Environmental Science

Lecture 33

Role of IT on Human Health

Environmental information technology is the study and practice of technological applications designed to deliver user-friendly information about the environment.

So when you talk about technological applications and it is going to be specifically used to be user friendly, there is an amount of awareness that is required not only by the person who is creating it and also the end user the people must have. So this particularly includes:

- Software creation
- Improvement of simulated environments for human interaction with the immediate environment or with remote environments.

So what actually happens here was, some one need not to be in one place creates a particular software where similar to the environment in that particular area is created, such that we can study how that environment is going to interact with the people, anticipate a path kind of reaction and with that particular environment, based on that reaction we can come up with solution towards the balanced sustainable approach.

If you look at software creation is the first step,

- Group of undergraduates at Harvard University created software in the winter of 2001.
- The students developed a remote notebook.

- Useful to marine biologists and others working in wet environments.

We are taking down the notes and data's as a huge hassle when using paper and pen are never a solution.

Improved Simulated Environments:

- Weather forecasters work with simulated environments.
- Accurate knowledge is not acquired through this method
- One way to improve simulated environments is by deepening the "artificial intelligence" component.

When you talking about deepening the artificial intelligence component, it actually refers to improving the quality of AI or in the way as technology is improved, the IT industry has grown spell and bound from the year 2012 and now in the year 2016. You can imagine the everyday advancements that is happening within the IT sector. So AI itself has grown just as what we perceived as AI say five years ago. So we need to ensure every simulated environment has particular data or artificial intelligence attached to it pertaining those data's certain other changes can be made to the simulated environment or to the people within that particular environment.

Bad effects of IT in the Environment:

- Refrigerators and freezers are an indispensable part of modern life and difficult to dispose off properly.
- Cell phones, cars, home appliances have become necessity.

Another important effect of the IT industry is the usage of computers more and more computer usage of systems, large systems and large

number of systems are increasing, they a lot of energy that is being consumed and energy to cool those places. These coolants towers are completely required for particular area for so many systems are particularly run. That is the energy consumption that we are looking at, as the industry, science and technology is improving, they also have some breakthrough in finding some ways to less energy, sustainable energy and it is the way that can be used and utilized elsewhere and lesser dependency on natural resources.

Applications:

- Use of geographical information system(GIS)
- Database
- Environmental information system
- Remote sensing
- World wide web
- Online learning center
- Teacher friendly features
- Student friendly features

Use of GIS:

- Technique of superimposing thematic maps.
- Uses digital data
- Used on a large number of inter-related aspects

Database is a inter-related collection of various subjects, it is obviously in a computerized form and it can be retrieved and wherever required too and has to be stored in a centrally retrievable place.

Environmental Information System:

- This works for generating a network of database, this is basically created by the Ministry of Environment and forests, government.
- Functions in 25 different centers all over the country.

This again has to be done in various locations for the information to be up to date, accurate and it has to be people by experiencing them up to the extent, so there is some control over the AI factor of this.

Remote sensing:

- Ongoing changes in the environment can be assessed easily through satellites.
- Occurrence of natural calamities can be predicted well in advance.

This is the very useful elements to have, especially you are talking about centers in satellite and can study other parts of the globe and help other countries who might not have technologically advanced in some other. By creating some other simulated environments by prediction of impact and prepare that particular country or area for that impact.

Human health:

- Helps doctors monitor the health of people
- Information can be sent more quickly to take corrective measures.

World Wide Web:

- A vast quantum of data is available
- Has proved to be extremely useful for both; the students and the teachers.

This is become an online information retrieval portal essentially, for anyone and everyone who has access to the internet can avail information from this web. So the applications of using IT or the applications what we have seen now with respect to the environment.

Applications:

- These online learning centers provide the current and relevant information on, principles, problems, quarries, application of EVS.
- It has digital files of photos; power points lecture presentations, animations, web exercises and quiz.

They are useful to both students and teachers of environmental studies. So, we actually talking about the environment and the way to go about to saving it, we need to have adequate portal information as well, because every 200 to 300 kms the weather patter might have changed and we have aware of that because of today's modern technology otherwise there could be a point of time that could be sitting and aware of it just around us in our immediate vicinity. But now with all GIS and remote sensing and having access to the satellites we are able to be predict certain natural elements much ahead in advance, forget anything in the scale of calamities and earthquakes. Even the regular occurrences like a very hot day, level of ultra violet rays that is being present, avoid going out the temperature is too high and the maximum temperature is this and minimum temperature is this. All of these are possible because of the current trends and one of the important applications of IT is this with respect to the environment as well as human health. We can actually have the database that we can form which is constantly updated by many kinds of people who are attaching in this field. And thus can be accessed by not them and also

the students who are studying this, as well as teachers who are teaching environment with this.

Case Studies

Some Case studies on role of IT in Environment Protection:

Study on polluted back waters of Kerala:

A part of the back waters present in the Anchutengu-kodianamkulam, Kerala has been polluted due to the soaking of coconut-husks for the production of coir fiber. This polluted water has affected the fishery resources to a large extent.

The environment of the coastal areas covering the polluted and non-polluted zones was studied by Indian Remote Sensing(IRS) satellite. The IRS data were compared with water quality parameters such as turbidity, dissolved oxygen, production of H_2o and the primary productivity mechanism. Proper analysis of these IRS has been carried out and the necessary steps were undertaken for the proper development of aquatic systems.

Imagine doing the same thing without any of the systems like remote sensing or collection of data in a computerized manner. That would be near to impossible, even checking the turbidity of water can be done with the scale matter of few minutes versus taking a sample to lab and making a whole long scale process on it, entirely which is going to take a number of days. Having this data is not only going to help the future of water and the fishery department in Kerala and also along the coast where they can be aware such activities going to cause pollutants to the water bodies so it need to be aware of it.

So certain fact will become general knowledge and it is no more restrain to the educated elite of the people. Even the common area of people in the Kula were aware of the situation the people who were using the back water for the oil industry were aware that cannot be done, we need to use something else for it. And how is the coconut fiber is to be extracted, we need to come up with alternative theories as well. All of these can be practiced and outreached to the other parts of Kerala and the country as well which is going to face similar issues.

Ocean color monitor(OCM) to study phytoplankton:

IRS-P4 is the first Indian satellite used to get the required data's of oceanographic community. The space application center which is the part of Indian space research organization (ISRO) has developed many applications of IRS-P4.

The IRS-P4 (OCM) data has been found to be of great use for the estimation of phytoplankton to oceanic waters a well as the detection and monitoring of phytoplankton in oceanic waters as well as the detection and monitoring of phytoplankton blooms. It is also helpful in the identification of fishery zones.

The space application center which is the part of the Indian space organization (ISRO) has developed many applications for the IRS-P4. The main reason we need for the remote sensing in oceanographic community is the access is very difficult. It is not possible to get dive in each sample, to anticipate the turbidity, location of certain point source pollutants. It looks the water bodies in a much deeper level; it sees the level and changes the turbidity. Because of color variations and based on color variations it gives certain things which can be then acted upon and then it can be done on it. To ensure the samples are taken at the

right sample at the right time to check on the different dissolve contaminants and then the contaminates are developing and fighting the phytoplankton's, and if at all the phytoplankton's are growing too much and causing eutrophication that also needs to be monitored. So what the OCM data has found to do is, it is useful when it is trying to estimate the phytoplankton oceanic waters.

When the oceanic water we are talking about and they enlist water where you cannot even see the phytoplankton as part of them. But it is very important to know the oxygen level in all these areas, because oceans are the frequent place where oil spills occur and can meet with accidents, they can affect with severe to the ocean life.

Phytoplankton is the recognition theory we might have and it can be looked upon as a measure of checking the level of oxygen, it helps in detection as well as monitoring thephytoplankton blooms.

GIS for Forest management:

The forest area of Bihchua Range along Pench River in Madhya Pradesh was surveyed using GIS and remote sensing. The multi data images obtained by the satellite revealed that the forest is largely covered by Deacon Besalt and altered gnessic rocks. The various forests covers and denuded areas of the forest were also analyzed. The deforestation and other ecological imbalances in the forest areas were detected. A work plan id being prepared on these data's for the effective forest management.

National Emission Data Systems (NEEDS):

NEDS is developed by the environment protection Agency of USA. This NEDS works for coding storage, retrieval and analysis of nationwide air emission data.

Environment Information System (ENVIS):

ENVIS has been developed by the Ministry of Environment and Forest, by the Government of India. It has its headquarters in Delhi and functions in 25 different centers all over the country. ENVIS works for generating a network of database in areas like pollution control, clean technologies, remote sensing, coastal ecology, bio diversity, environmental management, renewably energy, wild life etc.,

This is actually the another way we can make sure that information system is used to our benefit, actually control not only one branch of only one environment of forests but also have the centralized control or the different states or center, here we can have data which is automatically compared so we can record it for future, we can have the maximum rainfall recorded, if it is the acidic rainfall, what is the percentage of acidity and if there is any clean technology available and it can be adopted to it and if it is adapted what are the changes in data. Comparisons and results are so quick within them helps us manage in a better function. Environmental management is something which we can do about in a sustainable manner, renewable energy can be thought about and supplied in a sustainable fashion and wild life can also be protected and tracked. What is actually happening in the wild life and poaches is they actually insert the chips in the wild life and let them go and if at all any animal is killed or poached, it is right away recorded and denoted. All the poachers can be identified and punished.

It can that is what it can give the strength now. Previously the animals are under our preview completely for it to be monitored. Now such a case does not exist. We can actually monitor the movements their birth, their death, their diseases and everything from a remote sensing location.

Role of IT in Human Health Protection

IT plays a key role in human health. It has changed the human life style. The health service technology mainly involves three systems.

They are

- Finance and accounting
- Pathology
- Patient administration: clinical system.

Applications of IT in health services:

- The data regarding birth and death rates immunization and sanitization programme are maintained more accurately using IT packages.
- It helps the doctor to help the people effectively.
- The information regarding the outbreak of epidemic diseases can be conveyed easily.
- On-line help of expert doctors can be consulted to provide better treatment and services to the patient.
- With a control system the hospital can run effectively.
- Drugs and its replacements can be administered efficiently.

Simple things like over dosing pain killers cause many deaths in one point of time. Even as micro gram or more of a pain killer as strong as

morphine and can cause death. But with monitoring medicines and all of this application will common. Everything is a set thing which gets automatically released at a particular span of every four hours and six hours as put in by the medical practitioner. It cannot be altered by the patient which means it is safe, it cannot be altered by the doctor without being programmed into by the password. So everything is administered in a more efficient fashion.

Case studies on role of IT in human health: Health services in New South Wales - The health services of NSW are dominated by the state administered public health services of providing integrated hospitals and community services to the population of 3 million people.

The IT packages purchased from US company was successful in the finance, accounting and pathology systems. But there were difficulties in implementing Patient Administrative System (PAS) or clinical system which involves the registration, administration and transfer of patients, medical records etc.,

The implementation of IT packages of the PAS went off successfully without much complications than in larger hospitals with networks.

One of the main consequence or negative impact of this is lack of a personal touch. There is something that inexperienced doctor might see, or in which computer may failed to notice, because it doesn't have any experiences as such. It just responds to the system it juts fed into it. Basically acts like a messenger and the doctor sees the messages on the data collection pad that he had. It does not have necessary to contact with the patient in certain situation does not warranted. So the number of cases they have been successfully applied but there are certain problems that patients can face, like privacy is important thing, certain

cases are out there in open. Your insurance providers can access, your doctors can access, and change of doctors might be accessed. If it is not well protected by the firewall or the full security system in place, then your information system can be misused, identified by a theft or other problems can also occur and the other important thing that u need to look at is can be used only by large hospitals with lot of funding. Where what is the point of having such technology in real places, it is difficult for sometimes the doctors to go. Patients can have rural paths in their own country. How to make the networks strong, infrastructure has to be developed before the IT can be stepped to make a huge impression especially in countries like India.