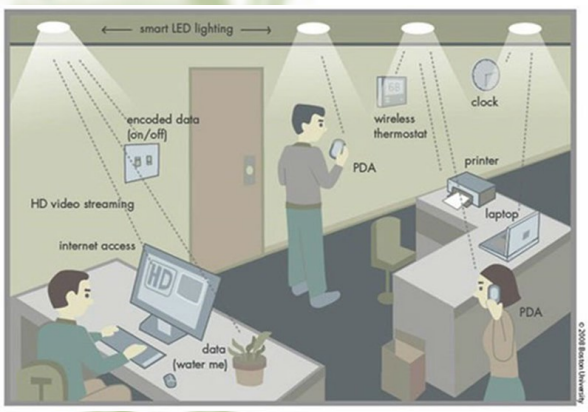
LI- FI(Light Fedility)

Professor Haas not only pioneered the novel concept of communication by lighting devices, but also publicized the technology earning him the recognition as the "father of LiFi"

Need of high speed data transmission, data security, impending RF spectrum crunch, and several technological superiorities over Wi-Fi technology majorly drives the visible light communication market. Apart from being economical, Li-Fi offers several technological advantages over currently prevailing Wi-Fi technology which include, nearly 100 times faster speed of data transmission, enhanced data security, no electromagnetic interference, and less power consumption. However, limited range of communication limits the applicability of Li-Fi because it is best used in a closed control environment, while the presence of other light sources hampers its speed. Although, extensive research in this field is anticipated to fuel up the demand in the light fidelity (Li-Fi) market in the upcoming years.

LiFi, which stands for 'light fidelity', is a technology that can transmit data through light and turn the lamps in every office, home, car or streetlight into wireless Internet access points. It offers higher speeds than traditional wireless technology, greater security and the potential to deliver unprecedented bandwidth and data density. Li-Fi technology facilitates bidirectional, high speed communication through wireless channel by utilizing visible light spectrum in a closed controlled environment such as hospital, airplane, shopping complex, office, and vehicle among others. It is used to provide communication between electronic devices with the help of visible light communication, or VLC technology. The use of VLC systems can be particularly observed in lighting facilities such as LED bulbs.

Li-Fi was invented by Harald Haas from the University of Edinburgh, Scotland back in 2011, when he demonstrated for the first time that by flickering the light from a single LED, he could transmit far more data than a cellular tower. Think back to that lab-based record of 224 gigabits per second - that's 18 movies of 1.5 GB each being downloaded every single second.The technology uses Visible Light Communication (VLC), a medium that uses visible light between 400 and 800 terahertz (THz). It works basically like an incredibly advanced form of Morse code - just like switching a torch on and off according to a certain pattern can relay a secret message, flicking an LED on and off at extreme speeds can be used to write and transmit things in binary code. The benefits of Li-Fi over Wi-Fi, other than potentially much faster speeds, is that because light cannot pass through walls, it makes it a whole lot more secure, and as Anthony Cuthbertson points out at IBTimes UK, this also means there's less interference between devices. While Cuthbertson says Li-Fi will probably not completely replace Wi-Fi in the coming decades, the two technologies could be used together to achieve more efficient and secure networks.Our homes, offices, and industry buildings have already been fitted with infrastructure to provide Wi-Fi, and ripping all of this out to replace it with Li-Fi technology isn't particularly feasible, so the idea is to retrofit the devices we have right now to work with Li-Fi technology. pureLiFi, a developer of Li-Fi a wireless communication technology based on visible light communication, has improved data transfer rates from 5Mbps originally to 10Mbps and further to 40Mbps, making Li-Fi a technological complement to Wi-Fi, according to Digitimes Research.In comparison with Wi-Fi, Li-Fi has disadvantages of higher cost, immature technology, short transmission distances (about three meters only) and inability to penetrate walls, and therefore can only complement Wi-Fi, Digitimes Research indicated. pureLiFi, spun off from the University of Edinburgh in the UK in 2012, unveiled its first-generation technology Li-ist in 2014, second-generation Li-Flame in 2015, and third-generation LiFi-X in 2016. LiFi-X APs (access points) support PoE (power over Ethernet), PLC (power line communication) and LED lighting products. While there are no significant commercial uses for Li-Fi and no large hardware ODMs or OEMs have adopted it, Li-Fi became the IEEE 802.15.7 standard in 2014 and is expected to see nice market usage in underwater communications as well as inside hospitals and



passenger airplanes which are sensitive to interference from radio signals. The light fidelity (Li-Fi) market is segmented on the basis of component, industry vertical, and geography. Based on component, the market is segmented into LED, photo detector, and microcontroller (MCU). Furthermore, the market is categorized on the basis of industry vertical which include retail, electronics, defense & security, automotive & transport, aerospace & aviation, and healthcare. Further, the market is analyzed based on four

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regions, namely, North America, Europe, Asia-Pacific, and LAMEA. Being an integral part of the Li-Fi systems LED plays a major role in the overall light fidelity (Li-Fi) market. Usage of LED is being promoted across the globe owing to its low power consumption, no harmful emission, and better illumination. Governments of various countries provide LED lights at subsidized rate, which in turn, has considera-bly reduced its price over the last few years. This trend is expected to follow in years to come which will aid in the adoption of Li-Fi across the globe.

Li-Fi technology is conquering the information communication world due to rising demand for better communication services in terms of bandwidth, efficiency, affordability and security. Li-Fi works by using the visible light emitted from the LEDs (Light Emitting Diodes) to transmit high speed data with lower interference and larger bandwidth. In the coming years, there shall be a noticeable growth in the Li-Fi market size owing to factors like no bandwidth limitations, RF spectrum bandwidth crunch, and lesser energy consumption. This will dominate the usage of older communication technologies such as Bluetooth, Wi-Fi, and WiMax. However, lack of awareness, high installation cost, and limited network coverage may hamper the industry growth.

Li-Fi market can be segmented on the basis of its applications which include Indoor Networking, Aerospace, Healthcare, Automotive, Underwater Communication, Location Based Services, Intrinsically Safe Environment, and Defense & Security.

In its most basic definition, LiFi leverages the ability of LED lights to modulate thousands of light signals simultaneously. In a process called demodulation, LiFi would extract an information-bearing signal from the LED's carrier waves. It then converts the information to binary data which can be transformed into internet.

While the speed is a nice perk, the truly game-changing aspect of LiFi would be the ability to transform practically every source of light into an internet hotspot.

The most interesting example of a use case would be smart (and driverless) vehicles. The LED headlights and tail lights could become LiFi-enabled, allowing moving vehicles to quickly and efficiently communicate with one another.

Because the technology leverages light waves, one major restriction for LiFi is it cannot travel through walls. So, within a home or office space, each room would need a LiFi enabled LED light to cover the entire space.

When we think of a developed nation, rapid industrialization turns out to be the backbone of the economy. Internet is the building block for bringing the mainstream audience in-line with the nation's future prospects.

Digital India programme, as stated by its official website, "is a flagship programme of the Government of India aimed at transforming India into a digitally-empowered society and knowledge economy".

With reference to the structure of the rural India, it is not feasible enough to provide Internet connectivity to each and every one. Rather, it is not economically viable, for electricity is yet a privilege in several rural parts of the country. Ensuring round-the-clock electricity supply with robust Internet connectivity is the ultimate goal of the programme. Well, a multi-purpose project seems to solve the dispute midst electricity supply and Internet connectivity.

Li-Fi is the brainchild of Harald Haas, an alumnus of the Edinburgh University and the interim CEO of PureLifi, a research-based venture. In his recent interview to Livemint.com, he specified a solution to the rural Internet connectivity issue. As per the report, Haas is in conversation with the Indian government to validate the feasibility of Li-Fi solar panels.

The Internet boom which we are speculating requires robust connectivity apparatus with minimal energy consumption. Li -Fi technology is the ultimate solution for digital innovation across the world. With self-powered Li-Fi enabled solar panels, connecting trillions of devices to the Internet will soon be a feasible task.

India faces several hassles when it comes to judicious development of power infrastructure. Hence, Li-Fi-enabled solar panels may be the inception of an Internet revolution. The recent developments, mainly these innovative solar panels, will ensure round-the-clock Internet connectivity, irrespective of the location of the entity.

That's how Li-Fi technology, a boon for the Digital India Programme.

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