Knowledge Management and its use in E-governance for Disaster Management

Aaditya Desai
Assistant Professor
TCET, Mumbai,

Sunil Rai, Ph.D
Director, GIM

Bhushan Nemade
Assistant Professor

ABSTRACT

Knowledge Management today is a very fast growing domain. Its use in E-governance for Disaster Management is unique. In this paper we focus on the Disaster Management before the disaster occurs (pre-disaster stage) and after the disaster has occurred (post-disaster stage) both of which are helpful for preventing great economic and life-loss.

General Terms

Disaster Management, Disaster Recovery

Keywords

Knowledge Management, E-governance, Backup, Replication

1. INTRODUCTION

Knowledge Management is simply collecting knowledge and using it for different purposes. In this paper we are concerned more about the statistical use of Knowledge Management for predicting occurrence of a disaster.

In the first part of this paper we focus on the pre-disaster stage and how we can try and prevent a disaster from greatly affecting lives and economic loss. Disasters are inevitable; we cannot simply stop them from occurring. Natural disasters are the ones which occur without giving any sort of warnings say earthquakes which may result eventually into a tsunami or a landslide or a volcano which becomes active suddenly due to the earthquake.

In the second part of the paper we focus on the post-disaster stage and how we can manage a disaster after it occurs. This includes collecting information about the loss of life and property as also providing food, water and shelter. Insurance claims can be made using this information.

2. PRE-DISASTER STAGE

There are certain ways we can predict a disaster like an earthquake can be predicted by simply observing the abnormal behaviour of animals.

All animals instinctively respond to escape from predators and to preserve their lives. A wide variety of vertebrates already express "early warning" behaviour's that we understand for other types of events, so it's possible that a seismic-escape response could have evolved from this already-existing genetic predisposal. An instinctive response following a P-wave seconds before a larger S wave is not a "huge leap", so to speak, but what about other precursors that may occur days or weeks before an earthquake that we don't yet know about? If in fact there are precursors to a significant earthquake that we have yet to learn about (such as ground tilting, groundwater changes, electrical or magnetic field variations), indeed it's possible that some animals could sense these signals and connect the perception with an impending earthquake.[1]

It was observed on 26th Dec 2004 Tsunami that not a single animal was dead in Thailand after the Tsunami. Incidentally four tourists from Japan who were visiting Thailand National Park on the back of an Elephant were saved as the Elephant took them high up on the hills, also all the animals in the Park went on higher ground to save their lives.

Also Flamingo's in Southern Indian Coast suddenly started flying in the wilderness hours before the Tsunami hit the coast. In Sri Lanka, dogs refused to take their morning walk just before the Tsunami.

It is very easy to find and predict about earthquake just by looking that the number of animals missing in a region is very high above the average number of missing animals claims James Berkland, Geologist from USA. If we can collect data about missing pets from every part of the country we will be able to predict that there is a natural disaster coming our way.[2]

If the number of missing pets is above average in a particular region, we can conclude that the region is likely to get a natural disaster sooner or later. This information will be collected through a website which will be having a Knowledge Base from which we can analyse the data on a regular basis. The data from various zoos, sanctuaries and national parks can also be collected in the same way. Of course there will be false alarms raised from time to time but it is always better to be safe than sorry. On the contrary, false alarms will keep the people alert all the time.

Another part of natural disaster is the heavy rainfall and cyclones hitting the country from time to time. Generally, the meteorological department of the government takes care of the weather forecasting on a day to day basis. The weather forecasting is done using the satellite imagery that we receive from the geo-stationary satellites orbiting close to the earth's atmosphere. This satellite imagery helps to study the flow of wind currents, low and high pressure areas developing over a certain region as well as the cloud formation and the cyclone movement, speed and direction. Using this information the meteorological department predicts the heavy rainfall or snowfall and cyclonic warnings in a particular region of the country.

In general, in a metropolitan city like Mumbai, heavy rainfall and water- logging is a very common problem that occurs during the monsoon season. The Municipal Corporation of Greater Mumbai (MCGM) issues alerts from time to time regarding heavy rainfall and high tide information to the citizens residing in the city through Short Messaging Service (SMS) via various mobile phone operators in the city. Also alerts are broadcasted through

Television, AM and FM radio channels as also announcements are made on railway platforms, bus stations and airports to inform the people. In fact, MCGM has started training 30 volunteers for a period of 30 days for the actions that need to be taken when a disaster strikes a city like Mumbai.

A unique way of alerting citizens of Mumbai is to turn on the sirens placed at different locations across Mumbai to inform the people to stay inside their houses. These sirens were installed way back during the war time for alerting the citizens. Most of these sirens are still present in industries and mills for alerting the workers when an accident occurs. On similar lines, we can install the sirens on mobile towers or electric towers with battery back-ups so that they keep running even if the electricity is cut off.

A very important part of Disaster Management in Information Technology industry is to preserve the vital information in the company's data centres. Most important aspect in preserving this critical information is to use backups from time to time. Also replication of information, especially remote replication can help to make information available even if the primary site fails. The business can be continued from a remote secondary site and the loss occurring to the business can be minimized. We can also maintain a hot site i.e. a site where basic infrastructure is present along with all the information required to start the business after the disaster occurs in the region. Remote replication is preferred here because the local replica may be destroyed being very close in the periphery of the primary source of information. After the 9/11 attacks in New York, USA, the US Government has made it compulsory for all companies to back up their data on two different remote sites (minimum 30 km away from the primary site) other than the primary source of data so that redundant data will be available as and when required after the disaster.
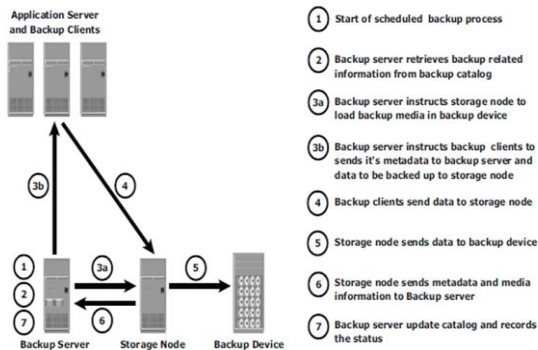

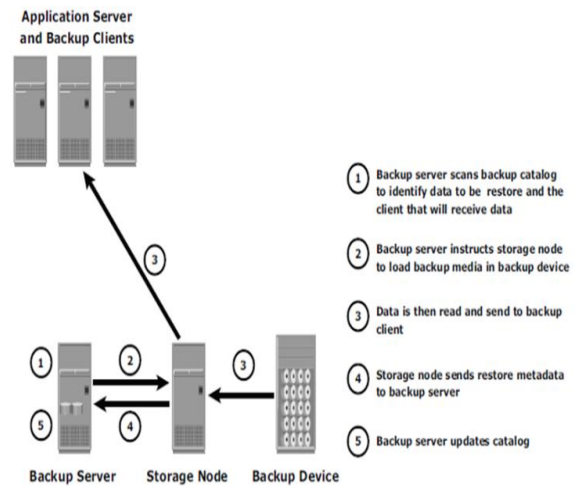**Figure 1: Backup Operation[3]**

Figure 2: Restore Operation[3]

Also helpful is the training given to National Social Service (NSS) and National Cadet Corps (NCC) students for helping people during the disaster. These students can help in moving the people out to a safer place away from the disaster site or to bring the injured people to the medical camp. Evacuation of people and animals is important especially away from a flooded river, away from the seashore in case of a Tsunami and away from the slopes of a mountain where the landslides occur.

It has been observed that communicating during a disaster is a very difficult task especially with the electricity going down and the mobile towers being destroyed. An effective way of communication in such a case would be to use licensed ham radio. Peculiarity with ham radio is that it does not require huge antennas and great amount of power supply; it can work on a simple battery.

3. POST-DISASTER STAGE

After a disaster strikes a region, it becomes very essential to maintain a record of the missing people, animals, loss of lives and loss of property. People in general can claim for the loss of property or life by claiming for insurance cover. For such insurance claims we can provide legitimate information from the Knowledge Base that we have collected immediately after the disaster so that people can start their life once again quickly.

Looking at the information in the Knowledge Base, we can also help people by supplying food, shelter and clothing. Government can also help the affected people by providing medical facilities, permanent houses and financial help. Some of the people may be in a state of shock after witnessing the disaster, for them proper counseling and treatment can help.

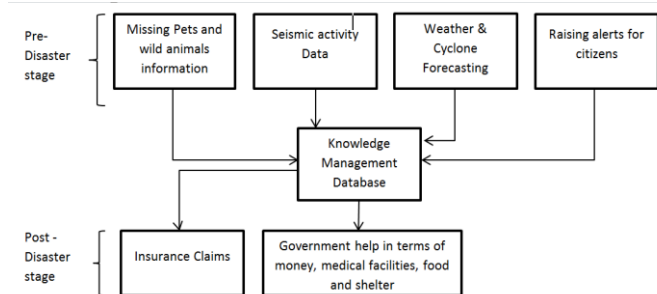## 4. KNOWLEDGE MANAGEMENT IN E-GOVERNANCE AND DISASTER MANAGEMENT

Figure 3: Knowledge Management in E-governance

A combination of Knowledge Management Database and Internet helps to collect data coming in from different sources like general public, wild- life sanctuaries for missing pets and animals from different parts of the country. This data will be helpful for analyzing and co-relating the missing animals and its relation with the occurrence of earthquakes and tsunamis.

Similarly data can be collected from meteorological department and seismology department for predicting heavy rainfall, snow or cyclones and earthquakes, tsunamis, respectively. This data will help the government to raise alarms and alert people so that they can evacuate or avoid going to these places immediately. This is the use of Knowledge Management in E-governance in the pre-disaster stage.

In the post-disaster stage, the government can collect data about missing people and animals as well of loss of their property which is very helpful for insurance claims and to provide monetary benefit to the affected people so that they can start their lives as early as possible.

5. CONCLUSIONS

We hereby suggest using a centralized Knowledge Management System connected to the Internet so that it becomes easy to analyze any abnormal statistics that may arise before the disaster strikes a particular region of the country. Relief to the affected people can be given faster if we have a Knowledge Management Centralized Database. Alert systems need to be upgraded so that people are informed correctly about the situation and there is no confusion about the disaster situation.

6. ACKNOWLEDGEMENTS

7. REFERENCES

Kirschvink, Joseph L. (2000). Earthquake Prediction by Animals: Evolution and Sensory Perception, Bull. Seism. Soc. Am., 90, pp. 312-323.

[2] "The Use Of Animals In Earthquake Prediction." Jeff Rense Program. Web. 10 Nov. 2011. http://www.rense.com/general61/use.htm .

[3] Information Storage and Management, Wiley Publications, EMC2 Chp.12. Backup and Recovery, pg. 261