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An Information Retrieval System Based on Google Earth with Special Reference to Ganga River in West Bengal Jurisdiction

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Abstract

Technological advancement has given us an opportunity to retrieve and disseminate information in any form. Internet has drastically changed the way information is distributed and has reduced the cost of information distribution. Library and information institutions are implementing advanced tools, techniques. In This paper reports work on an information retrieval system on Ganga River within the West Bengal jurisdiction. Data on research related to the Ganga River have been collected and incorporated into the system. The technologies like Google earth, WordPress and php have been used in a customized way.

Keywords: Ganga, Google Map, Information Retrieval System, Scholarly Communication

1. Introduction

Internet has impacted society and has revolutionized sharing, retrieving and dissemination of information. People are increasingly depending on the Internet to get required information. Considering the varied approaches of users seeking information, information centers are implementing different tools and techniques to provide better services to the user community. The new tools and techniques, academics are exchanging their ideas among them. Government and non-government organizations have taken initiative on Ganga River and publications emanating from these organizations are scattered. It will be helpful to get all the relevant information in one place. Kristicev (2013) stated that continuous development in IT is effecting in every parts of our society, library is an important part of our society and it is also trying to adopt new technology for changing its systems and services. Topcu (2011) stated that communities desire to have the required information in a simple way and also want to accumulate and share with peer group. An Information system on Ganga River will help the research community to know the work on Ganga Riverand will help provide published information on Ganga River thus enhancing communication with the user community. Considerable amount of information on Ganga may be available in digital form; common search engines may not retrieve all the information available. The present work provides a model so that not only digital sources but also all printed source of information in a specific domain could be retrieved from a single interface. Here we have concentrated to retrieve all the bibliographic information on Ganga river in West Bengal jurisdiction through a single interface.

Searching the Web with the database information system like scopus, proquest, sciencedirect shodhganga etc. may help to satisfy the user requirement.

625 km Ganga Valley is in West Bengal state between 87° 54′ 51.4800″ E- 88° 6′ 0″ E East to 24° 47′ 51.3600″ N-21° 48′ 0″ N North (Misra, 2010). The Ganga sub-basin area constitutes about 26.2% of India's geographical area.

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Misra (2010) stated that water management policy and creating awareness about wastage of water among the community can prevent water pollution caused by urbanization. Nriagu, et al. (2007) observed in his study that contamination of groundwater and arsenic contamination are major problems to our society. Many researchers have been initiated on this social problem to help government formulate appropriate policies. Much of this research is being published in different journals.

River bank erosion is another problem. Researchers analyze satellite images regarding to assess land erosion and they have found that drastic changes have occurred. There are research papers that address this issue of land erosion. Usual method of bank protection is the concretization and cementing of river bank. All these contributions should reach the potential user community and in this regards information centre plays vital role by providing these information. Pollution of Ganga River is now the main problem destroying the hydrology of the River. Untreated sewage, untreated industrial waste, municipal waste, human remains, remains of religious and cultural activities etc. pollute river water. The fish in the river have been found to be contaminated with metal above the permissible limit for human consumptions. Many initiatives have been taken by the concerned local administration and also by the Government of India. Some industries have been shifted; Local communities have also taken initiative to pressure the local administrations to initiate action.

Many of these efforts and initiatives have been documented and published.

2. Literature Review

Researchers have been working on the various issues related to the river Ganga. The outcome of this research serves as inputs to the governments in formulating and implementing plans. The government has formed different bodies and authorities (National Ganga River Basin Authority (NGRBA), National Mission for Clean Ganga (NMCG)) to clean Ganga. The scientific contributions in this regard and the related information is scattered in a number of different sources. There has been no initiative to gather all available information sources and make these easily accessible. Technology and relevant software are available and using these technologies this can be achieved and information made accessible via a single interface. The user friendly and popular Google Map may be used for designing an information system for this purpose.

3. Research Problems

After primary investigation, the following problems have been identified for detailed study and research.

- There is no specific web-based information system on Ganga River through which user can access information from a single interface.
- There are a large number of publications, research work, reports scattered across various sources, and organizations.

4. Objectives

The basic objectives of this work are as follows:

1. To design a web based bibliographic information system on Ganga River in West Bengal which can be extended to include other states through which the river flows.
2. To provide geospatial information on various locations related to said region.

5. Scope

The present study concentrates on journal articles. However, the system is flexible enough of to include records for different types of information sources such as books, reports, patents, etc. it mainly concentrates:

For testing the model data was collected from the following sources:

- Central Inland Fisheries Research Institute, Barrackpore; Annual Report.
- Bidhan Chandra Krishi Viswavidyalaya, West Bengal; Annual Report.
- Central Institute of Freshwater Aquaculture, Bhubaneswar; Annual Report.
- Central Institute of Fisheries Education, Andheri, Mumbai; Annual Report.
- Central Institute of Fisheries Technology, Cochin; Annual Report.

6. Methodology

This paper is based on a survey of different agricultural and fisheries research and academic institution to identify the contributions related to Ganga. Information has been collected from various universities, fisheries and agricultural research institutions and from various national and international databases such as Proquest, Scopus, Science Direct, Google Scholar, etc. for technology set up the model has used Google Map, WordPress software and php language. By using those technologies the present

work attempts to create an information system for Ganga River under West Bengal jurisdiction.

The methodology is as follows:

1. Data is collected by survey method consulting various institutions and databases.
2. Design, installation and implementation of the information system.
3. Evaluation and testing of the system.

6.1 Data Collection

To find the relevant documents following databases have been consulted.

1. ProQuest
2. Science Direct
3. Google Scholar

Form the above source we have found 266 publications which are directly related with this work.

6.2 Data Analysis

The 266 sources of information have been analyzed and listed under various subject headings based on Indian Fishery Abstract, CIFRI (Table 1).

Table 1. Sources of information analyzed and listed under various subject headings

Subject Key Word	Articles	Subject Key Word	Articles
Aboveground biomass	1	Energy production	1
Agriculture	10	Environmental impact	1
Aila	2	Environmental pollution	1
Anthropogenic processes	2	Ethology	1
Antimicrobial resistance	1	Evolutionary Biology	1
Aquacorp production	1	Experimental Fishing	1
Aquaculture	12	Fish	3
Aquatic animal	4	Fish biodiversity	1
Arsenic	12	Fish Biology	15
Artificial feeding	1	Fish disease	1
Benthos	3	Fish food organism	1
Bioaccumulation	1	Fish pathology	15
Biochemistry	5	Fish Population	1
Biodiversity	32	Fish production	3
Biofertilizer	1	Fish Spawning	1
Biogeochemistry	2	Fish yield	1
Biology of aquatic animal	13	Fisheries extension	2
Brackish Water	3	Fisheries management	1
Breeding and development	7	Fishery	29
Chemical fertilizer	1	Fishery economy	10
Chemical weathering	1	Fishery management	4
Climate change	4	Fishing	10
Critical coastal issues	1	Fishing Economy	1
Culture of aquatic animal	5	Flowering plant	1
Discharge water	1	Food and feeding	3
Ecology	14	Food and Feeding Habit	4

Economy	6	Freshwater aquaculture	8
Ecosystem	1	Fresh water fish production	3
Embryology	1	Ganga River ecosystem	1
Geochemical process	1	Plankton	3
Geographic information system	5	Post harvest technology	1
Ground Water	3	Prawn production	4
Hemocyte	1	Remote sensing technology	3
Histology Taxonomy	1	Reservoirs	1
Hydrology	2	River Sediment	1
Information system	1	Riverbank erosion	1
Information technology	1	Rural Empowerment	1
Longitudinal composition	1	Sagar Island	1
M2 tide	1	Sea level	1
Macrophyte	2	Sediment pollution	2
Management	1	Sewage fed wetlands	1
Mangrove sediments	1	Snail farming	1
Mangrove	3	Soil chemistry	5
Metal contamination	1	Soil productivity	1
Microbiology	10	Sundarban sediment	1
Miscellaneous reports	1	Sundarbans	12
Mission Clean Ganga	1	Supplementary feeding	1
Molecular Biology	1	Taxonomy	2
Molecular biology	1	Toxicology	1
Morphodynamic	1	Tropic Structure	1
Morphology	1	Tropical cyclones	1
Nutrition	10	Urbanization	1
Organochlorine pesticide	1	Virulence factor	1
Ornamental fish	1	Water chemistry	17
Oxidation in Bay of Bengal	1	Water governance	1
Parasitology	1	Water management	2
Pen culture	2	Water Pollution	15
Pesticide	1	Wetland	15
Phosphate solubilizing bacterium	1	White spot disease	2
Physio-chemical status	1	Zooplankton	1
Physiology	1		

6.3 Design of the Information Retrieval System

The processes in designing the system have been represented in the Figure 1.

6.4 System Design

As per requirement of the system a plugin (Px-Z GMaps) in php language was designed to incorporate the Google Map technology. Since the idea was to allow others to use the facility an option to download the plug-in was provided. The plugin called 'Pix-Z GMap' is built to incorporate Google map with the system. The plugin is shown in the Figure 2.

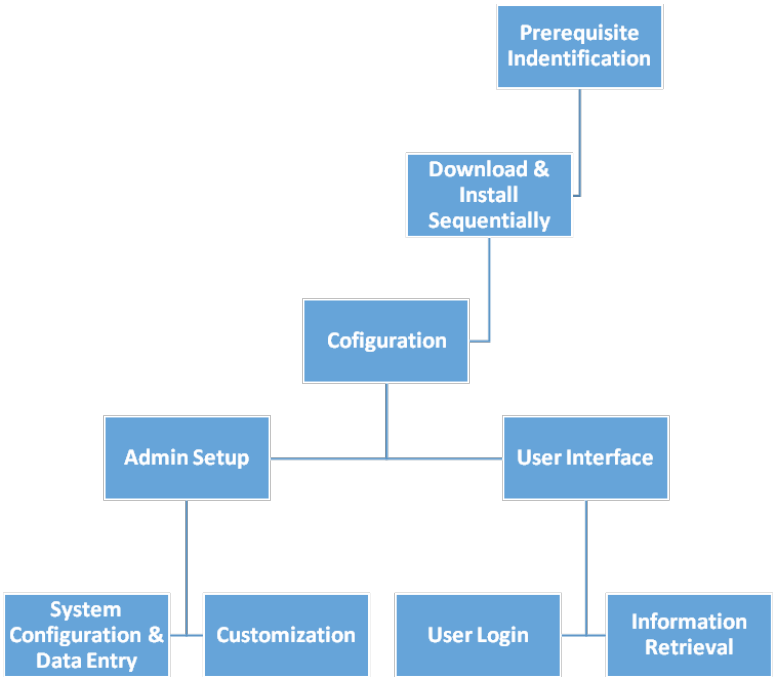

Figure 1. Processes in designing the system.

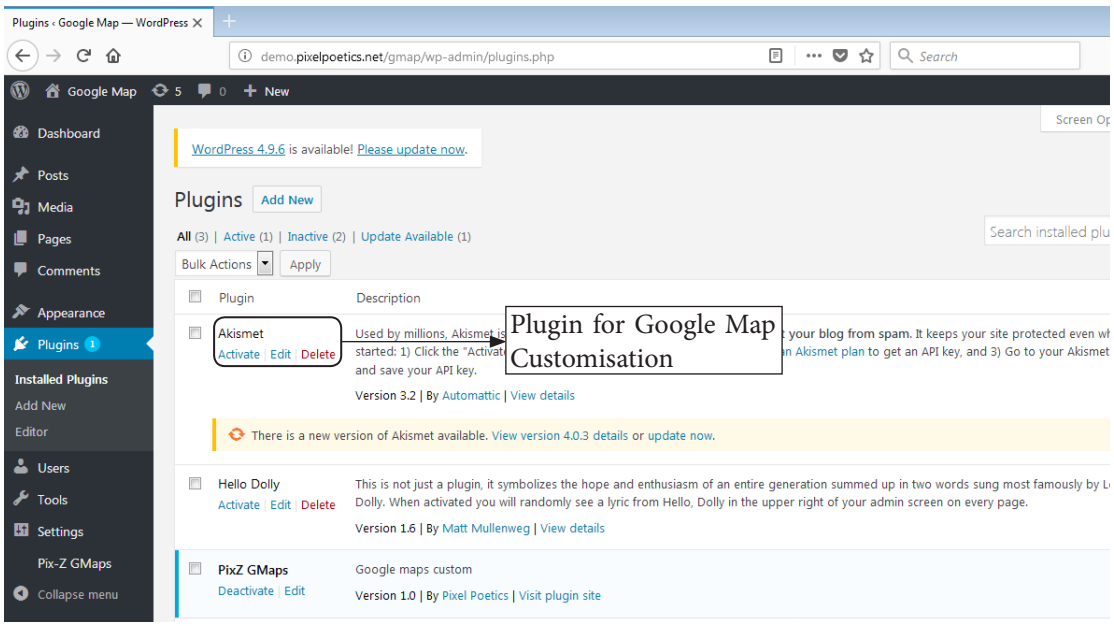

Figure 2. Plug-in home page.

6.5 Files under Plugins

The plug-in has multiple files all of which are stored in the wordpress plugin directory (/wp-content/plugin/). The plug-in has 15 php files and can be activated by clicking on the 'plugins' option. One of the files (Shortcodes. php) is used to display the map. This short code is a link, provided on every page in the wordpress to the map location page. When we login as admin and click on the title of the map location page, a page is displayed where we can add or modify the data. Here short code is linked with the map page. The short code is shown in Figure 3.

Once the plug-in is activated, clicking on 'Manage' will open the following page. A new map location page can be created by clicking on 'Add New' button and a wizard is opened. On those page details of map location page such as map title, short code, etc. are provided and saved.

6.6 Pix-Z GMaps

This plugin is also designed in php language as discussed above. In the map location page clicking on the map title will display in Figure 4. It is on this page that links to contribution related to Ganga in West Bengal are provided.

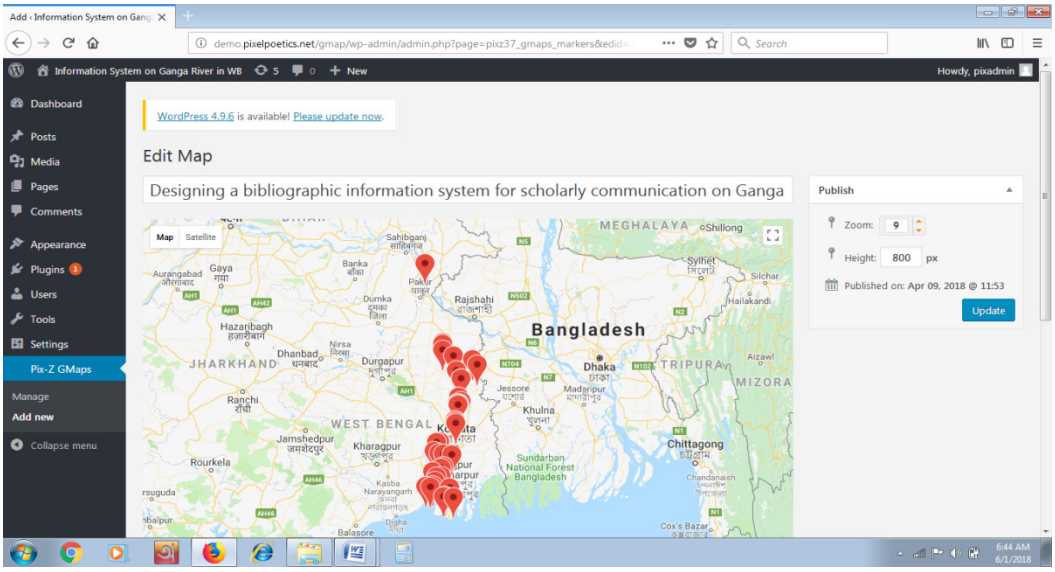

Figure 3. Admin page for data addition.

6.7 Testing and Evaluation of System

After installation of all prerequisites and activation of plugin the Google map is incorporated using that plugin. Now the system is ready to add the publications. With the sample data that was collected, several points are provided on the system. The system has also been tested for deletion, modification and alteration of added publication functions. The results with the sample data were satisfactory suggesting that the system works.

6.8 How it works

6.8.1 User Interface

This is interface from where user community can retrieve their required information. The URL of this interface is *"http://demo.pixelpoetics.net/gmap/"*. User can search required information using the provided search box. Again, they can also click on particular location to get the detailed information. The detailed procedures are explained in Figure 5.

6.8.2 On Mouse Click

User may click on the particular point to know the detailed contribution related to that particular location. On clicking on a particular point the related publications will appear. The result consists of title of the publication in red colour, bibliographical and geospatial information and the subject keywords. For example, by clicking the spot as shown in Figure 5, all the relevant bibliographic information will be displayed as shown in the box.

7. Conclusion

Due to the enormous growth of information and its scattered nature, the user community has to struggle to get their required information and sometimes they

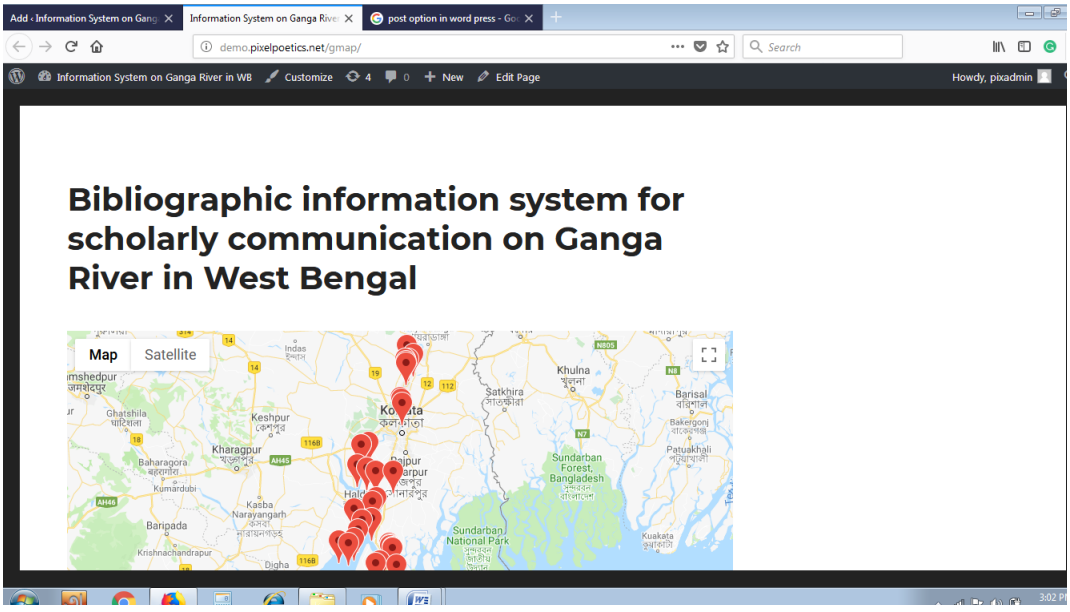

Figure 4. User interface.

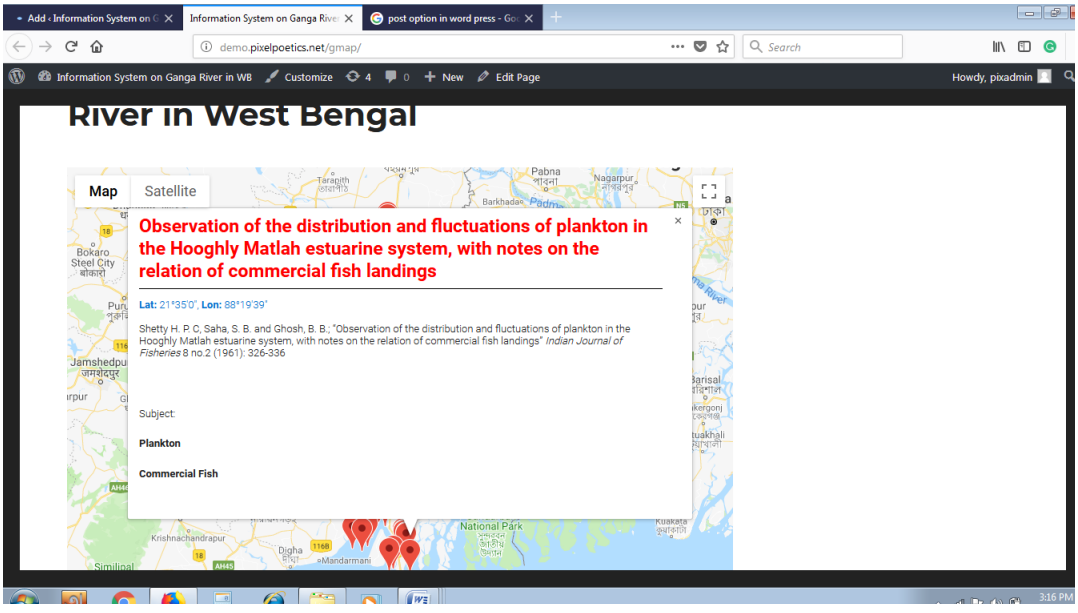

Figure 5. Result on mouse click.

become confused about which information is right and which is not. Institutions and organizations are trying to implement technologically advanced tools and techniques to satisfy the user demand.

Many researchers till doing their research on various issues related to Ganga. They Though Google has given access to search and retrieve a huge number of information sources, there are serious limitations. The user, more often than not, ends up with a large number of items for a single search. Scientists in Fishery research institutions, Oceanography study, Agricultural research institutions, etc. are contributing on Ganga. These contributions get published by the concerned institutions directly or in national and international journals, conference proceedings, etc. Since these are scattered in a variety of sources, user has to face difficulty to access the information. The work reported in this paper is aimed at addressing this problem. The present research tried to

follow the concept of conventional information system to design a model bibliographic information system by using Google Map and Wordpress software. There were difficulties in integrating the the different software and plugins. However, a system has been successfully designed. Specifically utilizing Google Map we have spotted various important locations of Ganga River in West Bengal jurisdiction related to which major contributions and published literature are available.

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