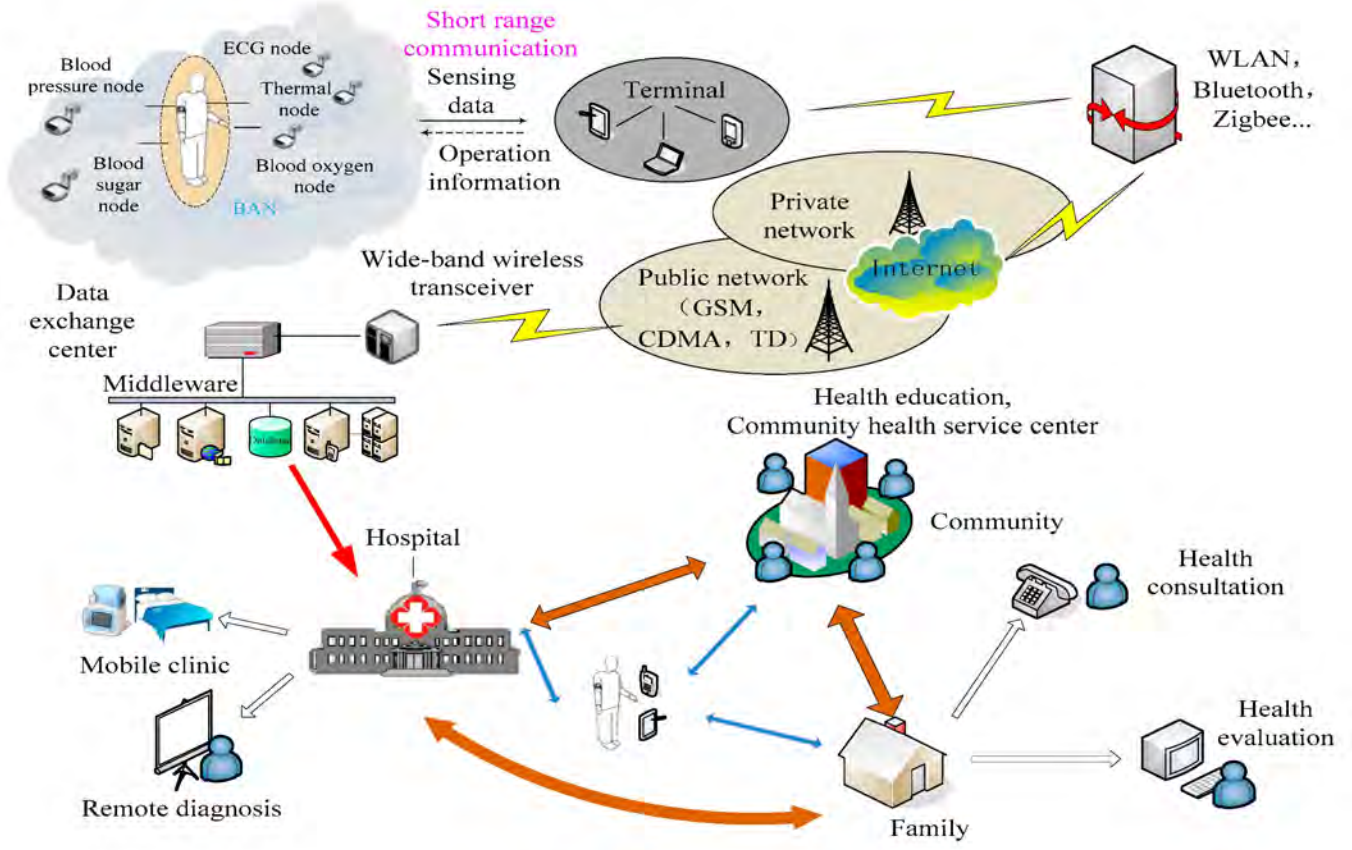
Challenges	Wireless Sensor Network	Wireless Body Area Network
Scale	Monitored environment (meters / kilometers)	Human body (centimeters / meters)
Node Number	Many redundant nodes for wide area coverage	Fewer, limited in space
Result accuracy	Through node redundancy	Through node accuracy and robustness
Node Tasks	Node performs a dedicated task	Node performs multiple tasks
Node Size	Small is preferred, but not important	Small is essential
Network Topology	Very likely to be fixed or static	More variable due to body movement
Data Rates	Most often homogeneous	Most often heterogeneous
Node Replacement	Performed easily, nodes even disposable	Replacement of implanted nodes difficult
Node Lifetime	Several years / months	Several years / months, smaller battery capacity
Power Supply	Accessible and likely to be replaced more easily and frequently	Inaccessible and difficult to replaced in an implantable setting
Power Demand	Likely to be large, energy supply easier	Likely to be lower, energy supply more difficult
Energy Scavenging Source	Most likely solar and wind power	Most likely motion (vibration) and thermal (body heat)
Biocompatibility	Not a consideration in most applications	A must for implants and some external sensors
Security Level	Lower	Higher, to protect patient information
Impact of Data Loss	Likely to be compensated by redundant nodes	More significant, may require additional measures to ensure QoS and real-time data delivery.
Wireless Technology	Bluetooth, ZigBee, GPRS, WLAN, ...	Low power technology required

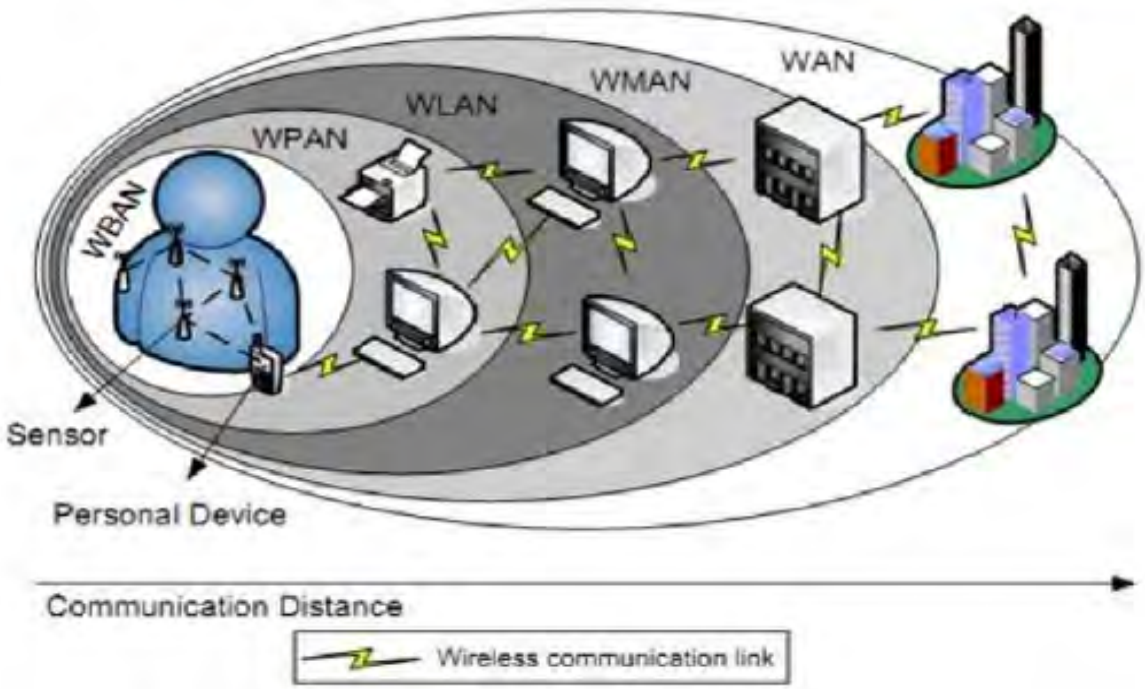
Application	Data Rate	Bandwidth	Accuracy
ECG (12 leads)	288 kbps	100-1000 Hz	12 bits
ECG (6 leads)	71 kbps	100-500 Hz	12 bits
EMG	320 kbps	0-10,000 Hz	16 bits
EEG (12 leads)	43.2 kbps	0-150 Hz	12 bits
Blood saturation	16 bps	0-1 Hz	8 bits
Glucose monitoring	1600 bps	0-50 Hz	16 bits
Temperature	120 bps	0-1 Hz	8 bits
Motion sensor	35 kbps	0-500 Hz	12 bits
Cochlear implant	100 kbps	–	–
Artificial retina	50-700 kbps	–	–
Audio	1 Mbps	–	–
Voice	50-100 kbps	–	–

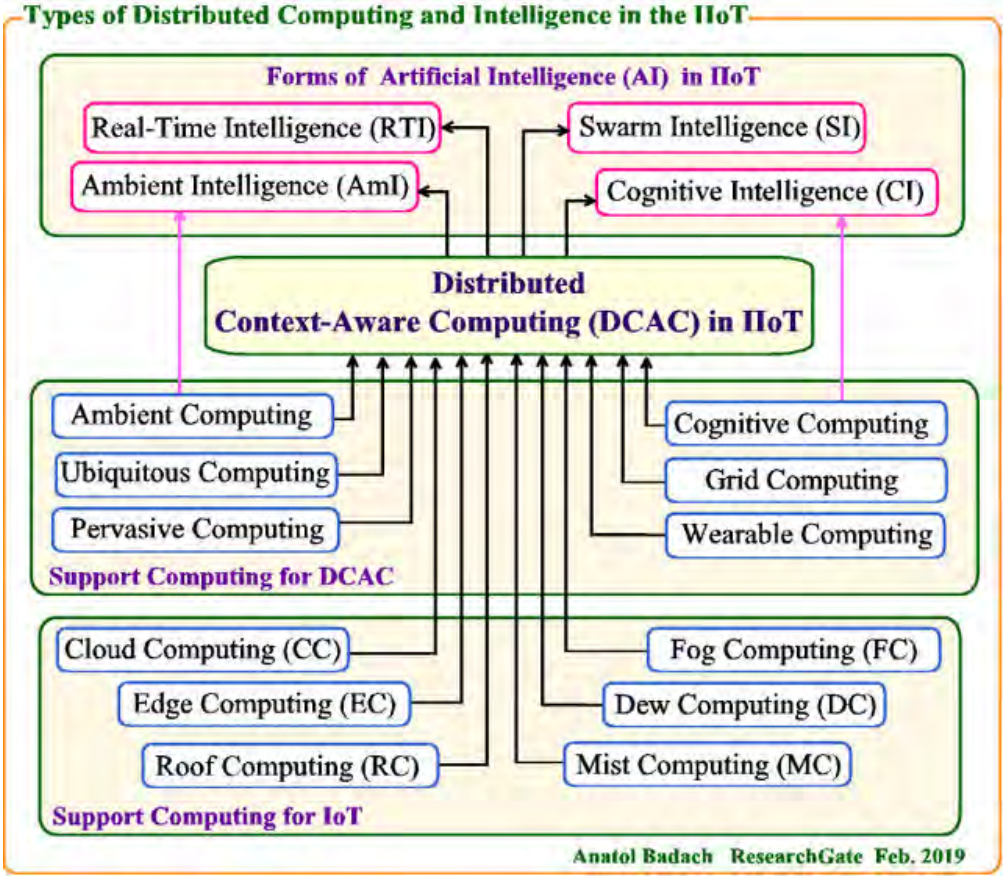

WAN
RAN
MAN
CAN
LAN
PAN
BAN
Nano


Vital Signs
ECG
Blood Pressure
Temperature
Physiotherapist
INTERNET
Wi-Fi / WiMax
GPRS
Zigbee / Bluetooth
Emergency
Response Team
Or Relatives
Gateway
Motion Sensors
Accelerometer
Gyroscope
Physician


Intra-BAN communications
Inter-BAN communications
Beyond-BAN communications
EEG, EOG sensors
ECG, respiration and movement sensors
Ambulant light, temperature and noise sensors
SPO2, Blood pressure and EMG sensors
3G/4G communications
Emergency
Intermediate family
Internet
Access point
Medical server and database
Medical staff
Biofeedback

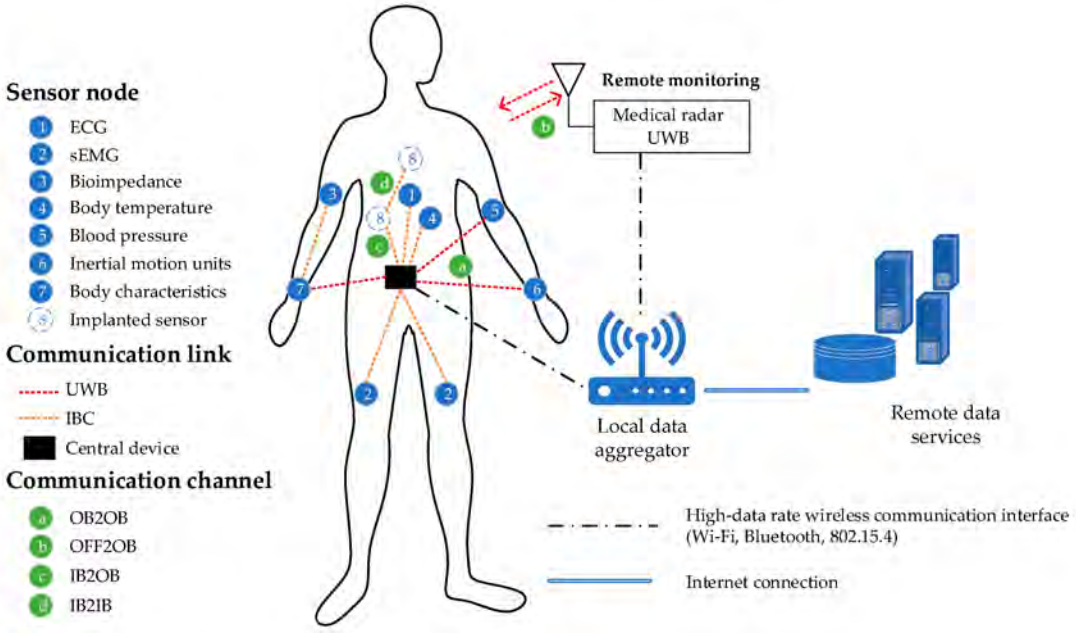

Short range communication
Sensing data
Operation information
Blood pressure node
ECG node
Thermal node
Blood sugar node
Blood oxygen node
BAN
Terminal
WLAN, Bluetooth, Zigbee...
Private network
Internet
Public network (GSM, CDMA, TD)
Wide-band wireless transceiver
Data exchange center
Middleware
Health education, Community health service center
Community
Hospital
Health consultation
Mobile clinic
Health evaluation
Remote diagnosis
Family

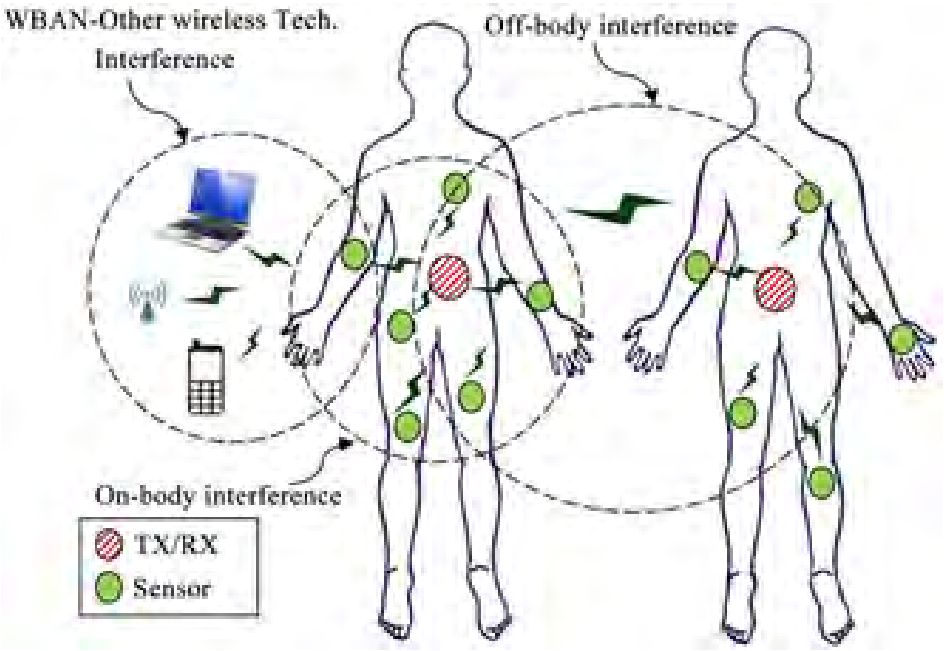

WAN
WMAN
WLAN
WPAN
WBAN
Sensor
Personal Device
Communication Distance
Wireless communication link


Types of Distributed Computing and Intelligence in the IIoT
Forms of Artificial Intelligence (AI) in IIoT
Real-Time Intelligence (RTI)
Swarm Intelligence (SI)
Ambient Intelligence (AmI)
Cognitive Intelligence (CI)
Distributed
Context-Aware Computing (DCAC) in IIoT
Ambient Computing
Ubiquitous Computing
Pervasive Computing
Cognitive Computing
Grid Computing
Wearable Computing
Support Computing for DCAC
Cloud Computing (CC)
Edge Computing (EC)
Roof Computing (RC)
Fog Computing (FC)
Dew Computing (DC)
Mist Computing (MC)
Support Computing for IoT
Anatol Badach ResearchGate Feb. 2019



https://lifesciences.ieee.org/lifesciences-newsletter/2013/june-2013/ieee-standard-supports-development-of-innovative-body-area-networks/





Wireless Engineering and Technology > Vol.9 No.2, April 2018

Hybrid IEEE 802.15.6 Wireless Body Area Networks Interference Mitigation Model for High Mobility Interference Scenarios

Anthony Mile, George Okeyo, Ann Kibe
School of Computing and Information Technology, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya.

DOI: 10.4236/wet.2018.92004 **PDF** **HTML** **XML** **1,347** Downloads **3,030** Views Citations

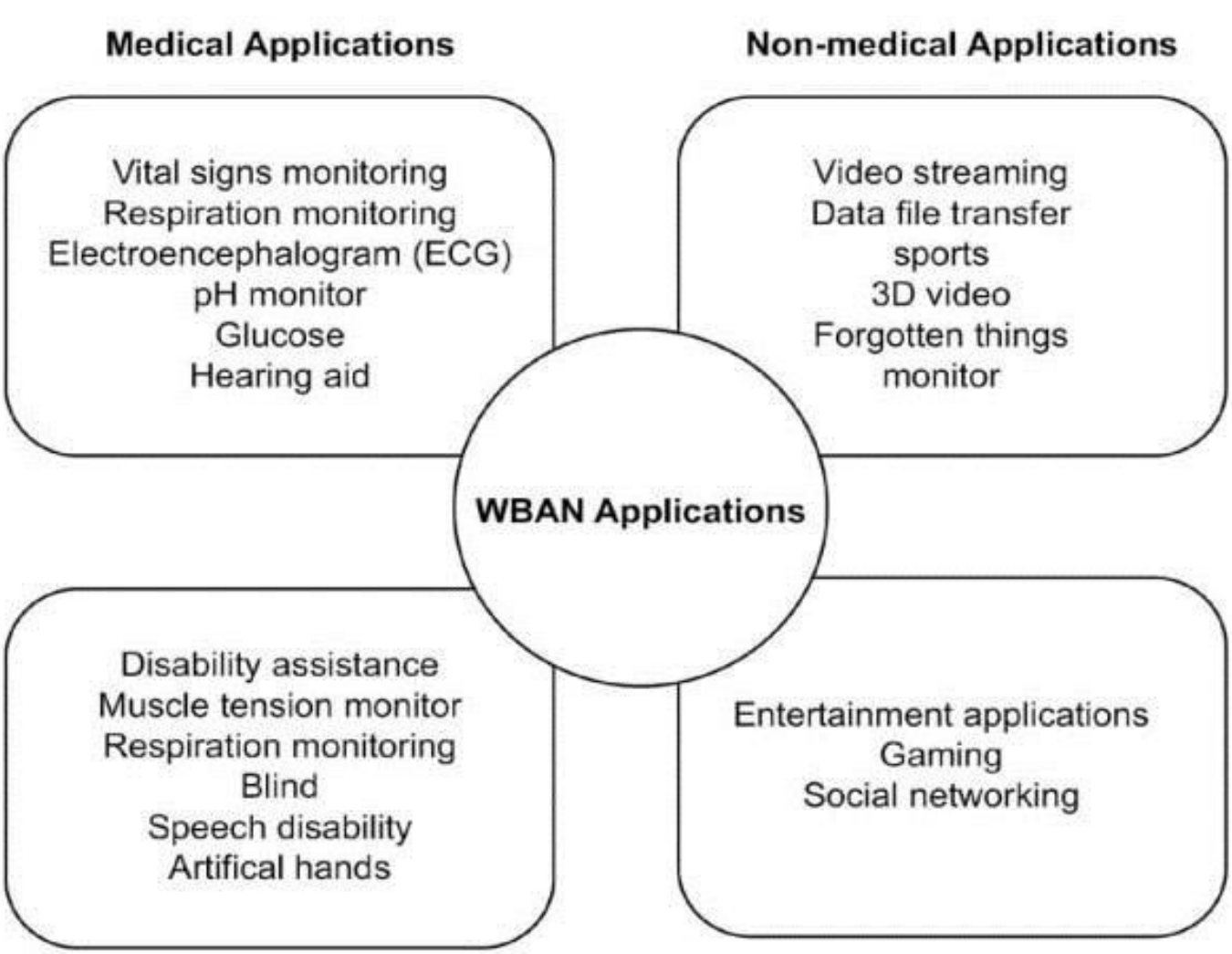
Abstract

The field of Wireless Sensor Networks (WSNs) has revolutionized tremendously in the recent past with its major application in Wireless Body Area Networks (WBANs). This has in the same dimension attracted immense interests from the researchers and technology providers. The operational modality of the WBANs is that a few sensor nodes are placed in or around the body and that they are meant to operate within a limited condition while providing high performance in terms of WBAN life time, high throughput, high data reliability, minimum or no delay and low power consumption. As most of the WBAN operates within the universal Industrial, Scientific and Medical (ISM) Narrow Band (NB) wireless band (2.4 Ghz) frequency band, this has posed a challenge in respect to inter, intra and co-channel interference especially in dense areas and high mobility scenarios. As well the body posture changes dynamically due to these mobility effects. In this paper, we propose a hybrid WBAN interference mitigation model based on Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) Contention Window (CW) approach and User Priority (UP) queues. Using Omnet++ simulation, a comparison to the IEEE 802.15.6 based WBAN protocol is presented under the standing, walking sitting and Lying postural mobility scenarios. The results show that the proposed hybrid model outperforms IEEE 802.15.6 based CSMA/CA protocol in areas of network throughput, bandwidth efficiency and network delay in these mobility postures.

Keywords

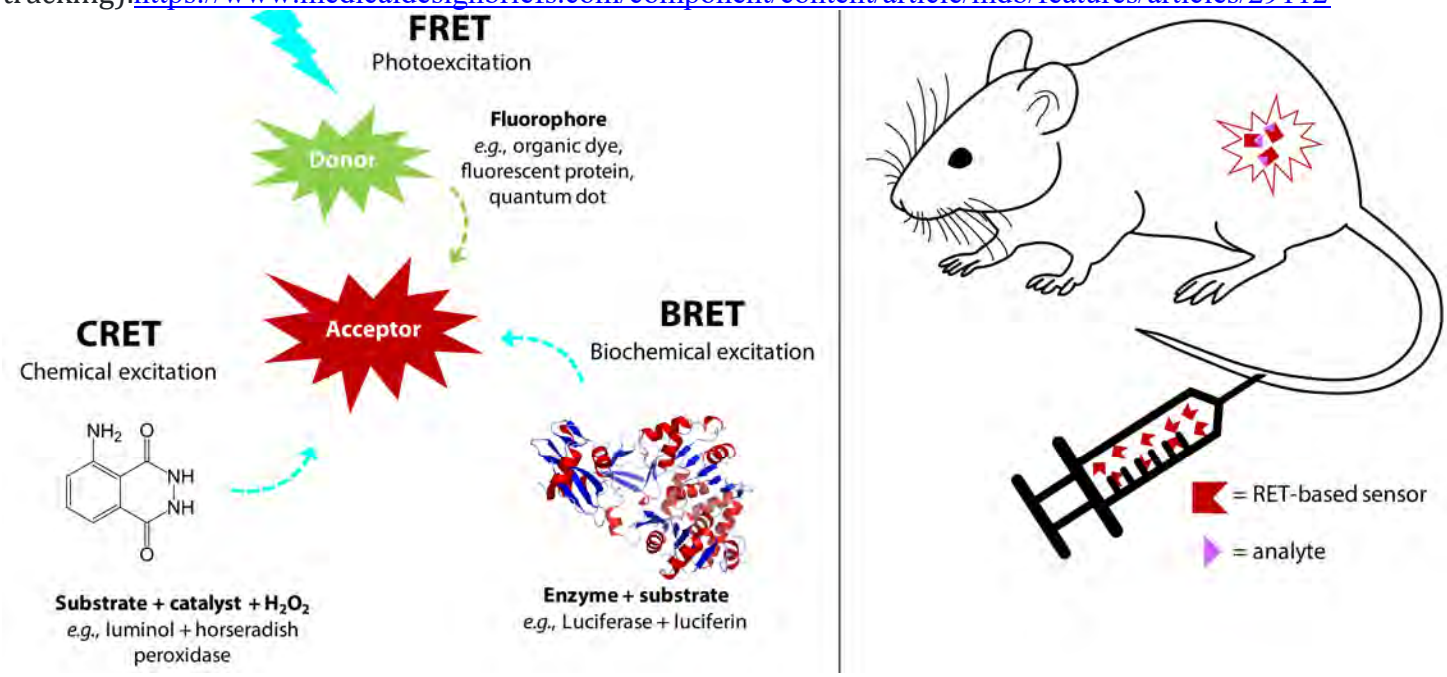
IEEE 802.15.6, Interference Mitigation, WBAN Mobility, Priority Queues, CSMA/CA

https://www.scirp.org/journal/paperinformation.aspx?paperid=84236



MEDICAL BODY AREA NETWORK (MBAN)

In 2014, the FCC finalized the rules for MBANs — a network of sensors/actuators worn on the human body that communicate with a controlling device via a wireless link. With a spectrum allocation in the S-band from 2360 to 2400 MHz, the ruling states that the 2360–2390 MHz band is restricted to indoor use while the rest of band is open for use in other locations (e.g., residential). The MBAN is a subset of the more general trend of wireless body area networks (WBAN) or body sensor networks (BSN) that includes nonmedical applications such as human-computer interfaces (e.g., neural interface, virtual reality), location tracking, and personal fitness tracking).https://www.medicaldesignbriefs.com/component/content/article/mdb/features/articles/29112



Journal of Research of the National Institute of Standards and Technology

J Res Natl Inst Stand Technol. 2007 May-Jun; 112(3): 139–152.

Published online 2007 Jun 1. doi: 10.6028/jres.112.011

PMCID: PMC4656002

PMID: 27110461

Biophotonic Tools in Cell and Tissue Diagnostics

Michael Brownstein

The J. Craig Venter Institute

Robert A. Hoffman

BD Biosciences

Richard Levenson

Cambridge Research and Instrumentation

Thomas E. Milner

The University of Texas at Austin

M. L. Dowell, P. A. Williams, G. S. White, A. K. Gaigalas, and J. C. Hwang

National Institute of Standards and Technology, Boulder, CO 80305-3328

Author information Article notes Copyright and License information Disclaimer

Go to:

Abstract

In order to maintain the rapid advance of biophotonics in the U.S. and enhance our competitiveness worldwide, key measurement tools must be in place. As part of a wide-reaching effort to improve the U.S. technology base, the National Institute of Standards and Technology sponsored a workshop titled “Biophotonic tools for cell and tissue diagnostics.” The workshop focused on diagnostic techniques involving the interaction between biological systems and photons. Through invited presentations by industry representatives and panel discussion, near- and far-term measurement needs were evaluated. As a result of this workshop, this document has been prepared on the measurement tools needed for biophotonic cell and tissue diagnostics. This will become a part of the larger measurement road-mapping effort to be presented to the Nation as an assessment of the U.S. Measurement System. The information will be used to highlight measurement needs to the community and to facilitate solutions.

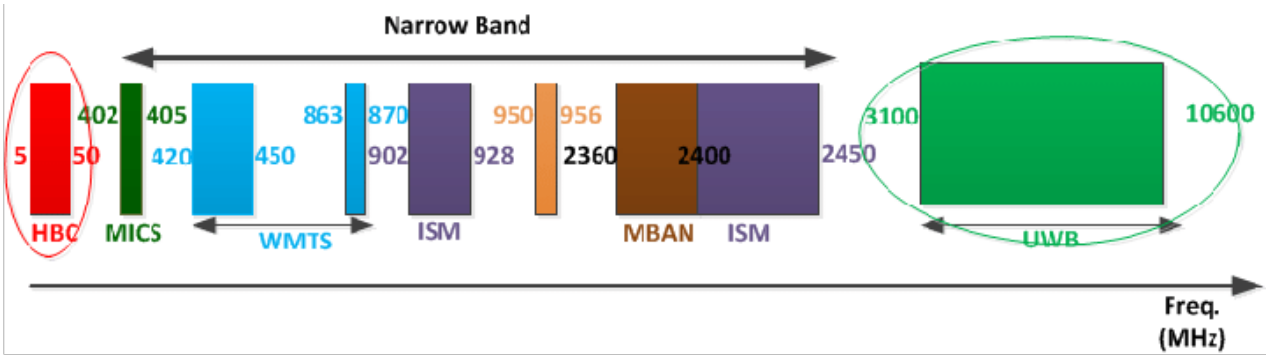
Keywords: biophotonics, flow cytome-try, imaging, microarray, optical coherence tomography

Go to:

1. Introduction

Since the invention of the microscope over 300 years ago, light has been used to probe biological samples. With the appearance of laser sources, versatile detectors (e.g., photomultipliers and CCD arrays), and optical filters, the use of light in biological and medical research has become increasingly sophisticated. The interaction between light and biological system leads to the modification of both; unraveling and understanding the changes is the purview of biophotonics [1]. The scope of biophotonic applications can be gleaned from the large number of examples described in recent books edited by Marriott and Parker [2,3].

To discuss diagnostic tools it is useful to have a clear picture of what is being measured. **On the most fundamental level, each cell has a fixed content of deoxyribonucleic acid (DNA) (genome) and a certain content of proteins (proteome). As currently understood, most functions of the cell are reflected in the genes that are activated, the amount of proteins expressed, and post transcription modifications that occur. Thus the meaningful measurements for elucidating the detailed state of a cell are the number and type of genes being expressed, and the proteins that are present in the cell.** Normal cells are associated with certain characteristic levels and patterns of gene transcription and certain characteristic levels of proteins. Disease states are associated with deviations from these “normal” levels and patterns. The measurement technologies which attempt to give a detailed picture of the genome and proteome are based on microarrays for DNA and proteins. With the development of microarrays there is an expectation that more detailed knowledge of gene expression and protein content can be obtained for diagnostic purposes. For example, patterns of gene expression arrays are useful in differentiating myeloid from lymphoid leukemia. They are even more useful in the classification of heterogeneous lymphoid neoplasmas that cannot be resolved with conventional morphology analysis.



https://www.researchgate.net/figure/Radio-frequency-spectrum-for-WBAN-communications-in-IEEE-802156-standard-see-online_fig1_319237624

Conferences >2017 29th International Confe...

Low power HBC PHY baseband transceiver for IEEE 802.15.6 WBAN

Publisher: IEEE

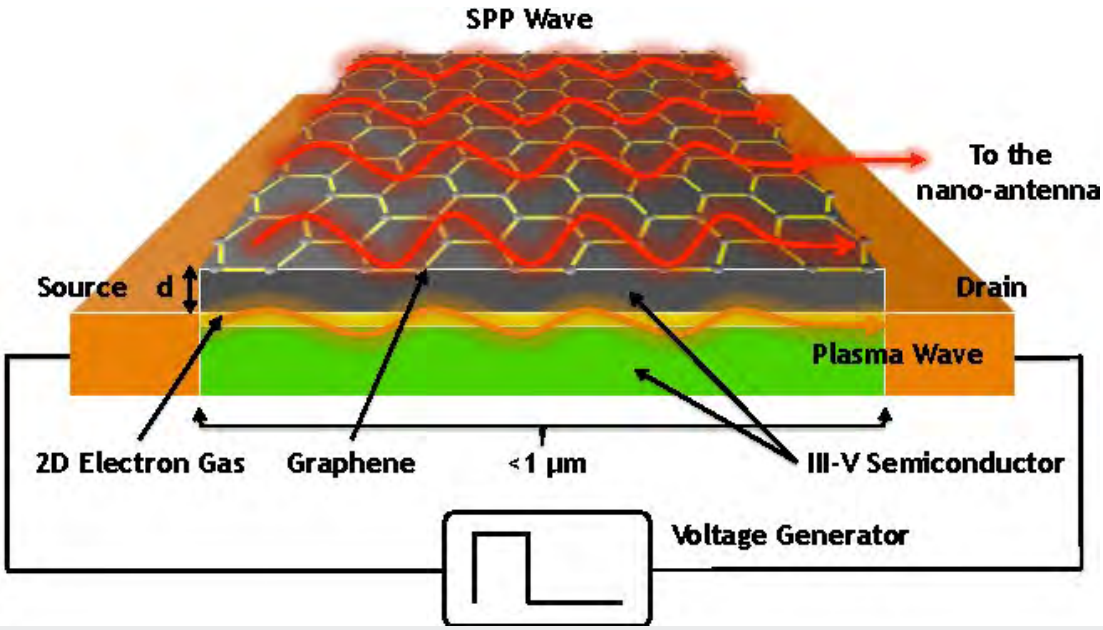
Cite This

PDF

Abdelhay Ali; Ahmed Shalaby; Mohammed S. Sayed; Mohammed Abo-Zahhad

Abstract:
The monitoring healthcare systems that can be used by patients wherever they are, has become very important for today efficient healthcare. Wireless body area network is one possible realization of these systems. Based on IEEE 802.15.6-2012 standard, this paper proposes a low power architecture of Human Body Communication transceiver for Wireless Body Area Network. A new efficient frame synchronization algorithm based on adaptive threshold is adopted. The proposed design is coded and simulated using MATLAB software. Then, the transceiver is implemented using Verilog and synthesized to 90nm CMOS technology. The implemented architecture meets all the standard requirements, consumes 0.63mW, and operates at a clock frequency of 42MHz.

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Date of Conference: 10-13 December 2017
Date Added to IEEE *Xplore*: 25 January 2018
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INSPEC Accession Number: 17524931
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Publisher: IEEE
Conference Location: Beirut, Lebanon
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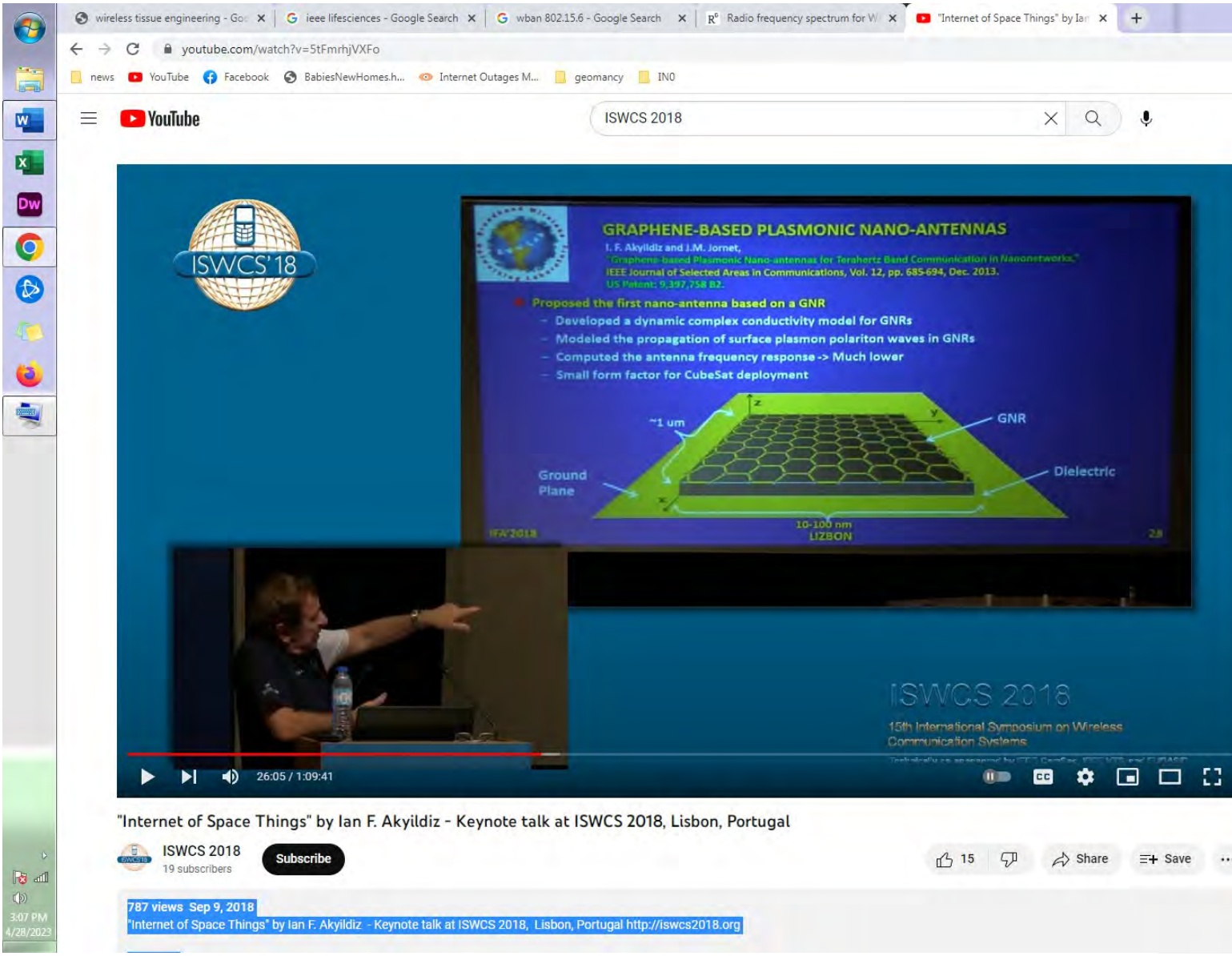
- DOI:10.1109/NANO.2015.7388948
- Corpus ID: 220644

On the feeding mechanisms for graphene-based THz plasmonic nano-antennas

- J. Jornet, A. Cabellos
- Published 27 July 2015
- Physics
- 2015 IEEE 15th International Conference on Nanotechnology (IEEE-NANO)

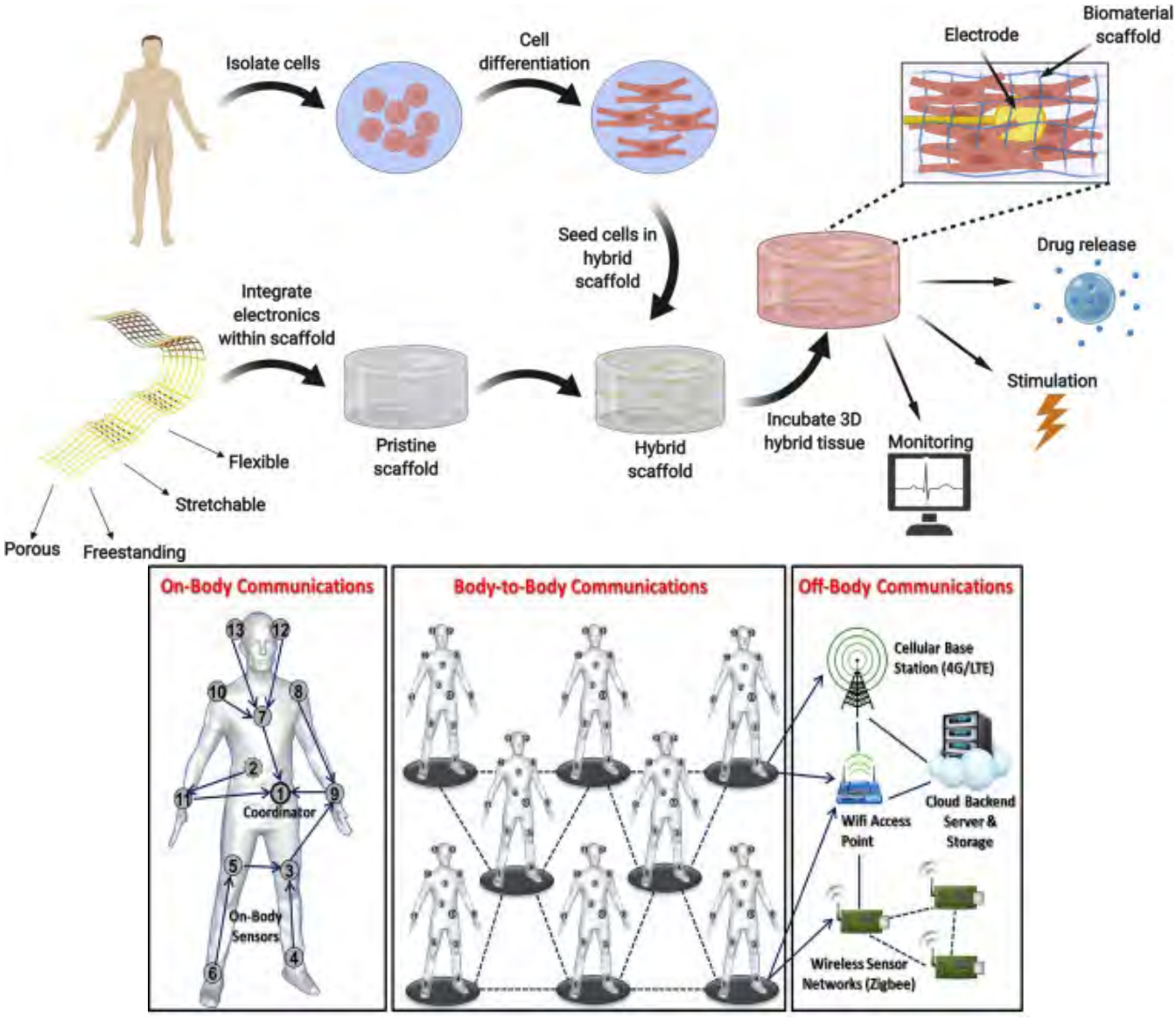
Graphene, thanks to its ability to support Surface Plasmon Polariton (SPP) waves in the Terahertz (THz) band (0.1- 10 THz), enables the miniaturization and electrical tunability of miniature antennas suited for wireless communication among nanosystems. Despite graphene antennas have been extensively analyzed by means of modeling and simulation, no experimental proof is available to date. One of the main reasons for this is the lack of adequate signal generators and feeding mechanisms able to contact the nano-antenna with a reasonable efficiency. In this paper, two recently proposed feeding mechanisms for graphene-based THz plasmonic antennas are described. The first technique is based on the optical excitation of SPP waves by means of optical downconversion with photoconductive materials, whereas the second approach relies on electrical excitation of SPP waves on the antenna by means of a high-electron-mobility transistor. While fundamentally different, the two feeding mechanisms are able to effectively couple to a graphene-based plasmonic nanostructure and, thus, can be utilized to excite plasmonic nano-antennas in practical setups.

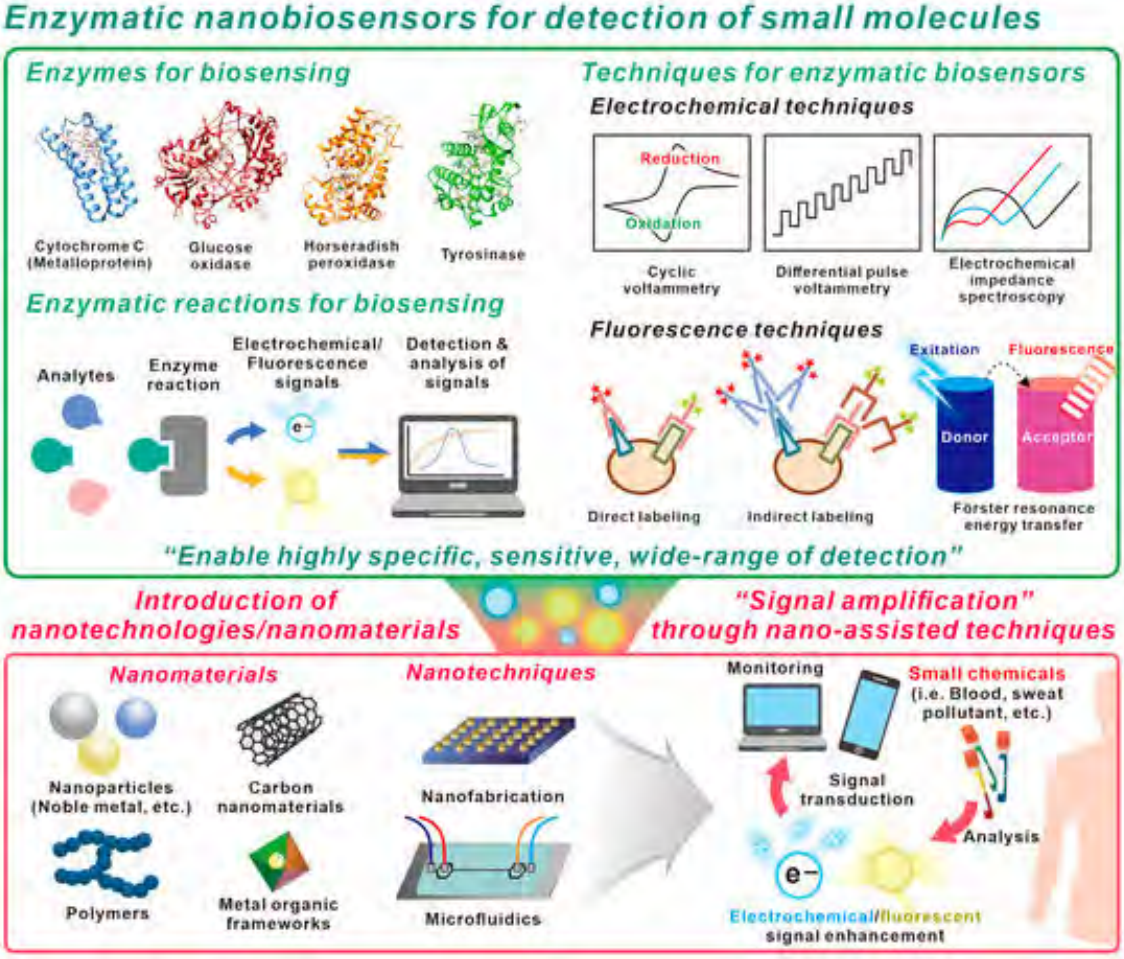
https://www.semanticscholar.org/paper/On-the-feeding-mechanisms-for-graphene-based-THz-Jornet-Cabellos/7c0f9d1990d43b10553dbd8492ce11160b28c547

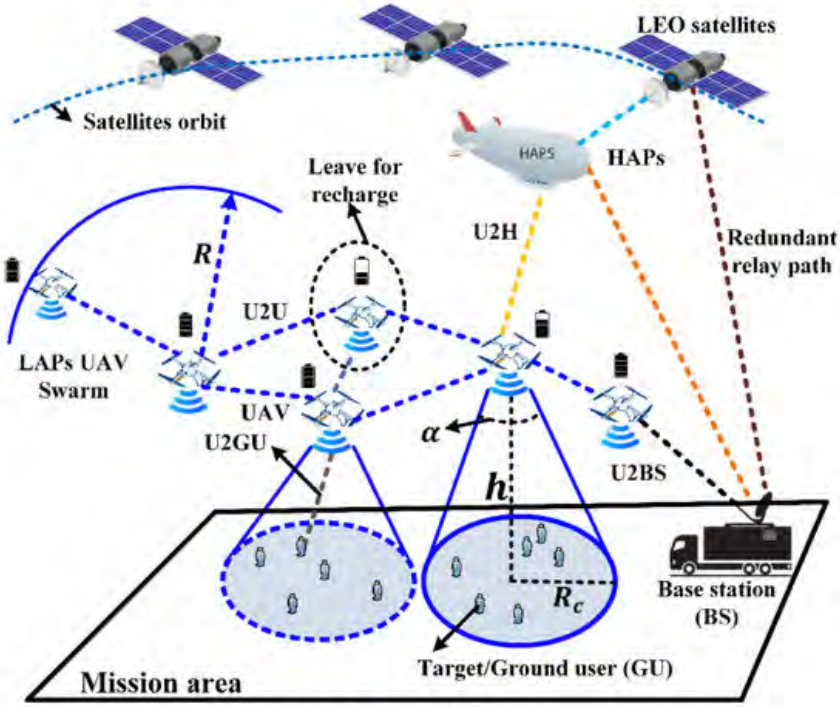


787 views Sep 9, 2018

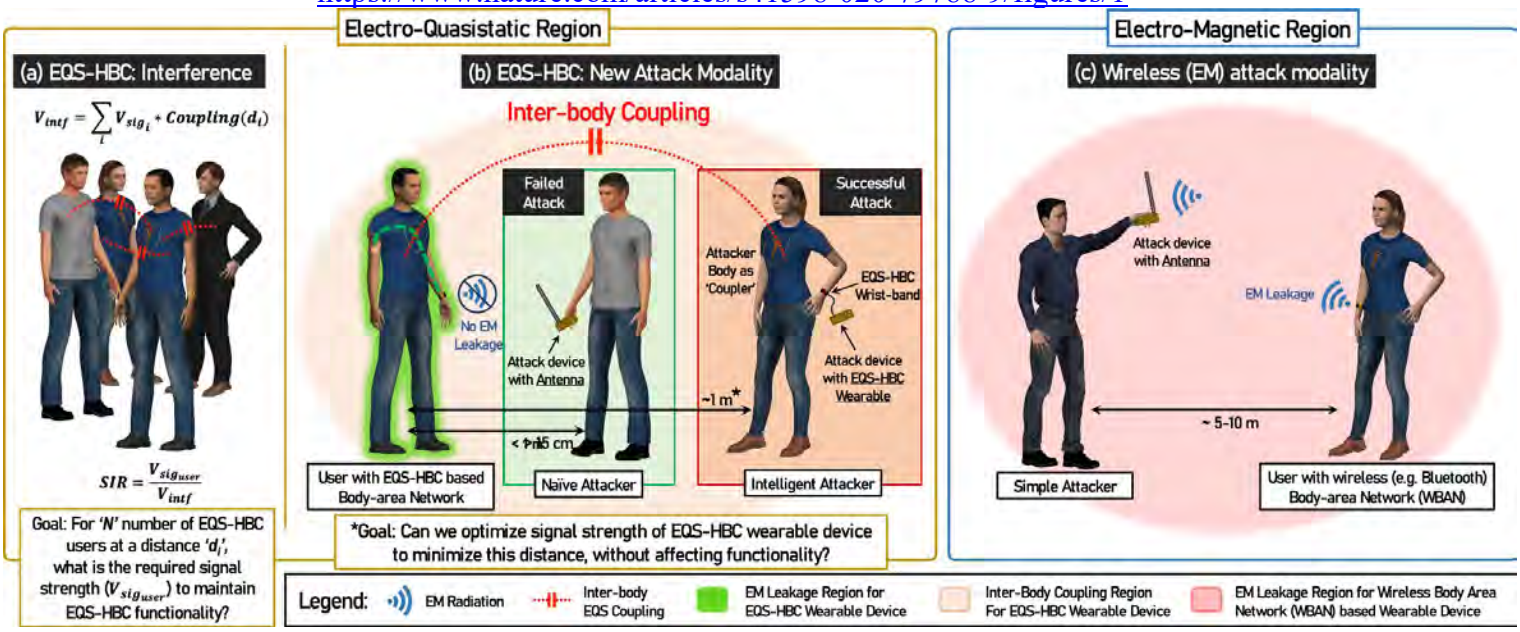
"Internet of Space Things" by Ian F. Akyildiz - Keynote talk at ISWCS 2018, Lisbon, Portugal http://iswcs2018.org Abstract: The Internet of Things (IoT) for terrestrial deployments is a major part of the next generation 5G wireless systems. However, there are many use cases such as monitoring remote areas, terrain monitoring including North and South poles, intelligent global transport management, etc. which require a more global, scalable, flexible and resilient solution. In this talk, a novel architecture of the Internet of Space Things (IoST) is introduced stemming from the fast development and application of newly designed CubeSats with compact hybrid THz/Ku/X band frequency transceivers and antenna arrays. The proposed IoST architecture is based on THz band communication for achieving terabit-per-second throughputs among CubeSats. Furthermore, software-defined networking (SDN), and network function virtualization (NFV) have been incorporated to effectively separate the abstraction of functionalities from the hardware by decoupling the data forwarding plane from the control plane, such separation is of prime importance given the limited onboard processing on CubeSats. Additionally, key parameters in the constellation design including the coverage footprint and number of CubeSats as well as orbital planes, etc. are investigated for feasibility and deployment studies at different altitudes in the exosphere orbit (800 km and above). Through the new IoST architecture, a much broader spatial and service domain with greatly enhanced efficacy can be served than with the traditional IoT solutions.




Enzymatic nanobiosensors for detection of small molecules
Enzymes for biosensing
Cytochrome C (Metalloprotein)
Glucose oxidase
Horseradish peroxidase
Tyrosinase
Techniques for enzymatic biosensors
Electrochemical techniques
Reduction
Oxidation
Cyclic voltammetry
Differential pulse voltammetry
Electrochemical impedance spectroscopy
Enzymatic reactions for biosensing
Analytes
Enzyme reaction
Electrochemical/ Fluorescence signals
Detection & analysis of signals
Fluorescence techniques
Exitation
Fluorescence
Donor
Acceptor
Direct labeling
Indirect labeling
Förster resonance energy transfer
"Enable highly specific, sensitive, wide-range of detection"
Introduction of nanotechnologies/nanomaterials
"Signal amplification" through nano-assisted techniques
Nanomaterials
Nanoparticles (Noble metal, etc.)
Carbon nanomaterials
Polymers
Metal organic frameworks
Nanotechniques
Nanofabrication
Microfluidics
Monitoring
Small chemicals (i.e. Blood, sweat pollutant, etc.)
Signal transduction
Analysis
Electrochemical/fluorescent signal enhancement


LEO satellites
Satellites orbit
HAPS
HAPs
Leave for recharge
U2H
Redundant relay path
R
U2U
LAPs UAV Swarm
UAV
U2GU
α
h
U2BS
Base station (BS)
R_c
Target/Ground user (GU)
Mission area
Residual energy level of UAVs: High Medium Low
α Sensor field of view h UAV height R_c Coverage radius to ground terminal
R UAV transmission range

https://www.nature.com/articles/s41598-020-79788-9/figures/1



https://academic.oup.com/burnstrauma/article/doi/10.1093/burnst/tkac022/6628224?fbclid=IwAR2orORXj8luihLLpzRcDE96GjSvG7v8ZhPfMXsbwl1HZY4sN35gA-IAJZw&login=false

JOURNAL ARTICLE

Regulation of signaling pathways in hair follicle stem cells

Xiaoxiang Wang, Yinghui Liu, Jia He, Jingru Wang, Xiaodong Chen, Ronghua Yang

Author Notes

Burns & Trauma, Volume 10, 2022, tkac022, https://doi.org/10.1093/burnst/tkac022

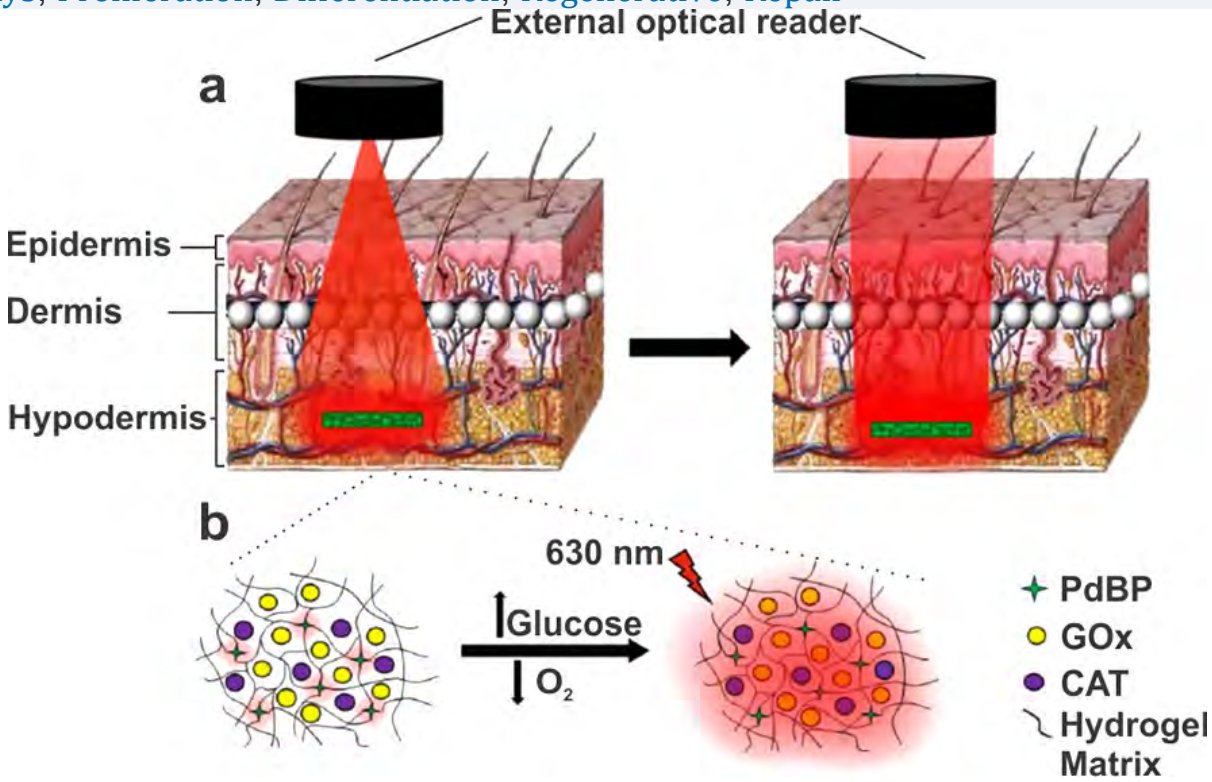
Published:

04 July 2022

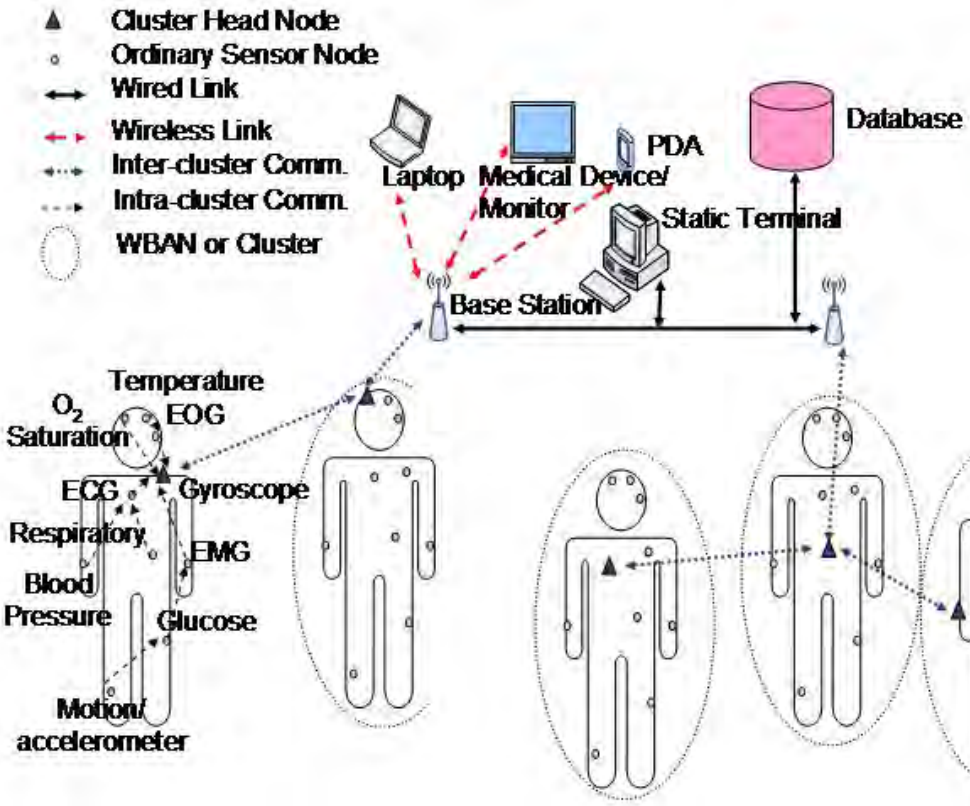
Abstract

Hair follicle stem cells (HFSCs) reside in the bulge region of the outer root sheath of the hair follicle. They are considered slow-cycling cells that are endowed with multilineage differentiation potential and superior proliferative capacity. The normal morphology and periodic growth of HFSCs play a significant role in normal skin functions, wound repair and skin regeneration. The HFSCs involved in these pathophysiological processes are regulated by a series of cell signal transduction pathways, such as lymphoid enhancer factor/T-cell factor, Wnt/β-catenin, transforming growth factor-β/bone morphogenetic protein, Notch and Hedgehog. The mechanisms of the interactions among these signaling pathways and their regulatory effects on HFSCs have been previously studied, but many mechanisms are still unclear. This article reviews the regulation of hair follicles, HFSCs and related signaling pathways, with the aims of summarizing previous research results, revealing the regulatory mechanisms of HFSC proliferation and differentiation and providing important references and new ideas for treating clinical diseases.

Hair follicle stem cells, Signaling pathways, Proliferation, Differentiation, Regenerative, Repair



http://cpslab.rutgers.edu/projects/body_networks/



- Original Research
- Published: 29 June 2022

Intra WBAN routing using Zipf's law and intelligent transmission power switching approach (ZITA)

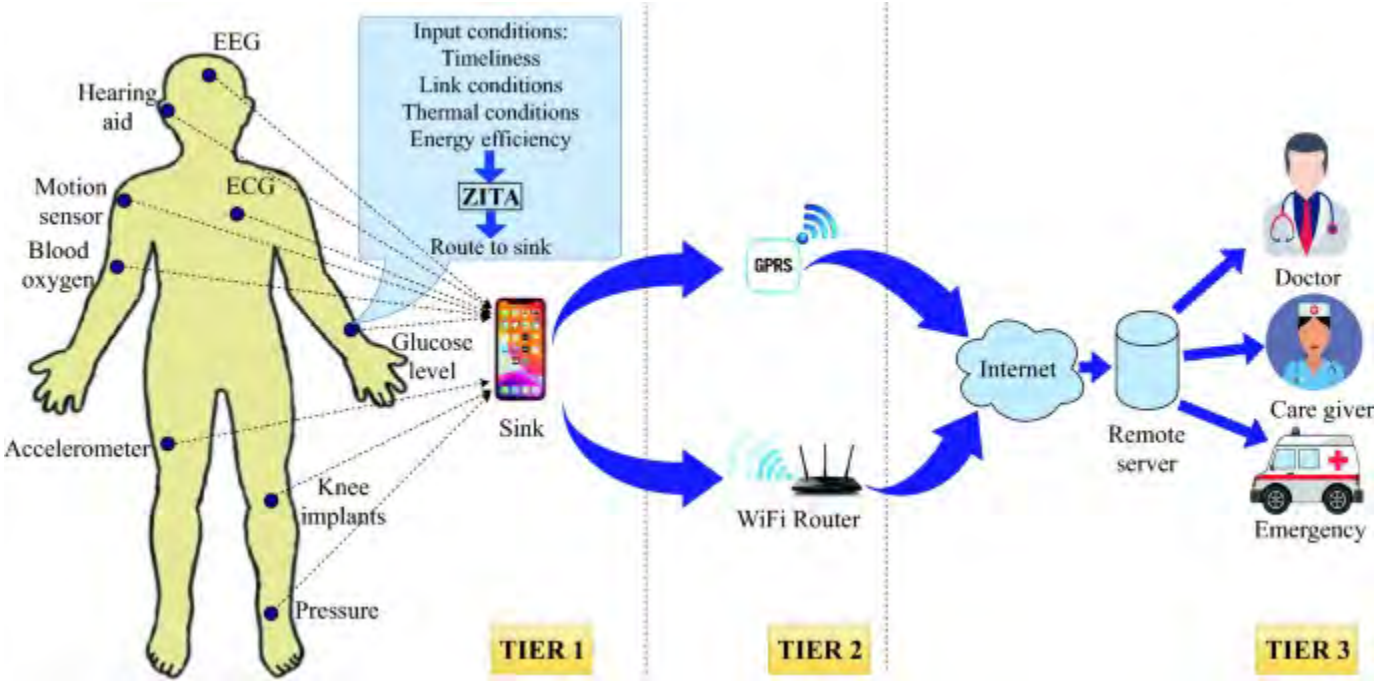
- Moumita Roy,
- Chandreyee Chowdhury,
- Ghufran Ahmed,
- Nauman Aslam,
- Samiran Chattopadhyay &
- Saif Ul Islam

Journal of Ambient Intelligence and Humanized Computing **volume 13**, pages4135–4149 (2022)Cite this article

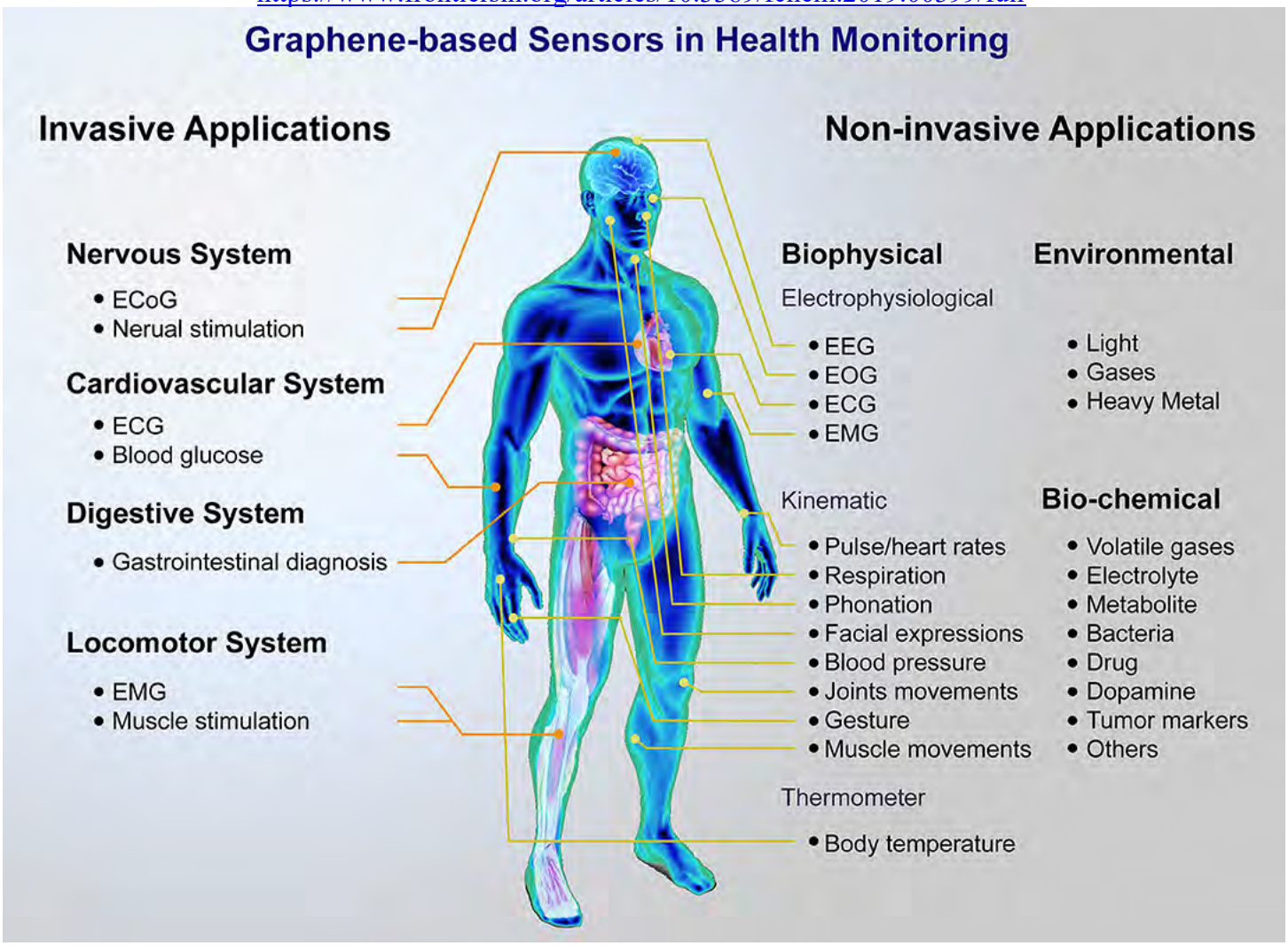
- **167** Accesses
- **2** Citations
- Metricsdetails

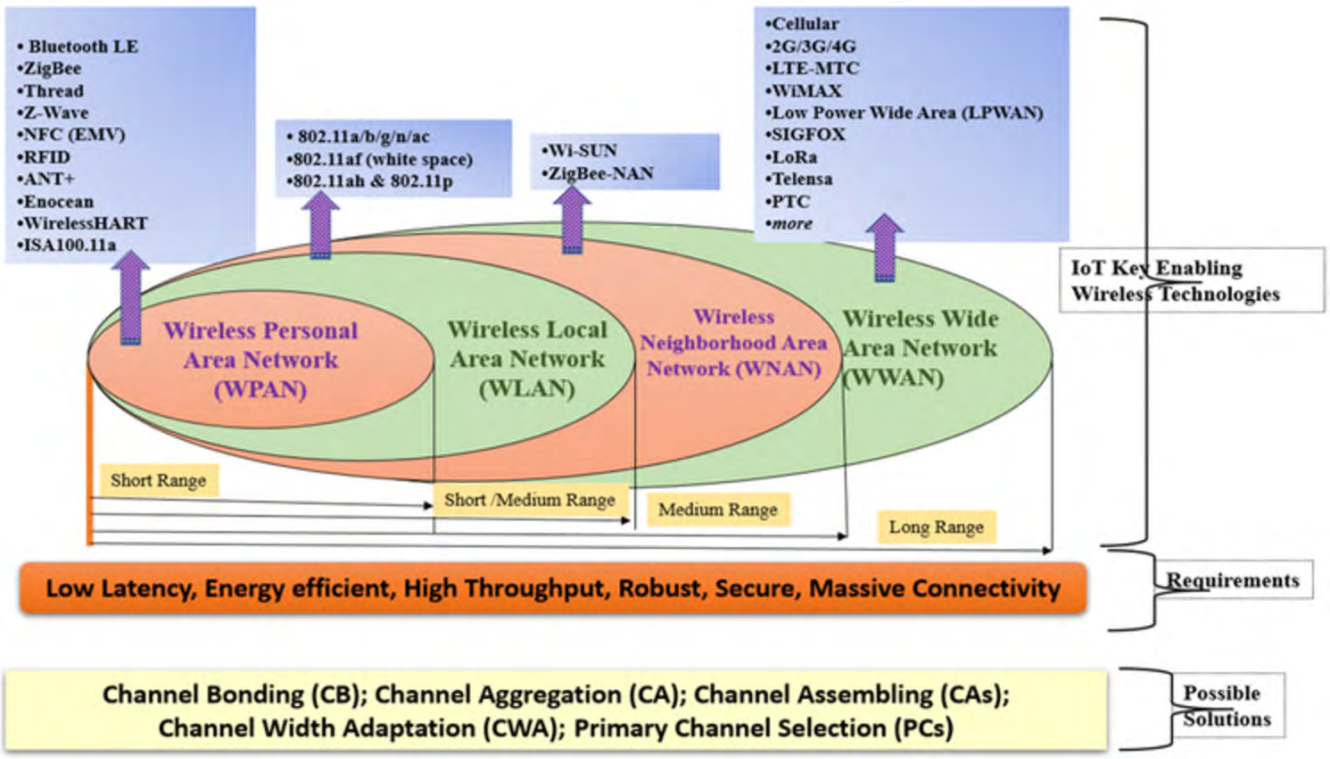
Abstract

Wireless body area networks (WBANs) are becoming a popular and convenient mechanism for IoT-based health monitoring applications. Maintaining the energy efficiency of the nodes in WBANs without degrading network performance is one of the crucial factors for the success of this paradigm. Obtaining routes for data packets should be a dynamic decision depending on network conditions. Consequently, in this paper, a novel cost-based routing protocol ZITA has been proposed that addresses primary issues of WBAN routing, such as timeliness, link quality, temperature control, and energy efficiency while finding the next hop for data packets. Zipf's law is applied for relay selection to ensure the distribution of forwarding load among the potential relays. ZITA controls the transmission power level adaptively in order to cope with the time-varying channel conditions following multi-hop architecture. The protocol is simulated and the results show that the protocol gives better performance in terms of data received by the sink, heat dissipation of the wearable as well as implantable sensor nodes, and load sharing among relay nodes.



https://www.frontiersin.org/articles/10.3389/fchem.2019.00399/full





AI-Based Federated Learning for 6G Mobile Networks
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Volume 2021 | Article ID 1331428 | https://doi.org/10.1155/2021/1331428
Show citation

Sixth Generation (6G) Cognitive Radio Network (CRN) Application, Requirements, Security Issues, and Key Challenges

https://www.hindawi.com/journals/wcmc/2021/1331428/

4.3. Information Transfer of 5 Human Senses

To experience the world's surroundings, there are five human senses: sight, touch, hearing, smell, and taste. These five senses received data will be remote transfer in 6G CR network communication. The neurological process by sensory integration is used in this process that detects sensation from the environment and the human body and effectively uses the body in the atmosphere and local environments. Brain-computer interface (BCI) technology will excellently boost this application.

4.4. CR Brain-Computer Interaction (CR-BCI)

BCI controls daily used appliances in innovative societies, specifically medical systems and home used appliances. It represents direct communication between external devices and the brain. It acquires brain signals which send to the digital devices, interpret, and examine the signals into other movements. Topographies of 6G CRN communication will provision actual BCI execution for quality of living standards.

4.5. Healthcare

Medical technology will benefit from 6G CR technology because innovation in VR, XR, MR, AR, mobile edge computing, telepresence, holographic, and artificial intelligence will assist in building intelligent healthcare systems. In the healthcare system, a satisfied remote-control system will be served by 6G technology. With the use of 6G technology, there is the possibility of remote surgery. Low latency, high data rate, and feasible 6G CR network will assist fast and promising transport large volume of medical data, which may progress both quality and access to care.

DARPA surveillance system uses EEG for image filtering

News
September 20, 2012

Technology Editor
Embedded Computing Design



Photo credit: Advanced Brain Monitoring

ARLINGTON – The Defense Advanced Research Projects Agency (DARPA) has released field test results of the Cognitive Technology Threat Warning System (CT2WS), a threat detection system utilizing a camera that interacts with operator brain waves to scan wide areas at extended distances. Test results revealed a 91 percent success rate in threat detection using the CT2WS, compared to the 53 percent successful detection rate of more traditional camera systems.

https://militaryembedded.com/ai/big-data/darpa-surveillance-system-uses-eeg-for-image-filtering

https://en.wikipedia.org/wiki/Cognitive_Technology_Threat_Warning_System

The **Cognitive Technology Threat Warning System**, otherwise known as (CT2WS), is a brain-computer interface designed to analyze sensory data and then alert foot-soldiers to any possible threats, passive or direct.[1] CT2WS is part of U.S. Department of Defense's effort to produce an efficient and working Network-centric infantryman.

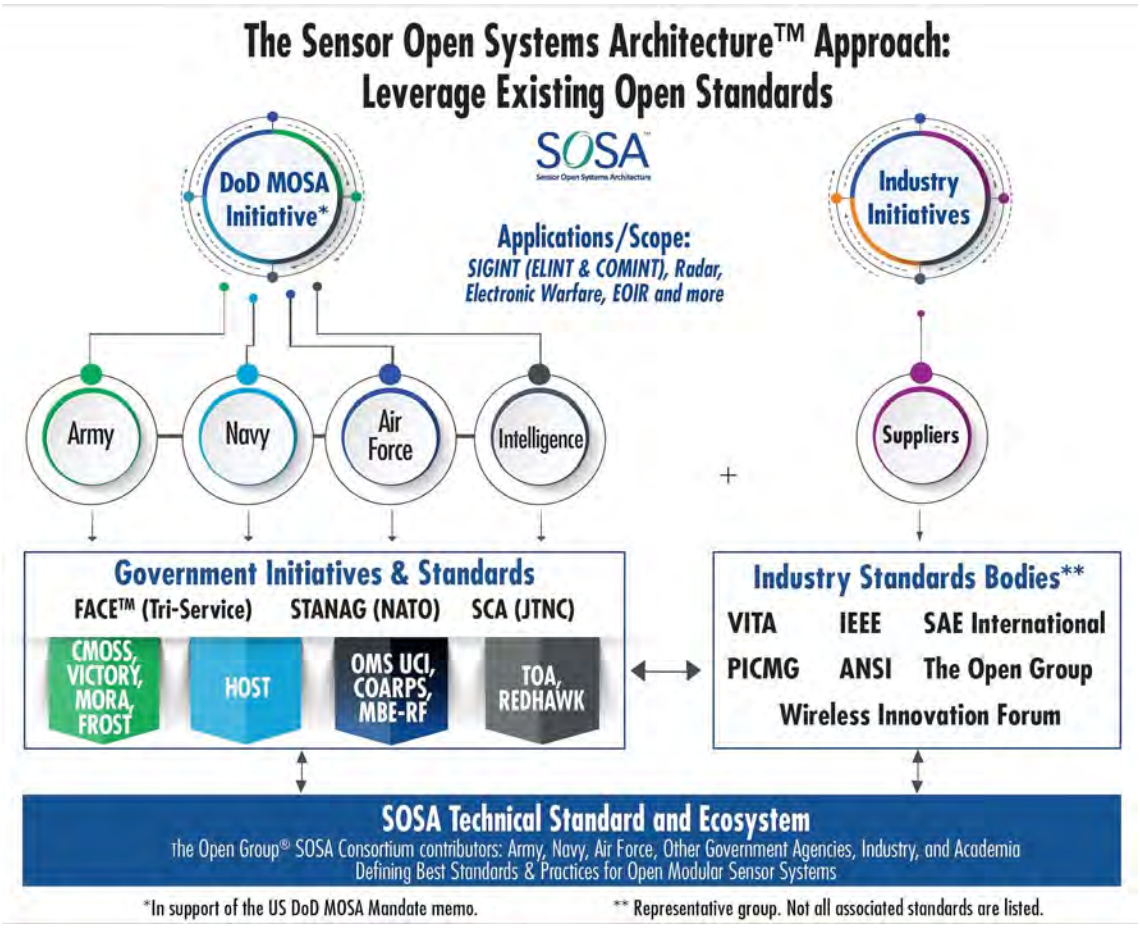
Project[edit]

Proposal[edit]

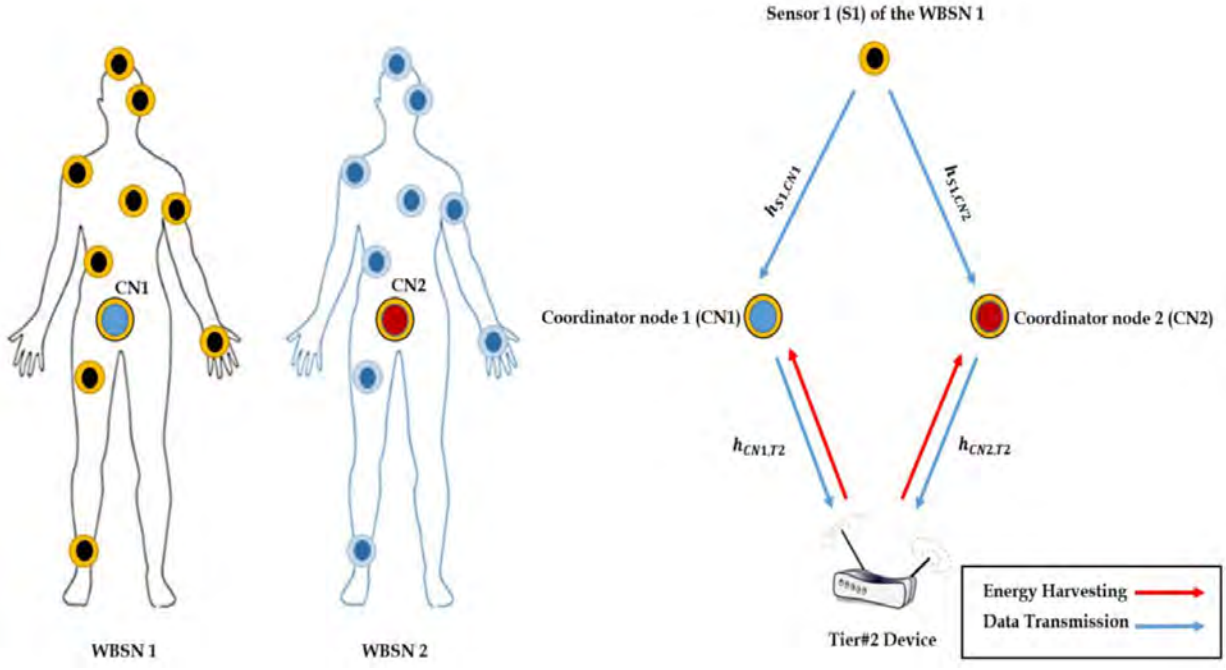
Proposed in early 2007, DARPA came to believe that a visual warning system could be produced and developed via an integration of technology and artificial intelligence.[1] By combining discoveries in flat-field, wide-angle optics, large pixel-count digital imagers, ultra-low power analog-digital hybrid signal processing electronics with cognitive visual processing algorithms, and neural network-based target detection signatures, DARPA felt a breakthrough was possible, but not likely to be achieved by independent researchers.[1] CT2WS further requires that human brain activity must be integrated with the technology.

Selection of research partners is currently open to potential researchers, including: non-traditional defense contractors, nonprofit organizations, educational institutions, small businesses, etc.




The Sensor Open Systems Architecture™ Approach:
Leverage Existing Open Standards
SOSA
Sensor Open Systems Architecture
DoD MOSA Initiative*
Industry Initiatives
Applications/Scope:
SIGINT (ELINT & COMINT), Radar, Electronic Warfare, EOIR and more
Army
Navy
Air Force
Intelligence
Suppliers
+
Government Initiatives & Standards
FACE™ (Tri-Service)
STANAG (NATO)
SCA (JTNC)
CMOSS, VICTORY, MORA, FROST
HOST
OMS UCI, COARPS, MBE-RF
TOA, REDHAWK
Industry Standards Bodies**
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IEEE
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Wireless Innovation Forum
SOSA Technical Standard and Ecosystem
the Open Group® SOSA Consortium contributors: Army, Navy, Air Force, Other Government Agencies, Industry, and Academia
Defining Best Standards & Practices for Open Modular Sensor Systems
*In support of the US DoD MOSA Mandate memo.
** Representative group. Not all associated standards are listed.

https://journals.sagepub.com/doi/10.1177/1550147719879870



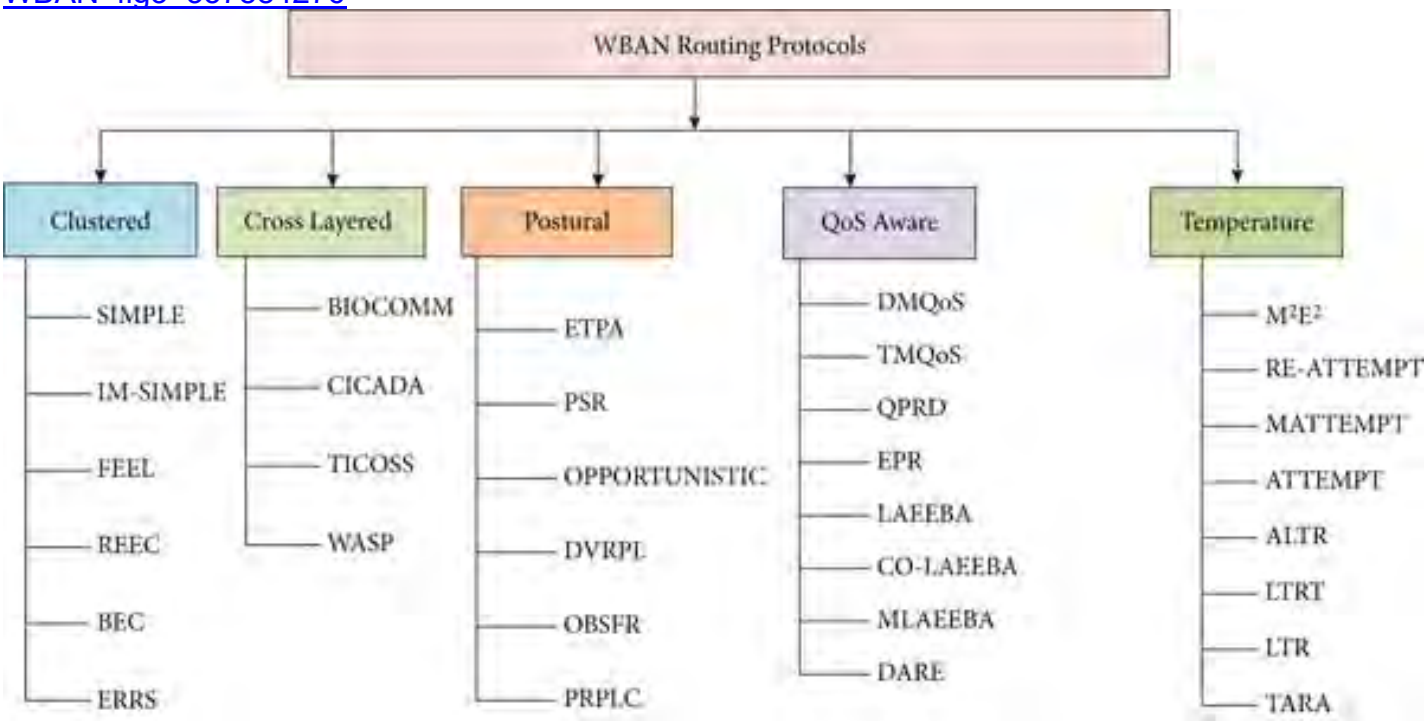
Energy harvesting Internet of Things health-based paradigm: Towards outage probability reduction through inter–wireless body area network cooperation

- WBSN networks architecture
- Link and outage probability analysis
- Simulation and results
- Conclusion
- Declaration of conflicting interests
- Funding
- ORCID iD

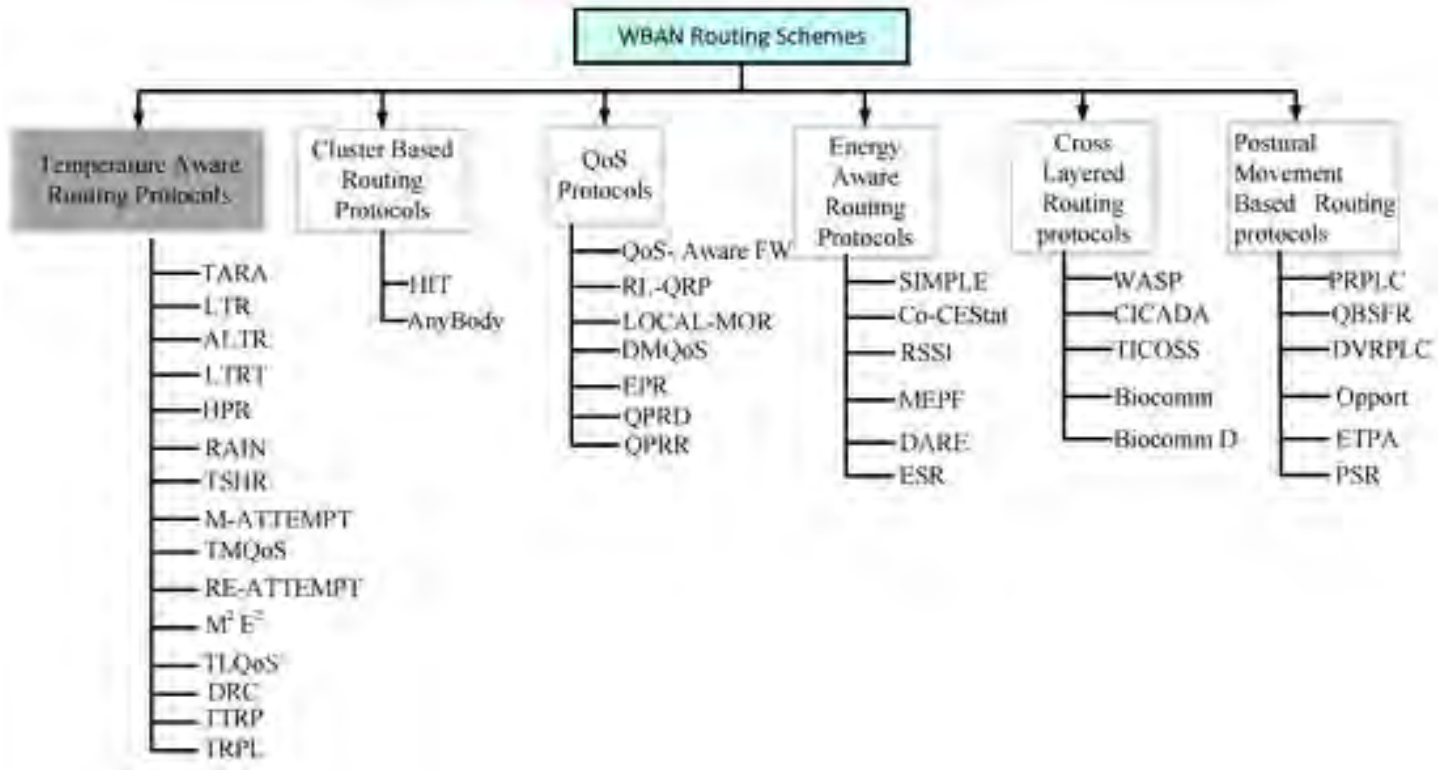
Abstract

In today's healthcare environment, the Internet of Things technology provides suitability among physicians and patients, as it is valuable in numerous medicinal fields. Wireless body sensor network technologies are essential technologies in the growth of Internet of Things healthcare paradigm, where every patient is monitored utilising small-powered and lightweight sensor nodes. A dual-hop, inter–wireless body sensor network cooperation and an incremental inter–wireless body sensor network cooperation with energy harvesting in the Internet of Things health-based paradigm have been investigated and designed in this work. The three protocols have been named and abbreviated as follows: energy harvesting–based dual-hop cooperation, energy harvesting–based inter–wireless body sensor network cooperation and energy harvesting–based incremental inter–wireless body sensor network cooperation. Outage probabilities for the three designed protocols were investigated and inspected, and mathematical expressions of the outage probabilities were derived. The simulation and numerical results showed that the energy harvesting–based incremental inter–wireless body sensor network cooperation provided superior performance over the energy harvesting–based inter–wireless body sensor network cooperation and energy harvesting–based dual-hop cooperation by 1.38 times and 5.72 times, respectively; while energy harvesting–based inter–wireless body sensor network cooperation achieved better performance over energy harvesting–based dual-hop cooperation by 1.87 times.

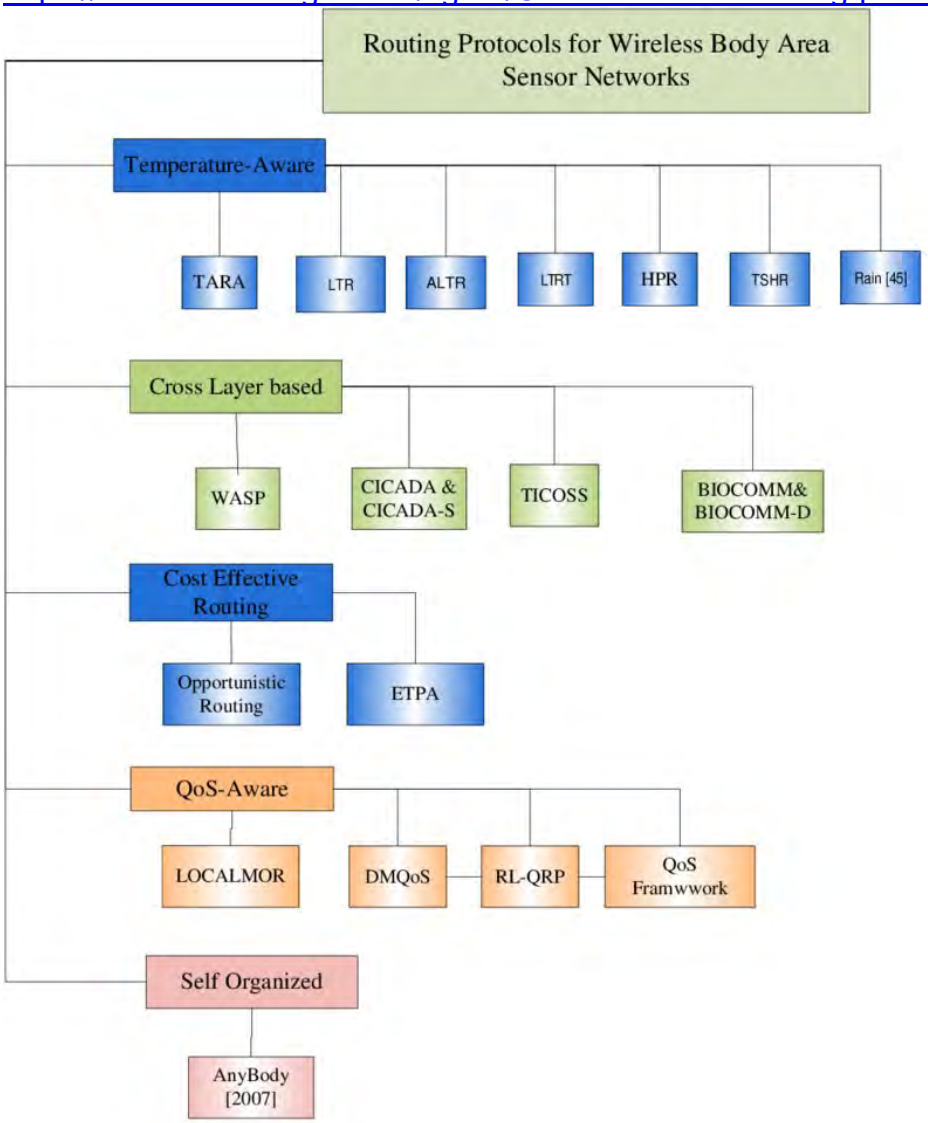
https://www.researchgate.net/figure/Classification-of-energy-efficient-routing-protocols-in-WBAN_fig3_357884276



https://www.mdpi.com/2079-9292/8/1/47



https://www.researchgate.net/figure/Classification-of-routing-protocol-in-WBAN_fig6_305910510



https://www.sciencedirect.com/science/article/abs/pii/S1389128618310764
A novel cluster head selection technique for edge-computing based IoMT systems
https://doi.org/10.1016/j.comnet.2019.04.021Get rights and content

Abstract

Edge-computing plays a significant role for remote healthcare systems in recent times since hospitals adopt Internet of Medical Things (IoMT) for medical applications. One of the primary concern of edge-computing based IoMT systems includes preserving the power of medical devices, also raise the lifetime of the healthcare system. Therefore, energy efficient communication protocol is mandatory for IoMT systems. In recent times, several approaches have been developed to enhance the lifespan of IoMT, but clustering is more preferred for offering energy efficiency in medical applications. The main disadvantage of current clustering technique is that likelihood of packet failure is not considered in their communication model which causes not a reliable communication issue, also cut downs the energy of medical nodes. In this research, we are focused on developing a clustering model for medical applications (CMMA) for cluster head selection to provide effective communication for IoMT based applications. From the experimental analysis, it is revealed that the proposed CMMA has better performance than compared approaches regarding sustainability and energy utilization. Thus, it can be concluded that he proposed CMMA not only minimize the energy utilization of edge-computing based IoMT systems but it also uniformly distribute cluster heads in the network so to increase its network lifetime.

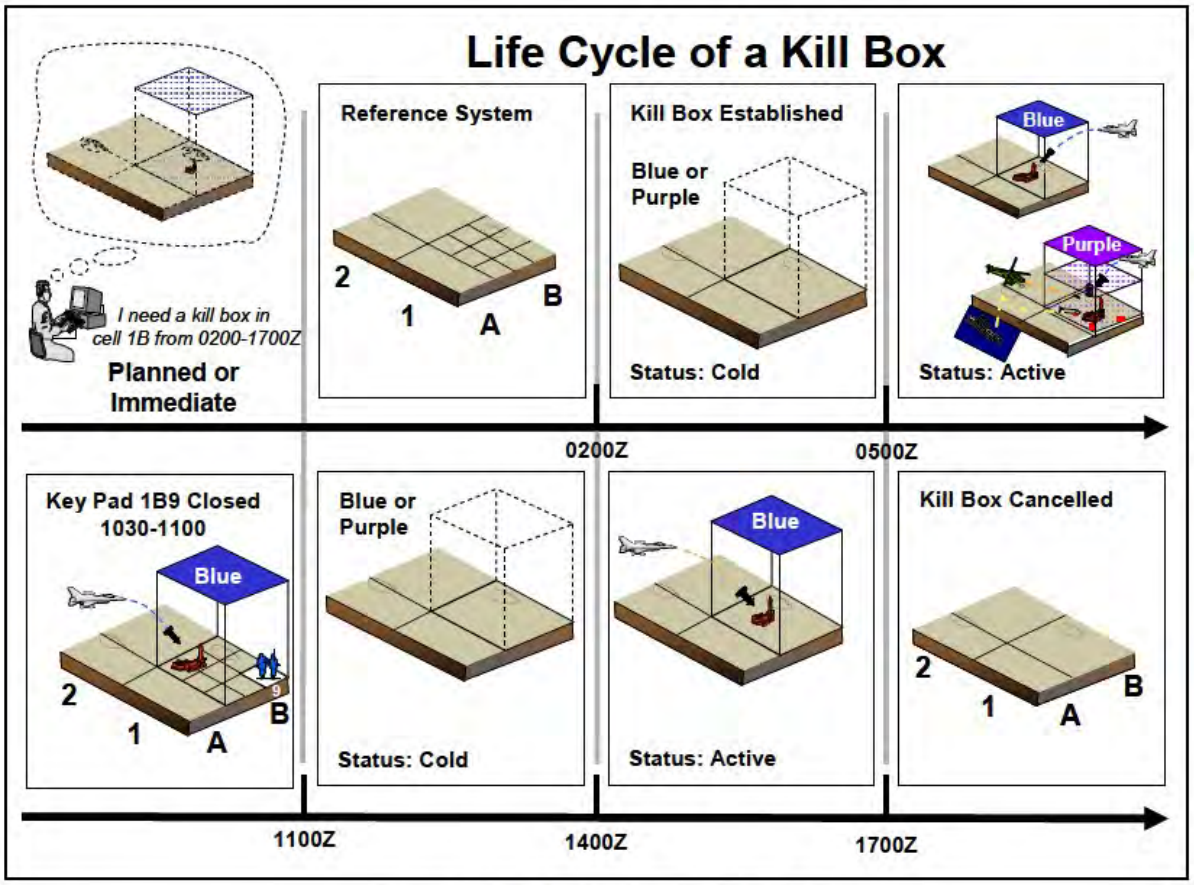


Figure I-1. Life Cycle of a Kill Box

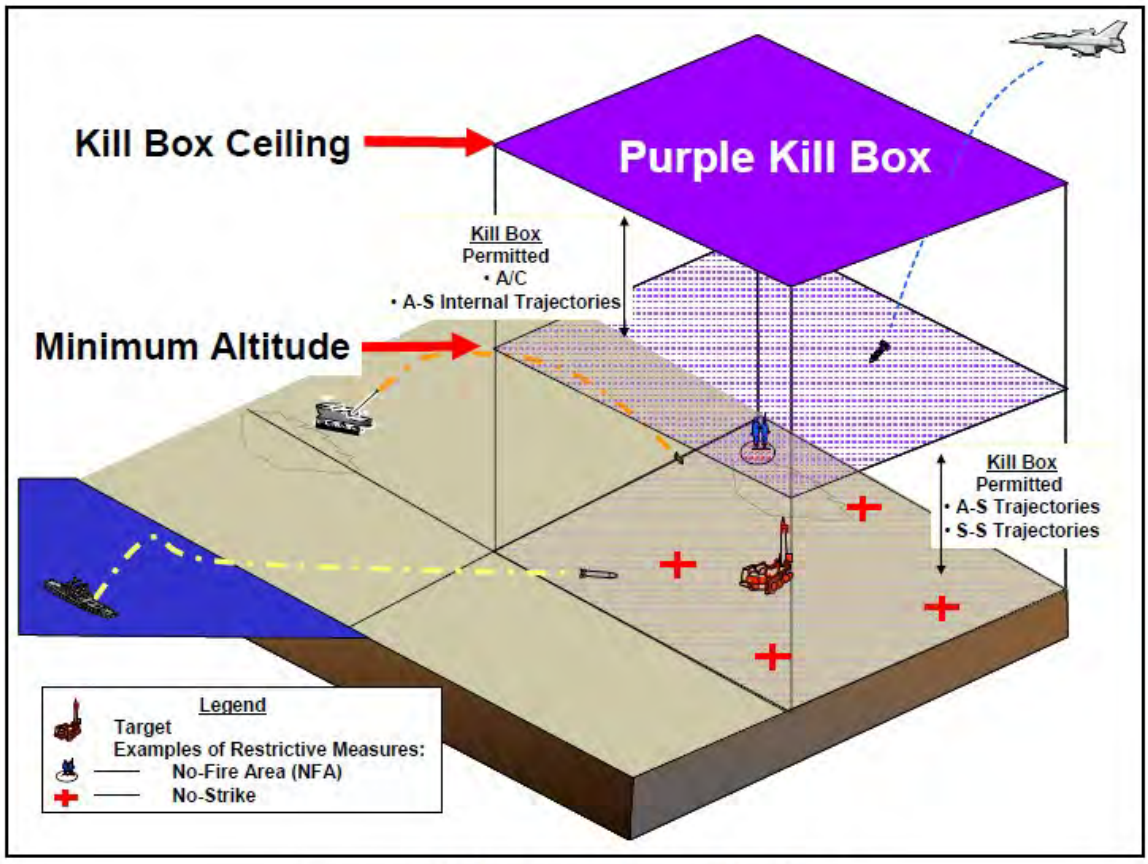


Figure II-2. Notional Purple Kill Box

https://www.mdpi.com/2076-3417/11/21/9993

An Intelligent Clustering-Based Routing Protocol (CRP-GR) for 5G-Based Smart Healthcare Using Game Theory and Reinforcement Learning

by
*
Authors to whom correspondence should be addressed.
Appl. Sci. **2021**, *11*(21), 9993; https://doi.org/10.3390/app11219993
Received: 8 September 2021 / Revised: 1 October 2021 / Accepted: 10 October 2021 / Published: 26 October 2021
(This article belongs to the Section Electrical, Electronics and Communications Engineering)

Abstract
With advantages such as short and long transmission ranges, D2D communication, low latency, and high node density, the 5G communication standard is a strong contender for smart healthcare. Smart healthcare networks based on 5G are expected to have heterogeneous energy and mobility, requiring them to adapt to the connected environment. As a result, in 5G-based smart healthcare, building a routing protocol that optimizes energy consumption, reduces transmission delay, and extends network lifetime remains a challenge. This paper presents a clustering-based routing protocol to improve the Quality of services (QoS) and energy optimization in 5G-based smart healthcare. QoS and energy optimization are achieved by selecting an energy-efficient clustering head (CH) with the help of game theory (GT) and best multipath route selection with reinforcement learning (RL). The cluster head selection is modeled as a clustering game with a mixed strategy considering various attributes to find equilibrium conditions. The parameters such as distance between nodes, the distance between nodes and base station, the remaining energy and speed of mobility of the nodes were used for cluster head (CH) selection probability. An energy-efficient multipath routing based on reinforcement learning (RL) having (Q-learning) is proposed. The simulation result shows that our proposed clustering-based routing approach improves the QoS and energy optimization compared to existing approaches. The average performances of the proposed schemes CRP-GR and CRP-G are 78% and 71%, respectively, while the existing schemes, such as FBCFP, TEEN and LEACH have average performances of 63%, 48% and 35% accordingly.

Keywords:
clustering; routing; game theory; reinforcement learning; smart healthcare; 5G and IoT

