1. **INTRODUCTION**
   1. THESIS STATEMENT
      1. Many constraints exist in current internet connection, Wi-Fi, which led to a high user’s demand for a faster internet connection that can be solved through Li-Fi which can transfer data faster, more secure, more reliable, wider coverage and with a cheaper cost.
   2. DEFINITION
      1. Professor Harold Haas from the University of Edinburgh in the UK, suggested an idea called “Data through Illumination”
      2. He used fiber optics to send data through LED light bulbs. Light modulation certainly is not a new concept, but Haas is looking to move things forward and enable connectivity through simple LED bulbs.
      3. With Li-Fi, we can connect to the internet simply by being within range of an LED beam, or we could conceivably transmit data using our car headlights. The ramifications of this are huge, especially with the internet of things in full swing and the much mooted spectrum crunch expected to bite increasingly hard in the coming years.
      4. LI-FI is a new technology which uses visible light for communication instead of radio waves.
      5. It refers to 5G Visible Light Communication systems using Light Emitting Diodes as a medium to high-speed communication in a similar manner as Wi-Fi
   3. BACKGROUND INFORMATION
      1. Li-Fi technology will in future enable faster, more reliable internet connections, even when the demand for data usage has outgrown the available supply from existing technologies such as 4G, LTE and Wi-Fi.
      2. It will not replace these technologies, but will work seamlessly alongside them.
      3. Using light to deliver wireless internet will also allow connectivity in environments that do not currently readily support Wi-Fi, such as aircraft cabins, hospitals and hazardous environments.
      4. Light is already used for data transmission in fiber-optic cables and for point to point links, but Li-Fi is a special and novel combination of technologies that allow it to be universally adopted for mobile ultra-high speed internet communications.
2. **CAUSE** 
   1. Medical technology has lagged behind the rest of the wireless world.
      1. Operating rooms do not allow Wi-Fi over radiation concerns, and there is also that whole lack of dedicated spectrum that can cause disruption
   2. The usage of Wi-Fi is limited in aircraft
      1. Availability of radio waves is a big concern due to it’s not advisable to use mobile phone in airplane
      2. Air travel has for many years, been a largely phone-free zone. Today, connectivity is much more important. Passengers don't just want to admire the view, or complain about a meal to their neighbor but instead of that they expect to be able to tweet about it, immediately, complete with pictures.
      3. The passengers travelling in aircrafts get access to low speed internet at a very high rate.
   3. Wi-Fi lack of security
      1. Radio waves can pass through the walls so they are less secure.
      2. Radio waves intrinsically have the power to propagate in all directions, with a relatively wide range. Because of this, it is very difficult to keep radio broadcasts confined to a limited area.
   4. Congested spectrum
      1. Current system makes use of radio wave so day by day number of mobile connection increase so the availability of the spectrum getting congested.
   5. Upgrading required more advanced equipment
      1. Simple and basic router only support speed up to certain Mbps and number of user also limited to the router configuration
      2. Wider coverage also need advanced router that can support dual link signal
      3. Placing the router and switch across a bigger platform will required more cable and longer time to install
3. **EFFECT**
   1. Interference happen from cell phones and computer
      1. Monitoring equipment like heart rate monitor and MRI scanner are sensitive to radio waves and can alter the reading due to the interference that block signal from the monitoring equipment.
   2. Usage of Wi-Fi can interfere the system
      1. Using Wi-Fi on plane can interfere with a pilot’s navigational equipment.
      2. The level of EMI required to affect a pilot’s screen exceed the level produced by the normal operation of normal level of Wi-Fi use.
   3. Unsecured connection
      1. Since radio waves can penetrate through walls so it might be intercepted. If someone has knowledge and bad intentions, they may misuse it. This causes a major security concern for Wi-Fi.
      2. This means that it is open to everyone, and anyone within the coverage area of an access point may potentially listen to communications being sent on the network.
      3. It also can cause for network intrusion which an unsecured wireless network gives hackers the perfect gateway to a business or organization's internal network.
   4. Efficiency decrease
      1. Higher no of user will use more bandwidth.
      2. When the bandwidth is all use up, the internet need to be upgraded to support more user, the cost will become much more expensive.
   5. Higher cost
      1. Cost for advanced router or switch is expensive
      2. Network installment for big platform is time consuming thus increasing the cost of installation.
4. **SOLUTION**
   1. Li-Fi could offer safe, abundant connectivity for all areas
      1. Light are allowed in operating rooms, and tend to be the most glaring fixtures in the room
      2. Light waves and radio waves are two different wave and interference will not occur between these 2
      3. Li- Fi uses light rather than radio frequency signals so are intolerant to disturbances.
   2. Implement Li-Fi in aircraft
      1. Li-Fi can provide high speed internet via every light source such as overhead reading bulb, etc. present inside the airplane.
      2. Li-Fi enabled lighting will allow high data rate connectivity for each passenger.
      3. It will allow connectivity at all times, without creating electromagnetic interference (EMI) with sensitive radio equipment on the flight deck. The reduction in cabling requirement also means a lighter aircraft.
      4. VLC could be used safely in aircraft without affecting airlines signals.
   3. Li-Fi provide more secure connection
      1. Light waves do not penetrate through walls. So, they can‘t be intercepted and misused. Therefore, with minimal precautions to avoid leakage from windows, etc., security is fundamentally enhanced as compared with Wi-Fi.
      2. Not like radio waves light waves cannot go through solid (wall) objects thus providing abundance of network privacy. So there will no other person can split a network unless the holder has allowed them to use it.
   4. Faster bandwidth and higher throughput
      1. The spectrum range of Li-Fi is 10000 times than Wi-Fi
      2. The data transmission through light can reach up to gigabits per second.
      3. The data spread for a unit energy use is high in the case of light waves. Here in Li-Fi data bits can be transmitted paralleled thus increasing the efficiency and number of user
   5. Cheaper. Save cost and time
      1. In terms of installation, only need to enable Li-fi is a LED light bulb and a microchip that will work as a kind of dimmer.
      2. Light needs to flicker to create a signal. Since it relies on the electric system, Li-fi can be quickly installed.
      3. Cooling the cellular base stations consume a lot of energy. By using Li-fi, would actually cut these costs and save energy.
5. **CONCLUSION**
   1. Restatement of thesis statement
      1. With the growing technology and increasing use of the internet services, possibilities are very high that use of Lifi technology will be soon in practice.
      2. The concept of Li-Fi is currently attracting a great deal of interest, not least because it may offer a genuine and very efficient alternative to radio-based wireless.
      3. This concept promises to solve issues such as the shortage of radio-frequency bandwidth and boot out the disadvantages of Wi-Fi
   2. Summary
      1. LI-FI is an emerging technology and hence it has vast potential. A lot of research can be conducted in this field. Already, a lot of scientists are involved in extensive research in this field. This technology, engineered by Harald Haas, can become one of the major technologies in the near future.
      2. If this technology can be used efficiently, we might soon have something of the kind of WI-FI hotspots wherever a light bulb is available. It will be cleaner and greener and the future of mankind will be safe.
      3. As the amount of available bandwidth is limited, the airwaves are becoming increasingly clogged, making it more and more difficult to get a reliable, high-speed signal. The LI-FI technology can solve this crisis. Moreover, it will allow inter access in places such as operation theaters and aircrafts where internet access is usually not allowed.
      4. In field of data electronics, it provides ample ways to transfer signals and it’s relative data to the greatest accuracy and in the most precise way.
   3. Concluding Statement
      1. Although LIFI has some disadvantages but it shows epic advancement in the world of wireless technology. It hits almost all sectors and definitely going to be boon for our society. LIFI technology has shown lots of improvements since it has discovered.
      2. This technology stands out with perfection, where data transfer is fast, efficient and significantly provides high level of security. Presently, Li-Fi technology is in its rudimentary stages. However with some developments and optimizations, the future scope of this reliable technology looks promising
      3. Although this technology sounds like a replacement to Wi-Fi but this high speed data transferring technology also has some limitations that is the inability of light to pass through obstacles. It cannot pass through walls and can be blocked. If the light signal is blocked, we can seamlessly switch back over to radio waves (Wi-Fi).