RECENT TRENDS IN WIRELESS AND MOBILE COMMUNICATION - SURVEY

A.M Aswin
Department of Embedded Technology, SENSE
Vellore Institute of Technology, Vellore-632014, Tamil Nadu, India

P.Sasikumar
Department of Embedded Technology, SENSE
Vellore Institute of Technology, Vellore-632014, Tamil Nadu, India

ABSTRACT
This paper provides a survey of recent trends in the field of wireless communication. Technology wise the Wireless communication field is evergreen it is being consistently growing new technology keeps on coming. Li-fi (It is a technology for wireless communication between devices using light to transmit data and position) and 5G are the recent trends in wireless communication. This paper showcases all the recent trends and their advantages.

Key word: Wi-Fi, Li-Fi, HDC-OFDM, WAP, CCAA, Optimal Back Propagation, BFO, VOD, AOD, DCO-OFDM, DACO-OFDM.

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1. INTRODUCTION
Wireless communication, or sometimes simply wireless, is the transfer of information or power between two or more points that are not connected by an electrical conductor. The most common wireless technologies use radio waves. With radio waves distances can be short, such as a few meters for Bluetooth or as far as millions of kilometers for deep-space radio communications. Physical limitations on wireless communication channels impose huge challenges to reliable communication. Bandwidth limitations, propagation loss, noise and interference make the wireless channel a narrow pipe that does not readily accommodate rapid flow of data. Thus, researches aim to design systems that are suitable to operate in such channels, in order to have high performance quality of service. Also, the mobility of the communication systems requires further investigations to reduce the complexity and the power consumption of the receiver. [17]
2. PROPOSED SYSTEM
Our paper consists of different trends in wireless communication that has emerged and the advantage of each application the algorithm used in each applications. All the methods we have mentioned in this paper is unique for specific application. These methods cannot be compared one with another. So these methods are unique and will be helpful in specific applications.

3. METHODOLOGY
Each technique has its own methodology

- Limited-content feedback
- Limited-frequency feedback
- Encryption
- Personalization
- Security data exchange
- Fraud detection systems
- Greedy Routing
- Protocol
- Virtual Reality
- Bacteria Foraging Optimization (BFO)
- HDC-OFDM
- Electroencephalographic measurements
- Optimal Back Propagation (BP)
- Demodulation
- Network model And there are even more ways used in different applications
4. LI-FI (LIGHT FIDELITY)

Li-Fi stands for Light Fidelity and is a Visible Light Communications (VLC) system which runs wireless communications that travel at very high speeds. With Li-Fi, light bulb is essentially your router. It uses common household LED light bulbs to enable data transfer, boasting speeds of up to 224 gigabits per second.[15]. Li-Fi has the advantage of being useful in electromagnetic sensitive areas such as in aircraft cabins, hospitals and nuclear power plants without causing electromagnetic interference. Optical wireless communications (OWC) technology uses light from light-emitting diodes (LEDs) as a medium to deliver networked, mobile, high-speed communication in a similar manner to Wi-Fi. The Li-Fi market is projected to have a compound annual growth rate of 82% from 2013 to 2018 and to be worth over $6 billion per year by 2018.

Visible light communications (VLC) works by switching the current to the LEDs off and on at a very high rate, too quick to be noticed by the human eye. Although Li-Fi LEDs would have to be kept on to transmit data, they could be dimmed to below human visibility while still emitting enough light to carry data. The light waves cannot penetrate walls which makes a much shorter range, though more secure from hacking, relative to Wi-Fi. Direct line of sight is not necessary for Li-Fi to transmit a signal; light reflected off the walls can achieve 70 Mbit/s. Both Wi-Fi and Li-Fi transmit data over the electromagnetic spectrum, but whereas Wi-Fi utilizes radio waves, Li-Fi uses visible light, Ultraviolet and Infrared. [18]
## 5. LITERATURE SURVEY

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| Bidirectional User Throughput Maximization Based on Feedback Reduction in LiFi Networks [2] | Reducing the amount of feedback in LiFi Cellular networks which causes lesser throughput. | i) Limited-content feedback (LCF) scheme based on reducing the content of feedback information  
ii) Limited-frequency feedback (LFF) scheme Based on the update interval. | Wireless Communication                        | The proposed schemes can achieve better average overall throughput compared to the benchmark one-bit feedback and full-feedback Mechanisms. | Increase in Throughput |
| Security and Privacy Issues in Wireless and Mobile Computing [4].    | Implementing security in wireless systems is a difficult and challenging task owing to the mobility of users and network Components and the fact that the wireless medium is susceptible to eavesdropping, espionage and fraud. | a)Encryption  
b)Personalization  
c)Security data exchange  
d)Security modules  
e)Fraud detection systems | Wireless and Mobile systems | Wireless systems like Wireless LANs, GSM, CDPD, UMTS, DECT and Cellular Networks are studied and compared. | Increase in the security protection and a better understanding of the issues. |
| Swarm Intelligence Based Greedy Routing Protocol for Wireless Sensor Network [5] | Energy consumption is a very crucial aspect in Wireless Sensor Network. In recent years many techniques have been proposed and explored for optimization of energy in Wireless Sensor Network. | Greedy Routing Protocol | Wireless sensor networks | By taking less number of hops this algorithm avoids energy wastage of more number of nodes while balancing the global energy of the network. | Life time is prolonged. |
| Using Virtual Reality to Mobilize Health Care [6]                   | Mobile virtual reality technology for attenuation of anxiety and pain.            | Virtual Reality | Health care | VR is the advanced technology in use for patient assessment and treatment, it is scientifically validated as a supplemental (e.g., PTSD-treatment) and stand-alone (e.g., pain distraction) treatment option for a variety of pain and behavioral conditions, and it is emerging as a tool for the detection of neurological disorders (e.g., Alzheimer’s). | The continued trend of migration to mobile devices has increased access and flexibility in patients who seek convenient health-care services. |
| Performance Analysis of the Bluetooth Physical Layer [7]            | Analyis of Bluetooth                                                             | 2-state Markov model for the Bluetooth channel. | Bluetooth communication | The outage probability appears to increase almost linearly with the number of piconets. Longer outage durations combined with simple FEC schemes imply that to the applications on Bluetooth, the channel will degrade rapidly as the number of piconets increases. | Increase in the number of piconets |
| Measurements of EMI Signals on Radio Links Based on Commercial Off-the-Shelf Wireless Devices [8]. | Neither shielding nor filtering effectively protects the receiver from being overdriven by front door coupling interfering signals. | Selected Access points and Disassociation. | Wireless devices | Tuning an interfering signal in a way it cannot be compensated by the receiver circuitry while occupying a significant amount of the bandwidth which is used by the wanted signal leads to dramatic interference. | Prevents wireless communication efficiently. |
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| Bacteria Foraging Optimization based Synthesis of Concentric Circular Antenna Array [9] | Optimal designs of three- \( \text{ring Concentric Circular} \) \( \text{Antenna Arrays (CCAA)} \) without and with central \( \text{element feeding are} \) \( \text{reported. For each optimal} \) \( \text{design, optimal current} \) \( \text{excitation weights and} \) \( \text{optimal radii are determined} \) \( \text{having the objective of} \) \( \text{maximum Sidelobe Level} \) \( \text{(SLL) reduction.} \) | Bacteria Foraging Optimization (BFO) | Antenna \( (i) \) All CCAA designs having \( \text{central element feeding yield} \) \( \text{much more reductions in SLL} \) \( \text{as compared to the same} \) \( \text{not having central element feeding.} \) \( (ii) \) The CCAA set having \( N1=4, N2=6, N3=8 \) \( \text{elements along} \) \( \text{with central element feeding} \) \( \text{gives the grand minimum SLL} \) \( (-36.14 \text{ dB}) \) \( \text{as compared to all} \) \( \text{other sets, which one is thus} \) \( \text{the grand optimal set among all} \) \( \text{the three-ring designs.} \) | \( \text{Optimal design of non-uniformly excited CCAA offers a considerable SLL reduction along} \) \( \text{with the reduction of BWFN with respect to the corresponding uniformly excited CCAA.} \) |

| A Backpropagation network for face Identification and Localization \[10\] | The entire process of face detection, identification and localization of faces should preferably be almost orientation or rotation invariant. | Optimal Back Propagation Network model | Face Identification \( \text{Learning has been designed and} \) \( \text{developed for face} \) \( \text{identification and} \) \( \text{localization. These are} \) \( \text{partially independent of} \) \( \text{orientation and rotation of the} \) \( \text{identifiable faces.} \) | The identification rate \( \text{for the optimal network (with optimal number of hidden} \) \( \text{layers and units) is} \) \( \text{moderately high, although the} \) \( \text{network size is small and} \) \( \text{the localization with the} \) \( \text{limitation is perfect.} \) |

| Voice Browsing For Handheld Mobile Devices Supporting WAP Protocol \[11\] | The metamorphosis of telecommunications networks, wireless networks and the Internet has led to a need for a system that makes access to the web on a mobile device convenient and easy | WAP Protocol | Handheld Mobile device \( \text{System that allowed the user to} \) \( \text{use his mobile device as a tool} \) \( \text{for browsing by using voice to overcome the limited visual} \) \( \text{capability of the device.} \) | Voice Response part of the system is improved. |

| A Method of Data Transfer Control during Handoffs in Mobile Multimedia Networks. \[3\] | Real time mobile multimedia networks is challenging due to some resource constraints of the wireless link and mobility of the links. | Data transfer Control | Multimedia Applications \( \text{The method performs efficient buffering of the data at the} \) \( \text{Base station using toggled buffers. The method has been} \) \( \text{tested on in-house wired wireless networks} \) | Enormous improvement in the continuity of data transfer \( \text{during multiple handoffs while running multimedia} \) \( \text{applications such as video-on-demand (VOD) and} \) \( \text{Audio-on-demand (AoD).} \) |

| Hybrid Diversity Combined OFDM for LiFi \[12\] | Orthogonal Frequency Division Multiplexing (OFDM) based light fidelity (LiFi) scheme provides the opportunity of high-speed data transmission along with room illumination. | HDC-OFDM \( \text{HDC-OFDM is a combination of} \) \( \text{the aspects of existing DCO-OFDM and DACO-OFDM modulations. Simulation results} \) \( \text{indicate that the BER results of} \) \( \text{HDC-OFDM varies depending} \) \( \text{on the proportion of} \) \( \text{DACO-OFDM and DCO-OFDM components. Since the} \) \( \text{HDC-OFDM has a DCO-OFDM component, the} \) \( \text{dimming facility is easily achieved in HDC-OFDM.} \) | a) Benefits of power efficiency of DACO-OFDM and the dimming flexibility of DCO-OFDM. \( b) \) Reduces the noise. |

| Implementation of EEG Based Control of Remote Robotic Systems \[13\] | The paper provides a novel approach to control the motion and orientation of a mobile robot using an encoded sequence of arm movements, obtained from the motor imagery \( \text{indicated by electroencephalographic measurements.} \) | Electroencephalographic measurements | Robotic systems | Successfully differentiated six classes of limb movements from the raw EEG data, encoded the classified signals and used this to control the movements of a Khepera mobile robot. | This work successfully classifies elbow-finger-shoulder movements of right and left arms with satisfactory accuracy. |

| System Issues Related To Satellite Communications In A Nuclear Environment \[14\] | The system design and operational constraints caused by high altitude nuclear effects to satellite communications link performance | Demodulation | Satellite communication | At the receiver it is necessary to restrict the demodulation coherence (integration) time to a value comparable or less than the minimum signal decorrelation time. This constraint still allows for non-coherent combining of many signal elements (chips) corresponding to a bit or transmission symbol. | Mitigation against nuclear induced signal scintillations |
6. CONCLUSION

The Different trends of wireless communication in different applications are studied and the ways by which they are advancing the predecessors and the algorithm which they are using are also studied.

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