HIS3B03 INFORMATICS AND HISTORY

MODULE-3 SOCIAL INFORMATICS

Prepared by

Priyanka.E.K

Assistant Professor

Little Flower College

Guruvayoor

Information Technology

- Information technology (IT) is a technology which uses computers to gather, process, store, protect, and transfer information.
- Today, it is common to use the term **Information and communications technology (ICT) because it is unimaginable to work on a computer which is not connected to network.**
- Information technology (IT) or Information and Communication Technology (ICT) is a broad subject which **deals with technology and other aspects of managing and processing information, especially in large organizations**.
- IT particularly **deals with the use of electronic computers and computer software to convert, store, protect process, transmit, and retrieve information**.
- It is all about accessing, storing and distributing information. As such "Information technology (I.T) is the **science and activity of storing and sending out information by using computers".**
- B.H. Boar considers that "the information technologies permit preparing, collecting, transporting, finding, memorizing, accessing presenting and transforming the information in any form".
- These actions can take place between people, between people and equipments and/or between equipments.
- Again, as there are different varieties of computing equipments, the more appropriate word to denote computerization is digitalization. So we can simplify the definition of Information technology as **"the science and activity of moving data digitally".**

Scope of Information Technology

- The last half of the 1900s has been characterized by the increasing importance of information and communication technologies (ICTs) in personal, professional and social life.
- Computers, both on the desktop and embedded in automobiles, appliances, cellular phones, and satellite dishes have become an integral part of our social lives.
- In three decades, the Internet has grown from a network connecting four American universities and research labs to a global communications network.
- The increasing importance of the World Wide Web (WWW), electronic commerce, digital libraries and computer-mediated distance education are all examples of a phenomenon particularly termed as digital revolution
- Information technology is revolutionizing the way we live, work, learn, play and do business.
- The digital revolution has given mankind the ability to treat information in a systematic way, to transmit it with a very high accuracy and to manipulate it at will.

- Computers and communications are becoming an integral part of our lives and the advent of internet has changed our routine life dramatically.
- Now, the physical barriers for interacting with people and also the community at large, like time and space (more precisely, the geographical boundaries of nations) has already turned outdated and irrelevant.
- To survive in this information world one must keep pace with these changes. This ever growing need for digitalization provides the basic scope for information technology.
- Now, we need technology to communicate with our fellow beings, to process information, and above all, to make our lives easier and effective.
- The knowledge and skills acquired in Information Technology enable learners to use information and communication technology (specifically computers) in social and economic applications, systems analysis, problem solving (using either applications or a current object oriented programming language), logical thinking, information management and communication
- It is envisaged that the fundamental knowledge and skills developed will not be restricted only to Information Technology but also relate to applications in other subjects in Further Education and Training and beyond

- The core focus areas of Information Technology include:
- ■ History of computing
- ■ Computer hardware Software;
- ■ Data structures and types;
- ■ Database development;
- ■ Electronic communications and;
- ■ Human-computer interaction.
- As a subject of study, Information Technology always demand an interdisciplinary treatment as it involves scientific, technological, social, philosophical, physiological and psychological aspects.
- The subject Information Technology will enable learners to understand the principles of computing through the use of current programming language, hardware and software, and how these apply to their daily lives, to the world of work and to their

Social Informatics

- The advancements in technology present many significant opportunities but also pose major challenges.
- Since the appearance of technology, human beings have neglected each other and themselves. Technology, together with commerce, has slowly robbed humans of their innate abilities and amputated them of their capacities.
- Today, too many of us find ourselves in poor health, depressed, isolated, alienated, alcoholics, drug addicts, overweight, stressed out, overworked, and exhausted.
- We are spending less and less time together in living face to face conversation and interaction with our families, friends, neighbours, and colleagues and more and more time working, consuming, eating, drinking, driving our cars, watching TV, being online on the computer, sending emails and text messages.
- A sour dependence on I.T grows on daily basis, the problems that are affecting our society are also in the increase. These newly generated problems include creating gaps and distancing people from the main stream, reason and motivation for advancement and larger concerns regarding the misuse of technological improvements.
- Today, innovations in information technology are having wide-ranging effects across numerous domains of society, and policy makers are acting on issues involving economic productivity, intellectual property rights, privacy protection, and affordability of and access to information. Choices made now will have long-lasting consequences and attention must be paid to their social and economic impacts

- At present, being a computer illiterate person means to be a person who is unable to participate in modern society or more simply, a person without opportunity.
- In spite of acknowledged necessity and benefits of inclusive computer literacy by international agencies like European Commission and UNESCO there are still groups of people with hindered access to basic computer education.
- This deprived sections are comprising of persons with disabilities, persons with learning difficulties, migrant workers, unemployed, persons lives in remote (rural) areas where IT education is not accessible etc.
- Apart from bringing a vast array of opportunities, the ongoing information and communication revolution is also puts some serious questions regarding our personal as well as professional lives.
- These questions- many of them seem rather difficult to answer in unambiguous terms- includes; how are ICTs changing the ways in which we live, work and play? What are the effects of the ever increasing computerization in modern societies? What are the practical, conceptual and ethical issues and implications of this widespread and pervasive phenomenon and many more.
- The answers to these irresistible questions or at least, the ways to find them, forms the base of social informatics.

- Our digital society badly needs a deepest sense of attention and wisdom in order to find solutions for more harmony, wellness, and health for human beings everywhere, and also to set a balance between our use of technology and the time we spend in conversation and social interaction with others.
- This growing need for balancing man with machine is the subject matter of social informatics.
- Social informatics refers to the interdisciplinary study of the design, uses and consequences of information and communication technologies (ICTs) that takes into account their interactions with institutional and cultural contexts.
- Social Informatics is actually application and integration of tools, techniques and technologies for better information processing and dissemination.
- The key areas to be covered under the broad title of Social Informatics includes the question of accessing tools and techniques of I.T, the greater concerns of digital divide, privacy, cyber security, cyber crimes, cyber ethics, managing digital resource, social networking and so on.

Data, Information, Knowledge and Wisdom.

- The most widely accepted working definition of computer is that it is a data processing machine. It is all about processing or refining data so as to reach the higher concepts of information and knowledge.
- Sometimes, knowledge can again be processed, refined or synthesized to form wisdom, an even higher level of understanding. From the body of knowledge thus created, it is possible to generate some new sets of data again and the process continues unabated. This never ending cyclical process forms the starting point of Information Science. This cycle is known as information life cycle or DIKW (short for data, information knowledge, and wisdom) cycle.
- Since all these different levels of information are graded hierarchically from data to wisdom, information scientists also call it knowledge hierarchy or Knowledge Pyramid.
- As the hierarchy is consisting of Data, Information, Knowledge and Wisdom it is also known as DIKW hierarchy. To reach a better understanding of the subject matter of information technology, it is essential to have a basic awareness regarding these four key concepts.

- **Data:** - Data means **any collection of raw figures or facts**. Data can be considered as the **raw material of information**. Data refers to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meaning. The data may be numerical such as payroll, employee Number, etc. or non-numerical like Student names, Product names, etc. Data can be defined as a representation of facts, concepts or instructions in a formalized manner which should be suitable for communication, interpretation, or processing by human or electronic machine. Data is represented with the help of characters like alphabets (A-Z,a-z), digits (0-9) or special characters (+,-,/,*,<,>,= etc.).
- Types of Data can be categorized as;
- 1. **Qualitative data:** It denotes the characteristics of things such as Average, Fair etc.
- 2. **Quantitative data:** It is expressed in terms of measurable quantities such as 10 KG, 40 degree Celsius etc.
- 3. **Numeric Types**: The data types may also be an integer (+, -) without any fractional part or real number which includes integers and fractions.
- Besides the above, the data types include alphabetic data and alphanumeric data.

- Data Processing: - As data is in its raw form it cannot solve any problem. The data needs some processing to make it useful.
- Data processing is the conversion of data into a more useful form. The transmission of data into meaningful information is called data processing.
- Data Processing is viewed as a system that accepts data as input, processes it into information as output. The result obtained by data processing is called information. It is the processed data.
- Data processing is the re-structuring or re-ordering of data by people or machine to increase their usefulness and add values for particular purpose. Data processing consists of three basic steps, namely input, processing and output. These three steps constitute the data processing cycle.

- **Objectives of Data Processing** As the complexities of business increased, the number of functions to be performed also increased. The data processing system must be responsible to supply the information when it is needed, so as to make the performance of the organization optimum.
- **General objectives of Data Processing.**
- 1. **Handle huge volume of Data** : The basic objective of data processing is to handle huge data in order to enable the organization to function efficiently.
- 2. **Qualitative and quantitative information**: The next important want of data processing is to provide qualitative and quantitative information.
- 3. **Proper and Timely Information**: Different kinds of information are needed in almost all organizations. Data processing provides correct and timely information.
- 4. **Storage and retrieval of data**: Through data processing, information can be stored and retrieved as and when necessary.
- 5. **Helps in Decision-making**: In every organization various decisions are taken at different levels. Such decisions can be more accurate if effective data processing system is used
- 6. **Improves Productivity**: To improve productivity, various measures are to be identified and implemented. It is possible through the properly designed data processing system.
- 7. **Maintaining Performance at Optimum Level**: To maintain the performance of the organization at best possible level various functions at different levels of the organization are to be coordinated. There should be a smooth flow of information among various functional departments. This can be easily achieved through data processing system.
- 8. **Efficient Office Management**: In office management also data processing plays a very important role, through which office automation can be done.

Kinds of Data processing

- The important kinds of data processing are as follows:
- 1. **Manual Data Processing**: Data is processed without the help of mechanical devices. Here the data is processed using manual things such as abacus, slide rule, Napier bones etc.
- 2. **Mechanical Data Processing:** In Mechanical Data Processing, mechanical devices like calculators, tabulators, etc, are used for processing.
- 3. **Electronic Data Processing**: In Electronic Data Processing, the data is processed by either analog or digital computer.

Information

- Information is organized or classified data which has some meaningful values for the recipient.
- A common and precise definition of information is that it is the interpreted data.
- In other words, information is quite simply an understanding of the relationship between pieces of data.
- Data needs to be combined in some manner to make information.

DATA V/s INFORMATION

Data	Information
Raw records	Complete done
Unordered	Ordered
Unrefined	Refined
What prevails	What is necessary

Knowledge

- Oxford dictionary defines knowledge as expertise and skills acquired by a person through experience or education.
- It refers to the theoretical or practical understanding of a subject.
- Knowledge is the data or information that have been organized and processed to convey understanding, experience, accumulated learning and expertise.
- Information becomes knowledge only when one is able to realize and understand the patterns and their implications. Information is not to be equated with knowledge.
- Just like data must be interpreted in order to become information, so must information be interpreted and analyzed in order to obtain knowledge.
- Knowledge is usually built by learning, thinking and proper understanding of the problem area.

Wisdom

- Wisdom refers to the ability of an individual to judge between right and wrong or good and bad.
- Oxford Advanced Learner's dictionary defines wisdom as "the ability to make sensible decisions and give good advice because of the experience and knowledge that you have".
- It is an understanding and realizing of people, things, events or situations resulting in most appropriate actions.
- Wisdom requires synthesis or bringing together of a wide range of knowledge created from a huge amount of information refined from tremendous mounds of data.
- As Neil Fleming rightly put it; "collection of data is not information; collection of information is not knowledge; collection of knowledge is not wisdom; collection of wisdom is not truth".
- The underlying idea is that information, knowledge and wisdom are more than simply collections. Rather, the whole represents more than the sum of its parts and has synergy of its own.

Information Technology and Society

- Humanity has changed dramatically from the Stone Age to the digital age through the Enlightenment and the Industrial Revolution. This evolution is marked by advances in technologies that appear to make people's lives better
- Now however, we are in the midst of a new digital era, where cell phones, Face book, and twitter dominate.
- With this exponential evolution occurring at a rapid pace, the fundamental questions arise: What are the real implications of this new technological revolution in our society and how will it shape the future? Concern about the impact of technology on people, organizations, and society is not new.
- Samuel Butler, in his 1872 book Erehwon, summarized the anxiety about the disruptive influences of technology on the lives of people. The book described a society that made a conscious decision to reject machines and new technology; in it, people have "frozen" technology at a predetermined level and outlawed all further technological development
- The major positive impact of I.T in our society includes;

IT Is Eliminating the Barriers of Time, Space, and Distance

- One of the most noticeable developments precipitated by information technology is the elimination of numerous barriers that traditionally separated individuals, organizations, and societies at different geographic locations.
- Proliferation of high-speed data communication networks that span the globe enables companies to integrate geographically distant manufacturing and research facilities, link international financial markets, and even provide customer service from halfway around the world.
- Broadband Internet access, secure virtual private networks, and mobile computing technologies are making it possible for many professionals to telecommute, or work from outside the office.
- Since 2000, telecommuting has continued to increase.
- Globalization and telecommuting are transforming the ways in which people work and organizations operate. Now, work can be performed at any time, and from any part of the globe, which tends to make organizations more efficient. Organizational structure, job content, and the nature of management and supervision are altered significantly by this trend.

Internet-The Most Powerful Agent of Change

- Internet is the single most powerful agent of change in recent history.
- In the words of Arthur C. Clarke, internet “is indistinguishable from magic.”
- The rapid pace of the changes shaped by the Internet indeed have a touch of magic about them.
- As a tool available to a fairly wide public, the Internet is only thirty years old, but it is already the key catalyst of the most extensive and fastest technological revolution in history.
- It is the most extensive knowledge repository the world has ever seen. It is most extensive because over the past two decades its effects have touched practically every field and every citizen in the world.
- And it is the fastest because its large-scale adoption is quicker than that of any earlier technology. The 100-million user mark was achieved by Personal Computers in 14 years and the Internet in 7years. The cycles of adoption of Internet-related technologies are even shorter—Facebook reached 100 million users in 2 years.

I.T Revolutionized the way we communicate

- Another leading feature of I.T is the changes occurred in the way in which we communicate with one another.
- Human communication has remained fairly constant, and limited, for the vast majority of our time on earth.
- Face to face and interpersonal communication had been the status quo for thousands of years.
- Charisma and oratorical skills as well as social signs and eye contact have been keystones in our abilities to interact, get what we want, and make progress as a society.
- However, all this is changing.It has become routine to send an email instead of writing a letter, a text message instead of calling, and adding someone on Facebook instead of inviting them to coffee.

I.T is Ubiquitous

- In our digital or information society I.T has attained a ubiquitous status.
- It is impossible to point out a single field of our personal or professional lives that is not affected, regulated or sometimes dominated by I.T.
- Today, each and every individual starting from primary school children find out about the impact of computer in their lives.
- Now, we are governed by the tools and techniques of E-governance, we are purchasing things online, watching movies in the internet, we are frequently using the larger knowledge resources available in the net to expand the horizons of our knowledge base, we are using the E-banking and telemedicine facilities and so on.
- We are busy reading news papers and magazines in digital format while travelling in bus or train.
- In short, we manage to do all the routine activities of our life simply sitting idle in our homes.

Undesirable Impacts of I.T

- The IT revolution may result in many changes in structure, authority, power, and job content, as well as personnel and human resources management.
- Information technology significantly impacts individuals, organizations and societies.
- Any kind of technology is likely to affect multiple entities in ways that may be both positive and negative.
- The **major negative impacts** of information revolution includes the **digital divide** or the uneven access to information technology, **information overload**, the **fear that machines and information systems can displace humans from their jobs** etc.
- Robotics, decision support systems, and other manifestations of information technology are improving the quality of human lives by relieving people from some of their tedious and hazardous tasks.
- At the same time, increased interaction with computers **considerably reduced the conventional forms of face-to-face interaction among people**.
- All these changes ultimately caused an **adverse impact upon the interpersonal relationships and other aspects of quality of human life**.
- Information technology **challenges traditional value systems and raises certain previously neglected issues such as security and privacy, freedom of speech and protection against inappropriate content, as well as respect for intellectual property and fair use.**
- Many people feel **a loss of identity or dehumanization** because of computerization; they feel like “just another number” because computers reduce or eliminate the human element that was presenting the non-computerized systems.

- Another possible psychological impact relates to distance learning. Some advanced European countries have legalized educating children at home through IT. Since distance learning system would deny all the possibilities of socialization, educational experts is arguing that such systems would not foster the social, moral, and cognitive development of school-age children who spend long periods of time working alone on the computer.
- Next is the problem of **Information Anxiety**. This is a state of mental unrest that can take several forms such as frustration with our inability to keep up with the amount of data present in our lives. Information anxiety can take other forms as well. One is frustration with the quality of the information available on the Web, which frequently is not up-to-date or incomplete.
- Another is **frustration or guilt associated with not being better informed, or being informed too late**
- A third form of information anxiety stems from **information overload** because of the existence of too many online sources.
- Another negative aspect is one involving **Health and Safety.** Computers and information systems are a part of the environment that may adversely affect individuals' health and safety. The major problems of this category are job stress and repeated strain injuries. An increase in workload and/or responsibilities can trigger job stress. Although computerization has benefited organizations by increasing productivity, it has also created an ever-increasing workload for some employees. Some workers, especially those who are not proficient with computers, but who must work with them, feel overwhelmed and start feeling anxious about their jobs and their job performance. Repetitive Strain Injuries, the other potential health and safety hazards are repetitive strain injuries such as backaches and muscle tension in the wrists and fingers caused by spending a long time in front of computers very often in an unhealthy working environment. Carpal tunnel syndrome is a painful form of repetitive strain injury that affects he wrists and hands. It has been associated with the long-term use of keyboards.

E-governance

- E-Governance (short for electronic governance, also known as digital governance, online governance, or connected governance) can be defined as the use of ICTs as a tool to achieve better governance.
- Basically e-governance **is an application of ICT for delivering government's services, exchange of information communication transactions, integration of various stand-alone systems and services.**
- Its **aim was to create a comfortable, transparent, and cheap interaction between government and citizens (G2C - government to citizens), government and business enterprises (G2B -government to business enterprises) and relationship between governments (G2G - interagency relationship).**
- There are **four domains of E-government namely, governance, information and communication technology (ICT), business process reengineering (BPR) and e-citizen.**
- However, we should distinguish e-governance from e-government.
- While e-government is defined as a mere delivery of government services and information to the public using electronic means, e-governance allows direct participation of constituents in government activities.

- Greater accessibility and full service availability i.e. 24 hours a day and seven days a week without visiting government offices is provided through e governance.
- **Three notable aspects to e-governance are (a) Automation of government routine functions (b) Web-enabling government functions for access of the citizens (c) Achievement of openness, accountability, effectiveness and efficiency through improvement of government processes.**
- E-governance **promotes efficiency, reduces time delays, enforces accountability and brings transparency in the working of the governmental system**. As a result, it has become an integral part of democracy.
- All important government policies, acts, rules, regulations, notifications that are useful to the general public including land records, examination results, crime records, vehicle registration, birth and death registration, training and education, employment information, policies and legislation, telephone directory, etc. are made available on the Internet and can be accessed by the public free of cost.
- It is beneficial to the citizens as they can enjoy faster, effective and timely government services and also to the government as it can become more integrated into the community and can focus its resources where they are needed the most.

- E-governance aims at changing how citizens relate to governments as well as how citizens relate to each other. It brings forth new concepts of citizenship, both in terms of needs and responsibilities.
- Usually, e-governance is described as a form of SMART governance. But the term SMART is seen used variedly to denote Simple, Measurable, Accountable, Realistic &Time-related projects aiming better governance or as an acronym for Speed, Moral ,Accountable/Accurate, Responsive and Transparent Governance.
- In its most ideal sense, e-governance is a practical concept meant to achieve all aspects of citizen-oriented governance; bringing the citizenry closer to the government and decision making process

Evolution of E-Governance

- Global shifts towards increased deployment of IT by governments emerged in the nineties; with the advent of the World Wide Web (WWW).The technology as well as e-governance initiatives have come a long way since then.
- The concept of e-Governance has its origins in India during the seventies with a focus on development of in-house government applications in the areas of defence, economic monitoring, planning and the deployment of IT to manage data intensive functions related to elections, census, tax administration etc.
- The First serious step taken towards ushering India into e-governance is setting of National Informatics Centre in 1977.
- In 1980's National informatics centre (NIC) established a network that connected all the district headquarters of India. It is a significant achievement at that time.
- With the advent of World Wide Web in 90's there is increment in deployment of IT by government. With the increase in mobile and internet connection people are expecting more and more services online form government.
- In mid to late 1990's, for conducting operations and to deliver services government agencies began using web sites.
- Then national e-governance plan was launched in 2006 which led to drastic change in e-governance strategy and program for India. This plan launched core infrastructure and policies for development of e-governance.

- While the emphasis has been primarily on automation and computerization, state governments have also endeavored to use ICT tools into connectivity, networking, and setting up systems for processing information and delivering services.
- This has ranged from IT automation in individual departments, electronic file handling and work flow systems, access to entitlements, public grievance systems, service delivery for high volume routine transactions such as payments of bills, tax dues to meeting poverty, alleviation goals through the promotion of entrepreneurial models and provisions of market information.
- Every state government has taken the initiatives to form an IT task force to outline IT policy document for the state and the citizen charters have started appearing on government websites.
- FRIENDS (Fast, Reliable, Instant, Efficient Network for the Disbursement of Services) is the most well-known e-governance initiative of the Government of Kerala.

Benefits

- saving of time and money
- simplification of procedures
- better office and record management
- reduction in corruption due to fastness and transparency
- improved attitude, behaviour and work handling capacity of the employee.
- It increases the effectiveness and efficiency to do the right work at right time.
- E-governance will allow citizens to communicate with government, participate in the governments' policy-making.
- It also helps the citizens to communicate each other.
- The e-governance will truly allow citizens to participate in the government’s decision-making process and to reflect their true needs and welfare by utilizing e-government as a tool.

Disadvantages

- **Inaccessibility**: - those who live in remote areas, having low literacy levels, existing on poverty line incomes etc.
- **Cost:** -The cost for providing infrastructure for e-governance is very high. The outcomes and effects of Internet-based governments are often unsatisfactory especially in under-developed and developing nations with poor infrastructure, frequent power failure and lack of awareness among citizens.
- **Hyper-surveillance**:-lead to a lack of privacy for civilians as their government obtains more and more information on them. When the government has easy access to countless information on its citizens, personal privacy is lost.
- **False sense of transparency and accountability**:-Opponents of e-government argue that online governmental transparency is dubious because it is maintained by the governments themselves. Information can be added or removed from the public eye for promoting vested interests.

Information Revolution: New issues and Concerns

- As we have mentioned already, the ongoing Information Revolution has changed our lives upside down. A vast array of tools and techniques of I.C.T together with the advent of Internet and the ever growing possibilities of mobile or ubiquitous computing has ushered an era of both qualitative and quantitative alterations in our lives.
- But, apart from bringing several advantages aimed to better our standards of living, level of understanding and communication strategies, digital revolution is also raising some serious issues, concerns and threats having far complicated implication in our personal as well as social lives.
- This new issues may be vary from the concerns of individual privacy and security to a wider spectrum of problems affecting the entire community such as digital divide, decreasing social interactions, information overload, cyber-crimes, the need for ethical computing etc.

- The most obvious feature of information society is the ever-growing number, variety and complexity of technological instruments and their constant change at an unprecedented scale and at a barely manageable pace. This unprecedented influx of instruments and information is really causing greater problems to humanity.
- The need for adapting this rapidly changing technology in more and more areas of our everyday lives often ends up in frustration and shock for individuals and in moral panic for society as a whole.
- When the real negative effects of technological change surface, it is primarily ‘machines’ (PCs, mobile phones, the Internet, etc.) that come to be seen as scapegoats by the public and the mass media alike exaggerating their contribution to the problem and forgetting their positive effects. The fact is that technology is neither good nor bad; it is neutral by all means. The good and bad are determined by the mindset or value system governing the person who uses it.

Digital Divide

- Digital Divide is the most serious social issue aggravated by Information Revolution.
- It refers to the existing social gap between those with better access to information and communication technology and those underprivileged having no or little access to technology.
- The gap in computer technology in general and Web technology in particular, between those who have such technology and those who do not is referred to as the digital divide.
- Digital divide exists not only between nations, but also within individual countries.
- Although access to electronic resources has been steadily increasing all over the world, digital divide still remains as a problem to be tackled.

- The most common factors leading to this unequal access to digital tools and techniques are;
- 1. Socio-economic: - This refers to the disparity between rich and poor. It is the most common factor causing digital divide, because being poor in our times simply means a person who is deprived of education and training.
- 2. Geographical or Location: - This division is pointing towards the gap between highly advanced western and not so advanced Afro-Asian and Latin American nations as well as the urban/rural divide.
- 3. Racial: - This is referring to the existence of majority and minority communities and also the marginalized or underprivileged tribal and ethnic groups. E.g.: studies proved that Afro-Americans in U.S.A are far behind their White compatriots in accessing digital devices and techniques.
- 4. Generational: - This is the gap existing in terms of generations or age groups.

- Digital divide is not anyone particular “gap” between rich and poor or between local and global, but rather includes a variety of gaps caused by inequitable distribution of resources.
- There is a comparative lack of meaningful access to information and communication technologies (ICTs), which can be viewed in terms of several kinds of “gaps”:
- (1) a gap in access to the ICTs themselves;
- (2) a gap in having the skills needed to use these technologies;
- (3) a gap between rich and poor in their ability to access information needed to compete in a global economy; and
- (4) a gap in education that translates into a “gap in abilities to process and absorb information.”
- The moral importance of the digital divide as a problem that needs to be addressed is linked to “inequalities between the rich and the poor— especially between wealthy nations and nations in absolute poverty.”

Bridging the Gap of Digital Divide

- Recently **various governments and international agencies like U.N.O** are realizing the need for reducing the gap of digital divide and are implementing a variety of programmes and initiatives to bridge the existing gap in terms of technology.
- These purposeful actions from the part **of U.N and other international donor organizations like USAID, World Bank etc**. are usually seen concentrated on **propagating e-literacy, providing digital tools at an affordable price and encouraging e-governance**.
- The U.N Project **One Laptop per Child** (OLPC) targeting the school going children of developing nations is a worth mentioning initiative in this direction.
- **Regionalization of computing language by replacing English is another notable step.**
- However, the world is now gradually begun to accomplish certain significant achievements towards reducing the gap of digital divide primarily because of the **widespread acceptance of mobile computing.**
- Innate quality of digital information and communication tools to reduce their size and price in all the succeeding generations, coupled with the larger possibilities of wireless and cellular technology has proved instrumental in ushering the era of mobile or ubiquitous computing.
- Besides these key factors, the **increasing competition between cell phone producers, Internet and Cellular phone Service providers, Free and Open Source Initiatives, and the launching of more advanced and net friendly smart phones and I Phones all have contributed greatly to bridge the gap of digital divide**

Cyber Ethics:

- The term ‘ethics’ carries wider connotations in the cyber world as it opens new opportunities as well as new threats.
- It offers its users, an opportunity to remain invisible while leading a normal life in public.
- In the 1940s and early 1950s, the field of study called **“computer ethics”** was given a solid foundation by ***Professor Norbert Wiener of MIT***. Sadly, Professor Wiener’s works in computer ethics were essentially ignored for decades by other thinkers.
- In the 1970s and 1980s computer ethics was recreated and redefined by thinkers. ***Walter Maner*** defined this field of study as one that **examines *“ethical problems aggravated, transformed or created by computer technology.”***
- **In her book, *Computer Ethics (1985)*, *Deborah Johnson* says that computer ethics studies the way in which computers *“pose new versions of standard moral problems and moral dilemmas, exacerbating the old problems, and forcing us to apply ordinary moral norms in uncharted realms.”***

- In his influential article ***"What Is Computer Ethics?" (1985), James Moor*** provided a definition of computer ethics. **He defined *computer ethics as a field concerned with "policy vacuums" and "conceptual muddles" regarding the social and ethical use of information technology*.**
- To be more precise, Cyber ethics is the study of ethics pertaining to computer networks. It tries to analyse and explain various aspects of our digital society such as the user behaviour and what networked computers are programmed to do, and how this affects individuals and society.
- Examples of cyber ethical questions include "Is it OK to display personal information about others on the Internet? Should users be protected from false information? Who owns digital data (such as music, movies, books, web pages, etc.)? Is technology dehumanizing us? Is ICT has affected our socialization process? etc.

- **Ten Commandments of Computer Ethics:-** The ethical values of computing were defined in **1992by the Computer Ethics Institute**; a non-profit organization whose mission is to advance technology by ethical means. These general norms of ethical computing are popularly known as the **ten commandments of Computer Ethics.** They are;
- 1. Thou shall not use a computer to harm other people.
- 2. Thou shall not interfere with other people's computer work.
- 3. Thou shall not snoop around in other people's computer files.
- 4. Thou shall not use a computer to steal.
- 5. Thou shall not use a computer to bear false witness.
- 6. Thou shall not copy or use proprietary software for which you have not paid.
- 7. Thou shall not use other people's computer resources without authorization or proper compensation.
- 8. Thou shall not appropriate other people's intellectual output.
- 9. Thou shall think about the social consequences of the program you are writing or the system you are designing.
- 10.Thou shall always use a computer in ways that ensure consideration and respect for your fellow humans

Computer Crime/ Cyber Crime

- Computer crime refers to any crime that involves a computer and a network.
- The term is used broadly to describe criminal activity in which computers or computer networks are a tool, a target, or a place of criminal activity and include everything from electronic cracking to denial of service attacks.
- Though there is no technical definition by any statutory body for Cybercrime, it is broadly defined by the **Computer Crime Research Center** as - ***"Crimes committed on the internet using the computer either as a tool or a targeted victim."***
- Cybercrime could include anything as simple as downloading illegal music files to stealing millions of rupees from online bank accounts.
- Cybercrime could also include non-monetary offenses, such as creating and distributing small or large programs written by programmers called viruses on other computers or posting confidential business information on the Internet

- Net-crime refers to criminal exploitation of the Internet.
- Cybercrimes are defined more comprehensively as, "***offences that are committed against individuals or groups of individuals with a criminal motive to intentionally harm the reputation of the victim or cause physical or mental harm to the victim directly or indirectly, using modern telecommunication networks such as Internet (Chat rooms, emails, Etc;) and mobile phones (SMS/MMS)***".
- Such crimes may sometimes threaten a nation's security and financial health. Issues surrounding these types of crime have become disturbing, particularly those surrounding cracking, copyright infringement, child pornography, etc.
- There are also problems of privacy when confidential information is lost or intercepted, lawfully or otherwise.

- We **can categorize computer crimes in two ways:**
- 1. **Criminal activities in which computer is the target** - attacking the computers of others (spreading viruses is an example).
- 2. **Crimes in which computers are used as a tool, accessory or medium** - using a computer to commit "traditional crime" that we see in the physical world (such as fraud or illegal gambling).
- The first recorded cyber-crime dates back to 1820, when, in France, the employees of a textile mill owned by Joseph-Marie Jacquard sabotaged the new technological device attached to the loom that allowed the repetition of a series of steps involved in the weaving of special fabrics. This criminal act was aimed to prevent Jacquard from further use of technology because the employees feared that their traditional employment and livelihood were being threatened by that newly invented device.
- At present, computer crime mainly consists of unauthorized access to computer systems data alteration, data destruction, theft of intellectual property. Now, Cyber-crimes have been reported continuously across the world and potential risks associated it have risen dramatically

Different Types of Cyber Crimes

- There are a good number of cyber-crime variants
- Cyber stalking : Cyber stalking is the use of Internet or other electronic means to stalk or follow someone. This term is used interchangeably with online harassment and online abuse.
- Hacking : the term is originally used to refer a person who is well versed in using computers. But, now the term hacking is seen used increasingly to describe a computer crime in which the offender penetrates into a computer or network to steal information or damage the program in some way. . It means unauthorized control/access over computer system. The hackers are classified into different groups on the basis of the real motive behind their intrusion.
- a) **White Hat Hackers**: - This group is comparatively harmless. They are joy riders **who use their technical expertise only to show the world that they are capable of penetrating into computer systems or networks**.
- b**) Black Hat Hackers**: - This group constitutes **the potentially dangerous hackers**. They are the real crackers capable of manipulating your data with malicious intentions. They always wanted to make monitory benefits from the act of cracking.
- c) **Grey Hat Hackers**: - This particular group of hackers **always targets networks for unauthorized access.**

- **Identity Theft :** An important form of cyber-crime is identity theft, in which criminals use the Internet to steal personal information from other users. Identity theft occurs when someone appropriates another's personal information without his or her knowledge to commit theft or fraud. The most common means usually employed for identity theft are ***phishing***, ***vishing and spoofing***.
- **(a) Phishing**: Phishing is just one of the many frauds on the Internet, trying to fool people into parting with their money. It is the criminal act of eliciting vital information like user name, password and account number by impersonation. The usual mode of phishing starts with the receipt of unsolicited emails by customers of financial institutions, requesting them to enter their username, password or other personal information to access their account for some reason. Customers are directed to a fraudulent replica of the original institution's website when they click on the links on the email to enter their information, and so they remain unaware that the fraud has occurred. The fraudster then has access to the customer's online bank account and to the funds contained in that account.

- **(b)Vishing** : Vishing is the criminal practice of using social engineering and Voice over IP (VoIP) to gain access to private, personal and financial information from the public like credit card numbers or other information used in identity theft schemes from individuals for the purpose of financial reward. The term is a combination of "voice" and phishing. Vishing exploits the public's trust in landline telephone services.
- **(c) Spoofing**: Spoofing literally means fooling. In Cyber terminology, Spoofing refers to a peculiar kind of cyber-crime in which the perpetrator make intentional use of bogus email ID's, IP address, Cell phone numbers etc; to spoof or fool the recipient of mails and messages. It also comes under the category of identity theft. This is typically done by hiding ones identity or faking the identity of another user on the internet. Such fake IDs, usually forged by imitating the already existing one, especially of financial institutions, are seen used increasingly for staging fraudulent activities. Spoofing can take place on the internet in several different ways. One common method is through email. Email spoofing involves sending messages from a bogus email address or faking the email address of another user. It shows its origin to be different from which actually it originates. Another one is SMS Spoofing. Here an offender steals identity of another person in the form of mobile phone number and sending SMS via internet and receiver gets the SMS from the mobile phone number of the victim. It is very serious cyber-crime against any individual

- **Spamming:** Spamming refers to sending of unsolicited mails containing usually, bulky marketing information. Such lengthy unwanted messages may cause considerable harm for the recipient as it would always be a matter of nuisance and require a huge storage space.
- **Mail-bomb** is another term associated with spamming. It is the term used to denote a deluge of e-mail messages from one or more sources, deliberately intended to overload the recipient's computer and make it crash. A mail-bomb is typically sent to punish someone guilty of spamming or some other serious breach of netiquette.
- A **Cancelbot (**short for cancel robot) is a program that detects spamming in newsgroups and automatically issues a cancel command. At present all the E-mail service Providers are equipped with inbuilt spam filters to curb this menace.
- **Denial of Service Attacks (DoS)** A denial of service attack is a targeted effort to disrupt a legitimate user of a service from having access to that service. This may be accomplished through a number of methods. Offenders can limit or prevent access to services by overloading the available resources, changing the configuration of the service's data, or physically destroying the available connections to the information. This involves flooding a computer resource with more requests than it can handle, causing the resource (e.g. a web server) to crash thereby denying authorized users the service offered by the resource. Another variation to a typical denial of service attack is known as a **Distributed Denial of Service (DDoS)** attack wherein the perpetrators are many and are geographically widespread. It is very difficult to control such attacks and is often used in acts of civil disobedience.

- **Violation of Intellectual Property Rights**: Intellectual property consists of a bunch of rights aimed to protect the ideas and innovations that are products of human mind and intelligence.
- Any unlawful act by which the owner is deprived of his rights is a crime.
- The most common types of IPR violation are **software piracy, infringement of copyright, trademark, patents, designs and service mark violation, theft of computer source code, etc.**
- Publishing Obscene Materials, Defaming and Pornography There are certain cyber offences which affect the personality of individuals. The most common form is defaming an individual by publishing obscene materials in social networking sites such as Face-book, Twitter, WhatsApp etc.
- Some offenders also used to send emails with obscene content to harass others. At present, harassment aiming defamation has become very common as usage of social networking sites is increasing day by day.
- Defamation also involves hacking a person's mail account and sending vulgar mails from it, only to lower down the dignity of the victim.
- Pornography refers to taking and publishing nude pictures which is also used to defame others especially women.

- **Cyber Squatting :** Cyber squatting is the act of registering a famous domain name (Website Address) and then selling it for a much higher price. It involves two persons claiming for the same Domain Name. It can be done in two different ways; either by registering a domain name first (prior to the registration by the person or firm who really wants that name) foreseeing its future possibilities or by registering a domain name very similar to a famous domain name.
- **Cyber Terrorism:** Cyber terrorism can be defined as an act of terrorism committed through the use of cyberspace or computer resources. As such, a simple propaganda in the Internet, that there will be bomb attacks during the holidays can be considered cyber terrorism. **Cyber extortion** is a form of cyber terrorism in which a website, e-mail server, or computer system is subjected to repeated denial of service or other attacks by malicious hackers, who demand money in return for promising to stop the attacks.
- In addition to the above, there are also other varieties of cyber-crimes like **Physical Loss (Stealing or theft of Computer Hardware and peripherals), Cyber Vandalism (destroying, damaging and disrupting the data or information stored in computers or networks), Web Jacking(taking control of a website forcefully through hacking)Internet Time Theft(use by an unauthorized person, of the Internet hours paid for by another person)Cyber Trafficking (trafficking of drugs, human beings, arms weapons etc by using cyber tools),Salami Attacks(a financial fraud, involving meagre amount in individual cases, based on the idea that an insignificant alteration will go unnoticed)Online Gambling etc.. Malicious Programs(Viruses, Worms, Trojan Horses etc.)**

- Viruses and malicious programs intended to cause electronic resources to function abnormally can potentially crash a massive amount of individuals and resources. These programs, generally known as the **malware** (Software or program with a malicious intent and content) can also endanger a legitimate user's access to computer resources.
- **Viruses** are programs that attach themselves to a computer or a file and then circulate themselves to other files and to other computers on a network. They usually affect the data on a computer, either by altering or deleting it. Now, so many anti-virus programs are available in the market to curb this menace. Eg. Norton Anti-virus, Avast, Avira, Kaspersky and AVG.
- A **worm** is a malware that attempts to travel between systems through network connections to spread infections. Unlike viruses, worms do not need a host program to attach themselves to. They merely make functional copies of themselves and do this repeatedly till they eat up all the available space on a computer's memory. A **Trojan horse** is a computer program that appears to be something beneficial, interesting or desirable such as a game or screen saver, but causes something malicious in the background. It hides its real identity and thereby concealing what it is actually doing. The term is derived from the ancient Greek story of wooden horses in which the Greeks were said to have concealed themselves in order to enter Troy. Unlike viruses a Trojan horse do not replicate itself. But it is more harmful since its mode of operation is very much akin to guerilla warfare.

- **Spyware :**Spyware is software that covertly transfers information about an unsuspecting user to a corporate site where such details can be manipulated for marketing or can be sold for a profit. Spyware often enters a system in the form of freeware or shareware. Spyware is an unwanted program that downloads itself with the software that is installed from Internet and then runs in the background of the system. Once downloaded in the computer, the spyware would transmit vital information regarding the user such as his internet searching habits, to the sender of the spyware program so that the information can be used for marketing purpose. This threat is more dangerous than the adware and is usually not detected by ordinary anti-virus software. However, certain anti-spyware programs such as Ad-Aware and e-Trust can effectively quell this malware.
- Adware: Adware is the software used for communicating advertisement of business products. It is downloaded automatically when other programs like a free software or a game is installed from the Internet. Once installed unintentionally, this software will display advertisements in pop-up windows while we are busy surfing the net. Although it is not as dangerous as a spyware, it can create considerable nuisance for the user. However, there is one plus-point in this, as it is very often used as a source of income for the developers of free software.

Cyber Law

- By the close of the preceding millennium, the new boon brought by information technology and the resultant changes in the business environment has brought its scar in the form of cybercrime and I.T sector began to experience an ever-growing need for new regulations, legal endorsements and legal remedies for curbing certain newly emerged threats precipitated by Information Revolution. To address this issue the United Nation through its core agency**, United Nations Commission on International Trade Law (UNCITRAL)** had formulated model legislation on electronic commerce in **1996.**
- Consequently, **THE INFORMATION TECHNOLOGY ACT, 2000** is enacted on **9thJune, 2000**. It owns a special recognition as a prime legislation of international standard dealing with cybercrime, ecommerce, Cyber Terrorism, Data Protection and privacy. India was the 12th nation of the world to adopt a comprehensive cyber law. With the adoption of this law, India has entered the coveted world of the few countries that have separate law to deal with information technology issues.
- The **Information Technology Act 2000** is **applicable to the whole of India,** including any offense committed outside India, if such contravention involves a computer, computer system or computer network located in India. The adoption of information technology law has facilitated the growth of ecommerce and trade and provided the law enforcing agency the iron hand to deal with cyber offenses effectively so as to transform the country technologically vibrant. The Act initially contained **94 sections divided into 13 chapters and 4 schedules.**

- The core object of the Information Technology Act 2000 was,
- a. To provide legal recognition of e-records.
- b. To provide legal recognition of digital signature.
- c. To provide legal recognition to electronic governance.
- d. To provide punishment for cyber offenses as the Indian Penal code 1860 was inadequate to deal with the growing menace of cyber offenses.
- e. To establish the Cyber Appellate Tribunal.
- f. To amend the certain provisions of Indian Penal Code, the Indian Evidence Act, 1872,he Banker's Book Evidence Act, 1891 and the Reserve Bank of India Act, 1934 for technological compliant.

THE INFORMATION TECHNOLOGY (AMENDMENT) ACT, 2008

- With the passage of time, as technology developed further and new methods of committing crime using Internet & computers surfaced, the need was felt to amend the IT Act, 2000 to insert new kinds of cyber offences and plug in other loopholes that posed hurdles in the effective enforcement of the IT Act, 2000
- This led to the passage of the Information Technology (Amendment) Act, 2008 which was made effective from **October 2009.**
- The following are important changes adopted in the amendment Act of 2008.
- a) The definition of communication device is provided under the new amendment and it includes cell phones, personal digital assistants or any other device used to communicate, send or transmit any text, video, audio or image. Thus mobile phones/smart phones came under the purview of Information Technology Act, 2000.
- b) The concept of electronic signature has been introduced. Electronic signature means authentication of any electronic record by a subscriber by means of the electronic technique specified in the second schedule of the Act and it includes digital signature. After this amendment information technology Act is now amenable to modern technological development in the field of authentication of electronic records. The Government can now prescribe new methods of authentication of e-record and is not restricted only to digital signature.

- c) Protection of privacy through data protection is one of the key amendments of Technology Amendment Act 2008 where it imposes liability on corporate body possessing, dealing and handling personal sensitive data. It shall be its responsibility to implement and maintain reasonable security practices and procedures and can be held liable for damages in case of negligence. It also prescribes punishment for breach of confidentiality and privacy by disclosure of information without consent.
- d) It provides for audit of documents, records or information processed and maintained in electronic format.
- e) The new amendment validates contracts formed through electronic means. The IT (Amendment) Act, 2008 has brought marked changes in the IT Act, 2000 on several counts. The declared objective of this amendment was to fill the gaps existed in the Act of 2000.It was a step in the right direction. However, there are still certain lacunae in the Act, which will surface while the amendments are tested on the anvil of time and advancing technologies.

Free and Open Source Software (FOSS)

- The late 1970s and early 1980s experienced the extensive expansion of proprietary software as a result of the competition among manufacturers.
- As its name implies, proprietary software is software that is owned as private property by a company or by an individual software developer. These proprietary rights are protected by various intellectual property laws and regimes and by the licenses required for its use.
- In order to prevent their software from being used on their competitors' computers, manufacturers copyrighted their software and stopped distributing source code.
- By this, they limited or prohibited the copying, redistribution and modification of software.
- Free Software initiative or the social movement advocating the need for free and open source software emerged during the mid 80's has to be viewed as a reaction against the excessive expansion of proprietary software which restricts the access of users to the source code, limits and prohibits copying and redistributing software.
- In the words of David Wheeler, Free softwares "are programs whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program (without having to pay royalties to previous developers)".
- Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software". Thus, "free software" is a matter of liberty, not price. As such, the term 'free' in free software free under a general public license, most of them are not.

- Free software is a broad concept that accommodates at least two important streams; **the free software and Open Source software or the software with an openly accessible source code.**
- That is why the movement has been generally known by different names such as **Free Software movement and Free and Open Source Software (FOSS) movement.** Another term used to denote the concept of free software is **Software Libre that owes its origin to the French word libre meaning liberty or freedom.**
- The ideal, **"knowledge should be free"** is the primary motto behind all these developments.
- The concept of free software offers many opportunities for governmental, industrial, and educational institutions. Organizations, as well as developing nations, that take advantage of FOSS and implement them appropriately stand to gain much

- The FOSS philosophy There are ***two major philosophies*** in the FOSS world: the ***Free Software Foundation (FSF) philosophy and the Open Source Initiative (OSI) philosophy***.
- According to the FSF, free software is about **protecting *four user freedoms***:
- ▫ **Freedom 0: The freedom to run the program, for any purpose.**
- ▫ **Freedom 1: The freedom to study how the program works, and adapt it to your needs.**
- ▫ **Freedom 2: The freedom to redistribute copies so you can help your neighbor.**
- ▫ **Freedom 3: The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.**
- Free software is one that can be easily run and distributed on a computer without much time consuming installation process. Free software can also be copied, changed and improved upon.

Philosophy of Open Source Initiative

- The Open Source Initiative was started by **Eric S. Raymond** in **1998**.He urged people to **rename "Free Software" into "Open Source"**.
- The basic idea behind open source is very simple. **When programmers can read, redistribute, and modify the source code of a piece of software, new software evolves**. People improve it, people adapt it, and people fix bugs. And this can happen at a **rapid speed in quite contrast to the slow pace of conventional software development.**
- The OSI is **focused on the technical values of making powerful, reliable software**, and is more business-friendly than the FSF. It is **less focused on the ethical or moral issues** of Free Software and more on the practical advantages of the FOSS distributed development method.
- While the fundamental philosophy of the two movements are different, both FSF and OSI share the same space and **cooperate on practical grounds like software development, efforts against proprietary software, software patents, and the like**.
- As Richard Stallman says, the Free Software Movement and the Open Source Movement are two political parties in the same community.

History of Free Software Movement

- The free software movement was started in **1984 by Richard M. Stallman**. In January1984 Stallman quit his job at MIT to develop his new initiative announced as **GNU operating system – a complete operating system that is free software, modeled after UNIX.** Stallman actually wanted to establish a community of cooperating hackers.
- In **October 1985 he started the Free Software Foundation**, a non-profit organization, with the mission of promoting, advocating and educating the concept of free software. By pioneering the Free Software Movement, Richard Stallman **claimed proprietary software as being unfair, "building walls to divide people" and "making the world a worse place."**
- Meanwhile in **1991, Linus Torvalds**, a young man studying computer science at the University of Helsinki, **prepared a UNIX like Operating System named Linux and decided to license it under General Public License originally conceived by Stallman**. Thus, Linux became the **first free and open source operating system**.
- Another notable development was the launching of O**pen Source Initiative in 1998byEric Steven Raymond and Bruce Perens**. OSI is more **concerned with the technological aspects of the concept of free software rather than its moral or ethical values.**

General Public License and Copy left

- Because the **copyright laws covering software are often used to take away our freedoms,** Stallman and the FSF developed a specific legal document called the **GNU General Public License (GPL)** to protect them.
- Instead of restricting what we can do with software the **GPL encourages us to learn and share, so it is called a "copy left" license.** The GPL, discovered **to prevent the GNU software from being turned into proprietary software, was based on the principle of Copy left in total contrast to copy right.**
- **"A Copy left license such as the GPL means that code must be shared with others and does not allow any user to distribute the code and its modifications, enhancements, and additions as part of a proprietary scheme. In addition, the GPL requires that the enhancements be licensed on the same terms as the code which the developer initially received and used".**
- In other words, **GPL licensed software is free to copy, distribute and modify and in return, the derivative works of that software must also be GPL licensed.** Its **main purpose is to keep the continuity of the freedom of software, ensure and reinforce the sharing of the programs' source code.**

Different Categories of Free Software

- **Public domain software**: It is the **software of which the author has relinquished all rights and anyone can do what they like with it**. For example, they could improve the software and then keep the improvements to themselves, perhaps to make money. In other words, it is the **software whose copyright has been expired, or is not copyrighted, or the author has released it onto the public domain .** Since public-domain software lacks copyright protection, it may be freely incorporated into any work, whether proprietary or free.
- ▫ **Permissive licenses**:- These licenses are **also known as copy free as they have no restrictions on distribution**. The author retains copyright solely to disclaim warranty and require proper attribution of modified works, and permits any modification and redistribution, even with a closed source code. This type of a free software are also called **BSD-style (Berkley System Distributions) because they are applied to much of the software distributed with the BSD operating systems.**
- ▫ **Copy left licenses**: - **GNU General Public License** is the most prominent in this category. Here, the **author retains copyright and permits redistribution under the restriction that all such redistribution is also to be licensed under the same license.** Additions and modifications by others must also be licensed under the same “copy left” license whenever they are distributed with part of the original licensed product. This is also known as a **viral license.**
- ▫ **Freeware**: - Freeware refers to **software that anyone can download from the Internet and use for free.** The term freeware was **first used by Andrew Fugleman in 1982. User license or EULA (End User License Agreement**) is an important part of freeware. Freeware programs can be distributed free of cost. **Eg; Adobe PDF, Google Talk, yahoo messenger, MSN messenger etc.**

- Shareware: - Shareware is **not actually free software in the genuine sense of that term. It is a type of proprietary software which is provided (initially) free of charge to users, who are allowed and encouraged to make and share copies of the program, which helps to distribute it.** The word "shareware" is a created by **combining the words "share" and "software".** Sharewares give **users a chance to try the software before buying it.** Shareware is software that is **distributed on a trial basis with the understanding by the users of the software that there may be a small charge by the author to continue to use it.** You can copy shareware and pass it along to friends and colleagues, as long as it is the trial version of the software and not the registered version. They are also expected to pay a registration fee if they intend on using the software regularly beyond the trial period. **Eg; WinZip**.

Advantages of Free and Open Source Software

- The fundamental advantage is the **higher degree of user freedom it offers**. This is because of the **availability of source code that makes the user capable of reading, modifying and redistributing the program**.
- Another key advantage is that many of this **software are available free of cost or at a lower or nominal license fee.**
- The major advantages of Free and Open Source software can be summarized as follows:
- a) **Availability of Source Code and Right to Modify**:-Open Source Software are always available with its source code in binary or executable format and users or programmers has to modify that source code according there requirements. It enables the improvement of a software product.
- b) Right to Redistribute Modifications:-The right to redistribute modifications and improvements to the code, and to reuse other open source code, permits all the advantages due to the modifiability of the software to be shared by large communities.

- c) **Right to Use Software in Anyway**:-There is no one with the power to restrict in a unilateral way how the software is used. This to improve the quality and functionality of the product. When a proprietary software vendor decides not to upgrade some software product for some old platform, customers can only stick to the old version of the software, or switch to another product. If open source software is used, customers can also found some development for the desired platform, or look for other vendors to provide the upgrades (of the very same product).
- d) **Lesser Software Cost**:-Most of the open source software projects are **available with no or little cost**.
- e**) Lesser Hardware Cost**:-Open source solutions are **easily portable and compressed; it takes lesser hardware power to carry out the same tasks when compared to the hardware power it takes on servers, such as Windows or workstations**.
- f) **No Vendor Lock-in**:-IT managers in organizations face constant frustration when dealing with vendor lock-ins'.
- g) **Simple License Management**:-Open Source Software is licensed under various open source licenses like GNU General Public License and Barkeley's License etc. These licenses provide us ability to install it several times and also use it from any location.

- i) **Abundant Support**:-We will get ample support when you use open source software. Open source support is **mostly freely available and can be easily accessed through online communities**. There are also many software companies that provide free online help and also varied levels of paid support. Most organization that creates open source software solutions also provides maintenance and support.
- j) **Reliability**:-Reliability means the **absence of errors or bugs which cause incorrect operation, data loss or sudden failures**. If an error occurs in proprietary software, a defect report needs to be filed and then there will be a delay before the vendor determine when or whether to issue an updated release. If an error occurs in open source software, it could be fixed within hours, using a process that is undoubtedly assisted by the availability of source code. Developers discover error and fix it and also report to maintainers as well as release an updated version of the software on their own authority.

III. Demerits

- The main reason to the use of open source software is that it is cheaper and availability of source code for further modifications and reuse. However, we should also remember that there do exist some remedial measures also to overcome many of these limitations.
- Various demerits of open source software are described below:
- a) **Not So User Friendly**: -The main disadvantage of open-source software is **not being straightforward to use**. Open-source operating systems like Linux cannot be learned in a day. They **require effort and possibly training from our side before we are able to master them. We may need to hire a trained person to make things easier, but this will incur additional costs**.
- b) **Less no of applications**: -There is a **shortage of applications that run both on open source and proprietary software; therefore, switching to an open-source platform involves a compatibility analysis of all the other software used that run on proprietary platforms.** In addition, there are many ongoing parallel developments on open source software. This creates confusion on what functionalities are present in which versions.
- c) **Hardware Incompatibility**: -Many of the latest hardware are incompatible to the open source platform, so it is also a big limitation of the use of open source software.

- d) **Most OSS are not reliable**: -Most of the developers and promoters of open source software believe in an obscure, idealistic world where software companies do not sell commercial software. Although big multinational companies like IBM and Sun Microsystems are backing the open source software movement there are no great financial stakes involved and the motivation mostly originates from a prevalent anti-Microsoft feeling. So there is no clear-cut discipline in this field and everything is emotion driven. Hence most of the applications are not reliable and you cannot run critical business operations on them.
- e**) Less User Support**: -Once we decide to use open source software we are on our own. We agree that there is a lot of help is available on the Internet and many self motivated forums that can help us install and run open source software; but there **is no qualified support available**. We have to figure out on our own efforts that how to install and use applications without sabotaging our data and hardware. For instance, many have lost their rich and valuable data trying to shift from Windows to Linux. **No help documents and manuals are made available** since the software is being changed every second week.
- f**) No guaranty of updates**: -There is no guaranty of updating of Open Source Software. Since we are not paying for the open source software nobody is bound to give us regular updates. We can get stuck with the same old version for years without ever getting an update.
- g) **Difficult to know the current state of software**:-Open source software is come with its full source code. The availability of source code is the advantage of OSS and also disadvantage. Every person who has a little knowledge about the software can upgrade and change the software according to their requirements with its source code. Sometimes there are so many changes in software that it is difficult to know about the present state of the software. There is also not much advertising for open source software, so it is difficult to know about the existence of the project and if exist, its current status.
- h) **Involvement of Significant problems connected to intellectual property**:- Open source software, would invite many significant problems connected to intellectual property as almost all the nations are accepting software patents. Further, because of the availability of source code Open Source Software is disclosing how the software works. This includes disclosure of algorithms and how a device with a unique design might function. Revealing this information to others may cause duplication and loss of financial advantage.

Intellectual Property Rights (IPR)

- Intellectual property means the **legal rights which result from intellectual activity in the industrial, scientific, literary and artistic fields. It usually relates to products of mind and intelligence that are intangible and cannot be measured physically or accurately.**
- Countries have laws to **protect intellectual property for two main reasons.**
- One is to **give statutory expression to the moral and economic rights of creators in their creations and the rights of the public in access to those creations.**
- The second is **to promote creativity and the dissemination and application of its results and to encourage fair trading which would contribute to economic and social development.**
- Generally, intellectual property law **aims at safeguarding creators and other producers of intellectual goods and services by granting them certain time-limited rights to control the use made out of those productions.**
- Intellectual Property Rights can be defined as the **"rights that pertain to creations of the human mind".**
- IPRs typically give the owner of the IP the exclusive **right to control use of the creation for a certain period of time.**
- Laws governing IPRs are **intended to stimulate innovation and creativity, ensure fair competition, and protect consumers.**
- Because intellectual property **shares many of the characteristics of real and personal property, associated rights permit intellectual property to be treated as an asset that can be bought, sold, licensed, or even given away at no cost. IP laws enable owners, inventors, and creators to protect their property from unauthorized uses.**

- Intellectual Property is traditionally divided into two branches, **“industrial property” and “copyright.”**
- The Convention Establishing **the World Intellectual Property Organization (WIPO), concluded in Stockholm on July 14, 1967**, provides that intellectual property shall include rights relating to:
- ▫ Literary, artistic and scientific works,
- ▫ Performances of performing artists, phonograms and broadcasts,
- ▫ Inventions in all fields of human endeavor,
- ▫ Scientific discoveries,
- ▫ Industrial designs,
- ▫ Trademarks, service marks and commercial names and designations,
- ▫ Protection against unfair competition, and
- ▫ All other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields.
- The key forms of intellectual property are copyrights, patents, trademarks, and trade secrets.

Copyright

- Copyright is a legal term describing the economic rights given to creators of literary and artistic works, including the right to reproduce the work, to make copies, and to perform or display the work publicly.
- Copyrights offer essentially the **only protection for music, films novels, poems and other works of cultural value.**
- **Computer programs and sound recordings** are also been protected through the institution of copyright.
- Copyright protection arises automatically on creation of the work, provided it is original.
- The term of copyright depends on the type of work that is protected, when it was made and whether it was published.
- **Generally, protection lasts for70 years after the death of the creator.**

Patents

- A patent is a **grant from the government conferring the rights to exclude others from making, selling, or using an invention for the term of the patent.**
- It is a **title providing the inventor and/or the applicant with the exclusive right to prevent others from possessing, using, selling, manufacturing and importing the patented invention or offering to do any of these things within a definite geographical area.**
- Patent is generally **applicable for inventions, processes, machines, improvements, and composition of matter**.
- Even though, **Software algorithms can often be patented**, typically software is protected under copyright.
- To file an application for obtaining patent, the product should possess the following **three basic qualities**.
- 1. **Novelty-it should be a new innovation having some kind of uniqueness.**
- 2. **Utility-the product must be useful in some way or the other**.
- 3. **Non-obvious to one skilled in the art-** the method of making or the technology behind the product to be patented should not be understandable easily or visible apparently to someone skilled in that field.
- Patent protection provides the right to **exclude others from making, using, and selling the claimed invention during the patent term**. In most of the countries ,patents for products are ordinarily **been given for a term of 20 years from the date of filing application.** But **Industrial Designs are usually patented for a period of 14 years.**

Trademarks

- A company's trademarks are very often its most important assets. **The names, designs and emblems used by internationally renowned producers such as Nike, Coca-Cola, Nestle and Apple Computers are the well-known examples of trade marks.**
- A trademark is a **word, phrase, symbol or design-- or a combination of any of these-- that serves to identify and distinguish a specific product or service from others in the marketplace.**
- For example, the particular font-style and the logo used by Life Insurance Corporation of India would distinguish it from other companies who are also offering insurance service in India.
- Trademarks normally perform **four main functions**:
- •Distinguishing the products or services of one enterprise from those of other enterprises
- •Referring to a particular enterprise which offers the products or services on the market
- •Referring to a particular quality of the product or service for which it is used
- •Promoting the marketing and sale of product sand the marketing and rendering of services.

Geographical Indications (GI)

- Geographical indications are treated as a **subset of trademarks.**
- GIs identify **a good or service as originating in a place, region, or locality where a given quality, reputation, or other characteristic of the good is essentially attributable to its geographic origin.**
- They serve the same functions as trademarks because, like trademarks, they are source identifiers and guarantees of quality, and they represent valuable business interests .
- GIs increasingly are being recognized as valuable marketing tools in the global economy.
- Examples of GIs are Banaras and Kanchipuram saris in India and Florida oranges in United States. Recently, the Aranmula Mirror of our own Kerala has also been accorded the status of GI.

Trade Secrets

- A trade secret is **any formula, pattern, physical device, idea, processor other information that provides the owner of the information with a competitive advantage in the market place.**
- Trade secrets encompass an almost infinite spectrum of information, such as Customer lists, Supplier lists, financial data, Product formulas, manufacturing processes, Marketing strategies, Software source code, Pricing information and similar types of proprietary information.
- In general, a **trade secret is confidential information that has commercial value.**
- Under international agreements, trade secrets are defined to **include information that is secret, having commercial value and are to be subjected to reasonable procedures designed to maintain its secrecy.**
- One of the most famous trade secrets in the world is the formula for Coca-Cola which is kept in a heavily guarded vault and is known to only a few people within the company.

International Conferences,Treaties and Agreements Relating to IPR

- The **World Intellectual Property Organization (WIPO)** functioning under **United Nations Organizations is the apex body specialized in the protection of IPR.**
- The WIPO was established at **Stockholm Convention of 1967** and entered into force **in 1970.**
- However, the real origins of WIPO **go back to the convening of Paris Convention for Protection of Industrial Property in1883**.
- It was the **oldest major International Treaty concerning the protection of Intellectual Property.**
- This treaty was **revised several times** during the period between **1900 and 1967 and the treaty was also amended in 1979.**
- Other **major agreements** relating to IP are the **Madrid Agreement Concerning the International Registration of Marks (1891)** and the **Protocol Relating to that Agreement (1989), Hague Agreement Concerning the International Registration of Industrial Designs (1925), Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks (1957)Berne Convention for the Protection of Literary and Artistic Works (1971)etc.**
- However, the international community did not have a single source for intellectual property obligations and norms until the formation of **World Trade Organization (WTO).** The WTO was organized **in 1994** as the **culmination of Uruguay Round talks of the General Agreement on Tariffs and Trade abbreviated as GATT.**

TRIPS Agreement

- The **Agreement on Trade-Related Aspects of Intellectual Property Rights** generally known as the **TRIPS agreement** is a **major step towards formulating a universally applicable standard for Intellectual Property Rights**
- **Significance of the TRIPS Agreement is three-fold:**
- 1) It is the **first single, truly international agreement that establishes minimum standards of protection for several forms of intellectual property**;
- 2) It is the **first international intellectual property agreement that mandates detailed civil, criminal, and border enforcement provisions**; and
- 3) It is the **first international intellectual property agreement that is subject to binding, enforceable dispute settlement.**
- The Trade Related Aspects of Intellectual Property Rights Agreement (TRIPS) **culminated at the end of seven years of negotiations from 1986 to 1993, as part of the Uruguay Round of Multilateral Trade Negotiations of the GATT.**
- The TRIPS Agreement **came into force on the 1st of January 1995, with the establishment of the World Trade Organization.**
- TRIPS is drastically **different from all previous IPR accords because membership in the WTO is a 'package deal' meaning that WTO members are not free to pick and choose among agreements.**
- **TRIPS apply basic international trade principles to member states regarding intellectual property, including national treatment and most favored nation treatment.** TRIPS **establish minimum standards for the availability, scope, and use of the trade related aspects of the seven basic categories of intellectual property rights such as Copyrights and Related Rights, Trademarks, Geographical Indications, Industrial Designs, Patents, Layout Designs of Integrated Circuits and the protection of Undisclosed Information**

Blogging

- A blog is a **frequently updated online personal journal or diary.**
- It is almost **like a mini website.** It is a **medium to express your thoughts, views and ideas.**
- **Wikipedia defines blog as a type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video.**
- A blog can also be a **shared online journal where people can post daily entries about their personal experiences and hobbies.**
- Blogging is **one of the easiest and simplest ways of reaching out to your audience.** Blog is a **short form for the word weblog** and the two words are often used interchangeably.
- One who participates in the activities of maintaining a blog is known as **a blogger** and the activity of keeping a blog is known as **blogging.**
- Anyone can write a blog. **Several web sites are offering blogging services.** They will let you post your thoughts on your own blog on their web site using their software.
- Usually **this service is free, but you have to register in order to use the site.**
- The **four well-known free blogging providers are Blogger (http://www.blogger.com),WordPress (http://wordpress.com), Type Pad (http://www.typepad.com) and Xanga (http://www.xanga.com).**
- Blogging happens to be a **very effective medium for building your reputation, for interacting with your customers, for building relationships as well as for business purposes. Blogging entails not only talking about yourself, your ideas, views and opinions, but more importantly to listening to the community as well.**

- **Any content - word, picture, sentence, paragraph or essay, with links and names and current news**- uploaded in the blog is called a post.
- A **blog usually contain the date, and title of the Post. It would also contain the name or username of the person who writes the post (author) and the feedback from the part of viewers in the form of comments**.
- The examples of **popular blog categories** are:
- ▫ **Personal:** This is the broadest category and includes blogs about topics of **personal interest**. The topic of a personal blog may vary from yoga to Nano technology in accordance with the personal interest of the blogger.
- ▫ **Corporate Blogs**: - All of the **Corporate Companies** in the world today have engaged themselves in building and interacting with customers across the globe through their Corporate Blogs. Each of these blogs is created and maintained with the **vision and goal of promoting their business interest**. In the technology field, you can find the best blog sites maintained by Corporates like **IBM, Dell, Samsung** etc. The subjects that are discussed may vary from discussions on product, installations, service, applications,

- ▫ **Other Types of Blogs**: - Besides the Personal and Corporate Blogs, one other type of blogs that you would want to check out would be the blogs that are built around a particular topic or genre such as **political blogs, travel blogs, blogs floated by Scientist community, Educationists and other such specialist blogs**.
- **Advantages of Blogs**
- 1. A Blog can be **developed very easily**
- 2. A blog post **goes public**, in other words, it **can be accessed and read by almost everyone who have an access to internet.**
- 3. The usage of blogs are **very convenient**, hence people tend to use them more frequently.
- 4. Students tend to **improve their writing skills** as blog articles should be reasonably good enough and free from grammatical mistakes.
- 5. Blog sites used as **online class forums enabling the students to interact with various personalities including teachers, scholars and experts**.
- 6. Individuals learn to **express their opinions and exchange their views on topics of common interest,** which not only keeps them updated but also contribute generating new ideas.
- 7. It is place for **students and individuals to share their articles and opinions with people outside their community**.

- **Disadvantages of Blogs**
- 1. It involves a **lot of time** to update and post an entry on the blog site
- 2. Regular writing may give **rise to slangs and sloppy way of writing spoiling the quality of proper usage of language.**
- 3. Blogging cannot be **forced upon students who are hardly interested in reading and replying to the post.**
- 4. There is **no confidentiality as it is a public forum.**
- 5. It can no way be related to conversation, as there is always a time gap in the replies received.
- 6. It is **not suited for issues requiring immediate solution.**
- 7. There may be **possibilities of misusing the blog posts for publishing obscene and offensive content and also a tool for defamation.**

Social Media

- All of us would agree to the point that the advent of Internet drastically changed the entire mode of human communications and interactions. Now, there are several web based services designed to function as an effective platform for socialization. These web based services are collectively known as Social Networking sites or more simply, the Social Media.
- Social networking services can be broadly defined as internet- or mobile-based social spaces designed to facilitate communication, collaboration, and content sharing across networks of contacts.They allow users to manage, build and represent their social networks online. Social networking sites are web-sites where users can create a profile and connect that profile to others to form an explicit personal network.
- They are web-based services that allow individuals to
- a. Construct a public or semi-public profile within a bounded system
- b. Articulate a list of other users with whom they share a connection and
- c. View and traverse their list of connections and those made by others within the system.

- The nature and nomenclature of these connections may vary from site to site. Permissions are a very important feature of most social networking services. They allow members and groups to control who gets access to their profiles, information, connections and spaces, as well as degrees of access.
- Social Media is a term used to describe a variety of Web-based platforms, applications and technologies that enable people to socially interact with one another online.
- Some examples of social media sites and applications include Facebook, YouTube, Twitter, blogs and WhatsApp. Social media refers to all online communications channels dedicated to community-based input, interaction, content-sharing and collaboration.
- Websites and applications dedicated to forums,microblogging, social networking , social bookmarking, andwikis are among the different types of social media.

- Some prominent examples of social media:
- ▫ Facebook is a popular free social networking website that allows registered users to create profiles, upload photos and video, send messages and keep in touch with friends, family and colleagues.
- ▫ Twitter is a free micro blogging service that allows registered members to broadcast short posts called tweets. Twitter members can broadcast tweets and follow other users' tweets by using multiple platforms and devices.
- Google+ is Google's social networking project, designed to replicate the way people interact offline more closely than is the case in other social networking services.
- ▫ Wikipedia is a free, open content online encyclopedia created through the collaborative effort of a community of users known as Wikipedians. Wikipedia was founded in January 2001.
- ▫ LinkedIn is a social networking site designed specifically for the business community. The goal of the site is to allow registered members to establish and document networks of people they know and trust professionally.
- ▫ WhatsApp Messenger is a cross-platform mobile messaging app which allows you to exchange messages without having to pay for SMS. Whats App Messenger isworkable in all varieties of smart phones and I Phones. In addition to basic messaging Whats App users can create groups, send each other unlimited images, video and audio media messages.

- Advantages:
- ▫ Facilitates open communication, leading to enhanced information discovery and delivery.
- ▫ Allows us to discuss ideas, post news, ask questions and share links.
- ▫ It helps to generate a higher sense of social responsibilities by promoting social criticism and online activism
- ▫ Provides an opportunity to widen business contacts.
- ▫ Targets a wide audience, making it a useful and effective tool for business, education and entertainment.
- ▫ Expands market research, implements marketing campaigns, delivers communications and directs interested people to specific web sites.

- Disadvantages:
- ▫ Opens up the possibility for hackers to commit fraud and launch spam and virus attacks.
- ▫ Increases the risk of people falling prey to online scams that seem genuine, resulting in data or identity theft.
- More chances for misuse/abuse by misguided elements for viewing and forwarding objectionable, illicit, porn or offensive material and also for defaming and harassing others.
- ▫ Potentially results in lost productivity, especially if employees and students are busy updating profiles, etc.

Online Activism

- Activism consists of efforts to promote, block, or direct social, political, economic, or environmental change, or continuity.
- Online activism is also known as Internet activism, cyber activism, digital activism, online organizing, electronic advocacy, e-campaigning and e-activism.
- Online activism's basic working principle is similar to standard physical activism: to initiate a citizen-based movement toward a specific goal, cause or objective.
- Cyber-activism uses social networking tools and platforms to share and broadcast mottos and messages, and to interact with netizens. These platforms include Twitter, Facebook, LinkedIn, YouTube and other popular social networks, along with email, instant messaging (IM) and other online collaboration tools. Depending on the cause or need of the e-activist, cyber activism can be used for various purposes, such as awareness creation, gathering and organizing followers and initiating

- There are different categories of online activism such as;
- Hash-tag activismis a term coined by media outlets which refers to the use of Twitter’shash-tagsfor internetactivism.
- It is the act of fighting for or supporting a cause that people are advocating through social media like Facebook, Twitter, Google+ and other networking websites.
- This is the kind of activism that does not require any action from the person other than sharing or "liking" a post or "retweeting" tweets on Twitter.
- The term gets its name from the liberal use of hash-tags (#) that are often used to spread the word about a cause over Twitter.

- Slacktivism is a term that combines the words "slacker" and "activism" to refer to simple measures used to support an issue or social cause involving virtually no effort on the part of participants.
- Slacktivism is most commonly associated with actions like signing online petitions, copying social network statuses or joining cause-related social networking groups.
- Slacktivism critics contend these actions are merely for participant gratification because they lack engagement and commitment and fail to produce any tangible effect, in terms of promoting a cause.

- Hacktivism is the combination of the words hacking and activism. It refers to the act of hacking a website or computer network in an effort to convey a social or political message.
- The person who carries out the act of hacktivism is known as a hacktivist. In contrast to a malicious hacker who hacks a computer with the intent to steal private information or cause others harm, hacktivists engage in similar forms of disruptive activities to highlight political or social causes.
- For the hacktivist, hacktivism is an Internet-enabled strategy to exercise civil disobedience. Acts of hacktivism may include website defacement, denial-of-service attacks (DoS), redirects, website parodies, information theft, virtual sabotage and virtual sit-ins

- Advantages
- Online activism does have a distinct advantage in the sense that it allows people to act much more quickly than in the real world and it helps a group to keep a centralized narrative.
- Furthermore, although offline activists can create stronger connections by meeting in person, social media groups allow individuals to find like-minded people they otherwise would have never known.
- Another merit is that it can be used as an effective tool to galvanize offline action.
- Even though the number of people inspired to act may be less, there should definitely be a considerably larger number of people to support the cause. Online activism also provides activists a sense of safety and security often allowing them to express radical ideas.
- Another advantage is that social media offers instant visibility and information sharing in a cost effective way especially when targeting the younger generation who usually prefers the new media over the conventional one to keep a watch on happenings around them.
- The advantages of online activism also include the Boosting of fundraising capability and accountability.

- Criticism or Disadvantages of Online Activism
- The most prominent criticism leveled against cyber activism is one related to unequal Internet access, referred to as digital divide. This point is particularly relevant when dealing with the language problem concerning internet. As English still holds the status of linguafranka of internet, many from third world countries find it extremely difficult to cope with online activism.
- Other major shortcomings are directly linked to the very nature of more popular forms of online activism such as hash-tag activism and slacktivism. Some critics will argue that it is only a kind of pseudo activism as it very often generates a false sense of social commitment. It is this easiest and nothing to lose kind of 'activism' that has earned the nickname 'clicktivism' for online activism
- Another criticism is that the new media seem to lose their newness quickly which, in turn, will affect the creation of stable ties between activists that are necessary for sustained collective action. According to several scholars the Internet is unable to create the necessary trust and strong ties that are necessary to build a sustainable network of activists.
- In addition to above, all the general demerits of digital media such as the problems of accessibility, network and power failures, security vulnerabilities and identity theft may also be enumerated as the negative aspects of online activism.