Automation of Global Telecommunication System Data Processing

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***Abstract*- The existing exchange of World meteorological organisation data is tedious as it involves coding and decoding of data. Whereas Global Telecommunication System augments the speed of data exchange in a user friendly manner. The Global Telecommunication System is defined as "The co-ordinated global system of telecommunication facilities and arrangements for the rapid collection, exchange and distribution of observations and processed information with the framework of world weather watch". Various parameters of atmosphere like temperature, humidity, sst etc can be extracted and displayed using different Global Telecommunication System formats like BUOY, SHIP, RADOB. As part of this programme Indian National Centre for Ocean Information Services is involved in data exchange of oceanographic data in Indian Ocean region. Presently the data exchange is happening by encoding and decoding the data with reference to Manual on Codes in American Standard Code for Information Interchange format. The main objective of this paper is to process and archive data in World meteorological organisation No. 306 prescribed format along with development of software for encoding and decoding of data in real-time. Indian National Centre for Ocean Information Services receives different types of data through Global Telecommunication System out of which the data from ocean stations/platforms have high priority like BUOY, SHIP, SYNOP, TESAC etc. Generating and publishing Global Telecommunication System data through WEB GIS, Global Telecommunication System data is downloaded from File Transfer Protocal using JAVA. Segregation is also done using JAVA. Then it is decrypted and stored in separate database using java. But there should be apache server in order to run the Map server which displays data on WEBGIS. The aim of this paper is to provide the data to end user with geospatial solutions, where the software provides the visualization of data and plotting data graphs based on user requirement**

***Key words* - Web GIS, Map Server, Global TELECOMMUNICATION SYSTEM, MY SQL**

INTRODUCTION

The Project aims to provide exchange of telecommunication data globally. Global Telecommunication System provides facilities and arrangements for the rapid collection, exchange and distribution of observations and processed information among different metrological and oceanographic centres [1,2,5]. Objective of paper is to store the data pertaining to various Parameters like humidity, air pressure etc in a database [7,9,6]. This is achieved by using My SQL Database for storing, querying and extracting data of from database. MYSQL queries allows anyone to extract the data relating to particular period of time for a particular area [3, 10,11]. Output for the query is provided in form of formats like data plots, image (gif,jpeg).The GLOBAL TELECOMMUNICATION SYSTEM data downloaded consists of many formats here the BUOY data is found using ZZYY it is code with which required format is matched. After the pattern matching the data is segregated and stored in separate table. Then after the data is decrypted and again stored in the database [4,8, 13].The data stored in the database is displayed on WEB-GIS where as the map server is the interface between the WEB GIS and database. But there should be Apache server to start the map server [12, 15].

If the user is willing to get details of particular data he need to enter the details then after map server interacts with database and makes the data to display on WEB-GIS where the WEB-GIS allows only one layer so open layers are used so that more than one layer gets open in it[14,16,18].Design a system development program based on open source WebGIS which is of high-efficiency and low-cost. The core of system which uses My SQL as database is Map Server [17,19].

METHODOLOGY

To design, implement and test Web GIS, the following steps have been taken:

1. **Knowledge on data acquisition:**
   Here the data is downloaded to the system from FTP where FTP gets data from radar.
2. **Data analysis, data storage and software choice:**
   After downloading the data it is pushed to database. Here the data base used is MYSQL server.
3. **Data processing and software testing:**
   In this system data in database is again processed so that the GLOBAL TELECOMMUNICATION SYSTEM data extraction is done i.e. segregation of different formats of data is done here (BUOY, SHIP, RADOB…..etc)
4. **Web GIS files Implementation and data loading:**

The segregated data is displayed on WEB GIS as reporting's the user can access any report to get its details in pictorial form.

PROJECT FLOW:

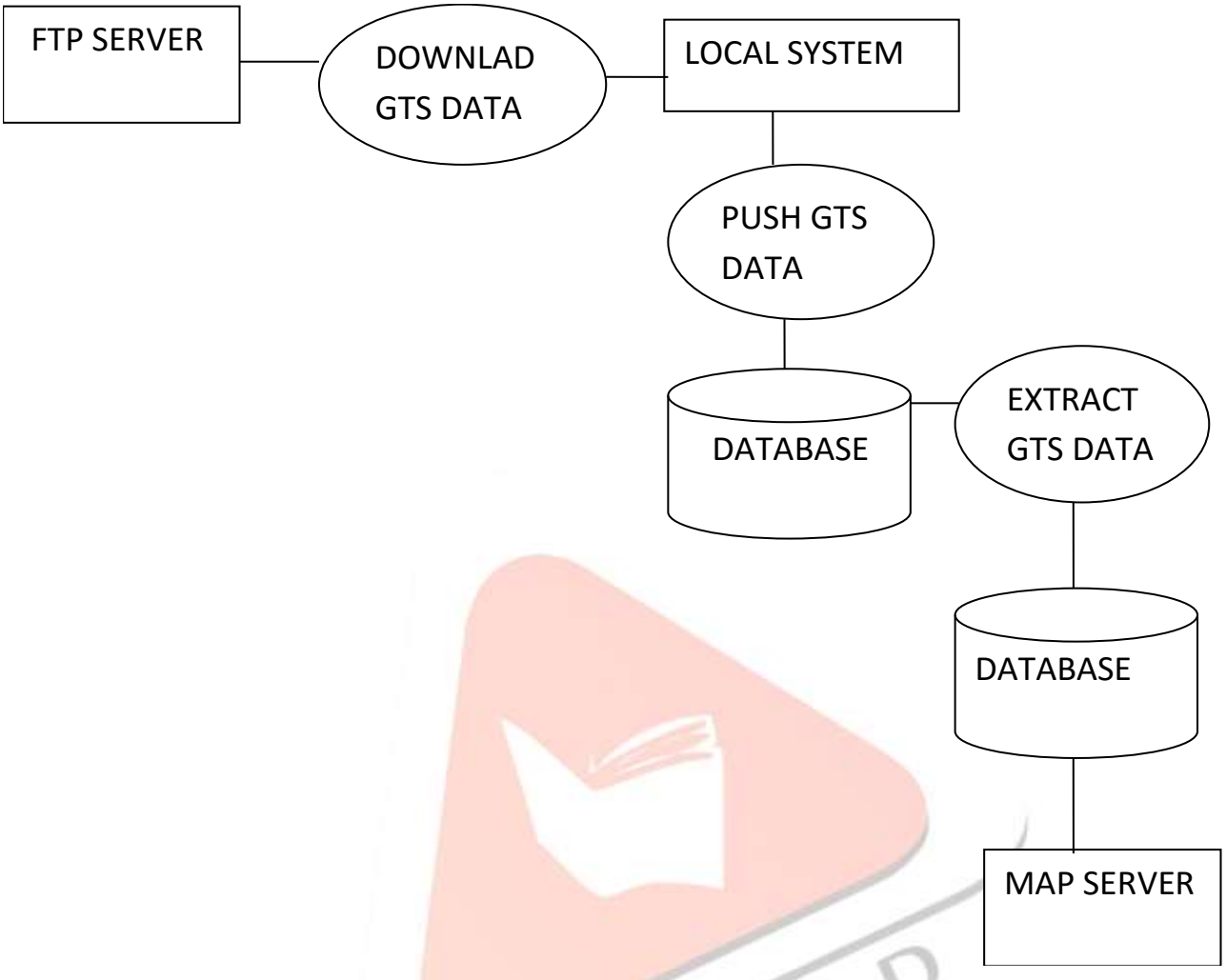

Fig: 1 Methodology flow chart

EXPERIMENTAL WORK:

Different components/modules involved in the developed system, i.e.

1. Acquisition of data through FTP.
2. Extraction of the download data based on the patterns.
3. Segregation and storing data into database.
4. Web GIS interface.

First the Global Telecommunication System data is downloaded to the local system from ftp using java script JavaScript sample code for downloading global telecommunication system data from ftp.

Then after the data is segregated as the data downloaded contains several formats like SHIP, BUOY, and RADOB. The separation is done using java.

After the segregation the BUOY data is again stored in database. The BUOY data is in encrypted form it need to be decrypted which is done using JAVA SCRIPT. This decrypted data is again stored in database.

The data in database will get displayed on map server using SQL Commands where Apache server is interface.

MAP SERVER:

i) Map server is an open source development environment for spatially- enabled internet applications. It can run as a CGI programme or via Map Script, with several programming languages.

ii) This map server is used for displaying Global Telecommunication System data in it.

MAPSERVER can display GLOBAL TELECOMMUNICATION SYSTEM data in one layer only. So the open layers are used in Map Server which is used for displaying data in more than one layer.

OPEN LAYERS:

Open Layers is a pure JavaScript library for displaying map data in most modern web browsers, with no server-side dependencies. Open Layers implements a JavaScript API for building rich web-based geographic applications, similar to the Google Maps and MSN Virtual Earth APIs.

CREATING HTML PAGE:

Building an Open Layers viewer requires crafting HTML in which viewer will be seen. Open Layers supports putting a map inside of any block level element – this means that it can be used to put a map in almost any HTML element on your page.

RESULTS AND DISCUSSION:

When user open the website of INCOIS for weather report it shows the BUOY file which designed into excel format and shows the data in different colours mainly white and red. White indicates data available for user need and red indicates data is not reported. so it is easy to access for user required data. Here time is sufficient for all users.

Providing the BUOY reports so that user gets an idea about its reporting. Report in red colour says the buoy data is not reporting since 7 days.

Wmo Id	Last Reported Time	Last Reported Latitude	Last Reported Longitude
11902	2014-07-07 03:00:00	14.809	49.818
11905	2014-07-07 03:00:00	16.632	64.894
11906	2014-07-07 03:00:00	14.190	56.950
11907	2014-07-07 03:00:00	15.125	59.380
11909	2014-07-07 03:00:00	13.405	55.531
11910	2014-07-07 03:00:00	15.220	57.394
11926	2014-07-07 03:00:00	15.674	60.695
13001	2014-07-06 23:00:00	11.467	-22.989
13002	2014-07-07 03:00:00	20.435	-23.141
13008	2014-07-07 03:00:00	14.972	-38.015
13009	2014-07-07 03:00:00	7.921	-38.102
13010	2014-07-07 01:00:00	.009	.013
13517	2014-06-13 17:22:00	8.401	-53.709
13518	2014-07-07 01:17:00	24.583	-46.637
13520	2014-07-07 03:12:00	30.489	-29.200
13522	2014-07-07 02:52:00	21.713	-66.186
13524	2014-07-07 02:52:00	23.769	-58.719

Fig: 2 BUOY data

Last reported BUOY gives the details of BUOY which is reported at last. Last received time says about the particular BUOY which is reported at last (its time).

ACCESSING THE BUOY:

Whenever user need to get information about particular BUOY a click should be given on it so that a window is opened.

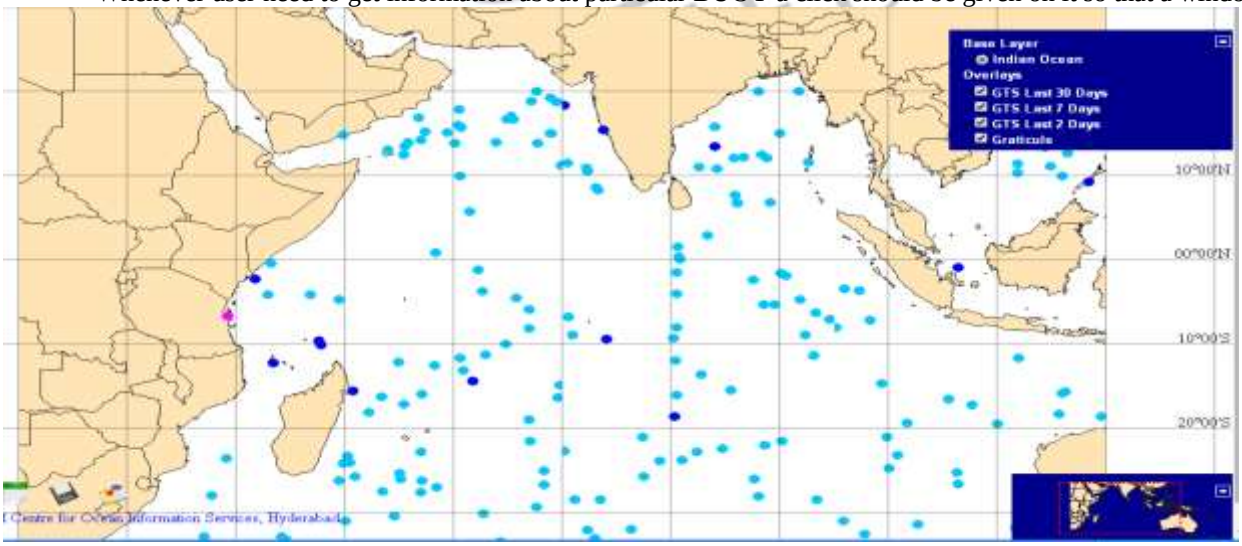

Fig: 3 Web GIS to Publish Buoy Locations

Latitude, longitude values gives location of particular BUOY.

DATA PLOTS:

It gives the pictorial representation of BUOY data for this purpose CHARTDIRECTOR is used.

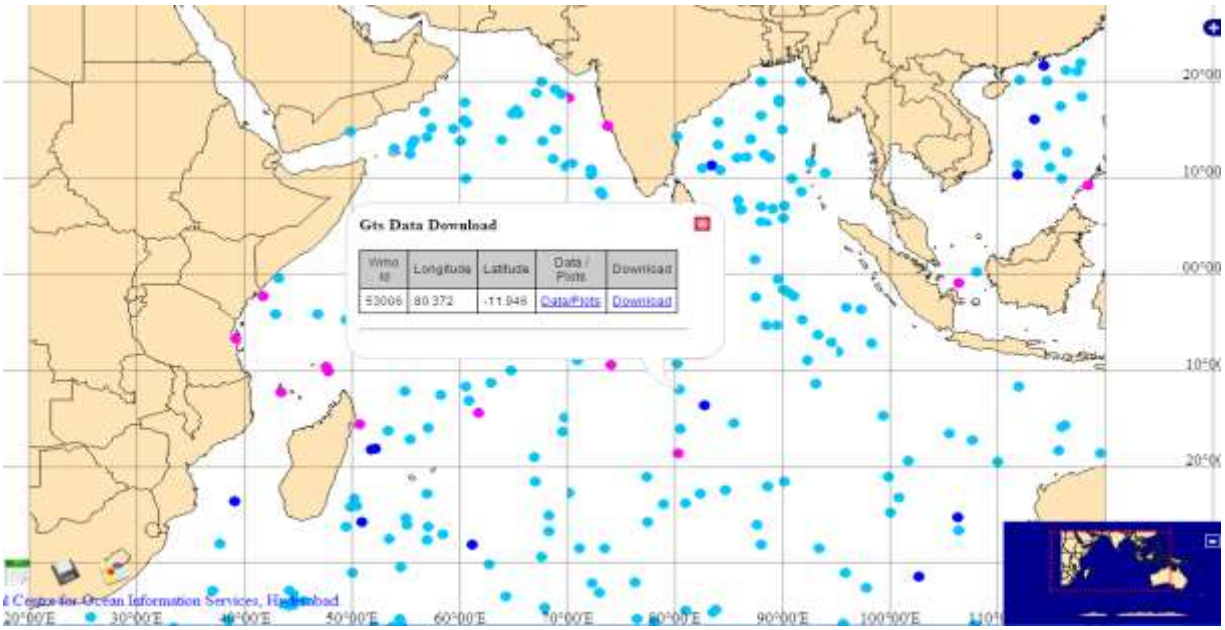

Fig: 4 Data plots

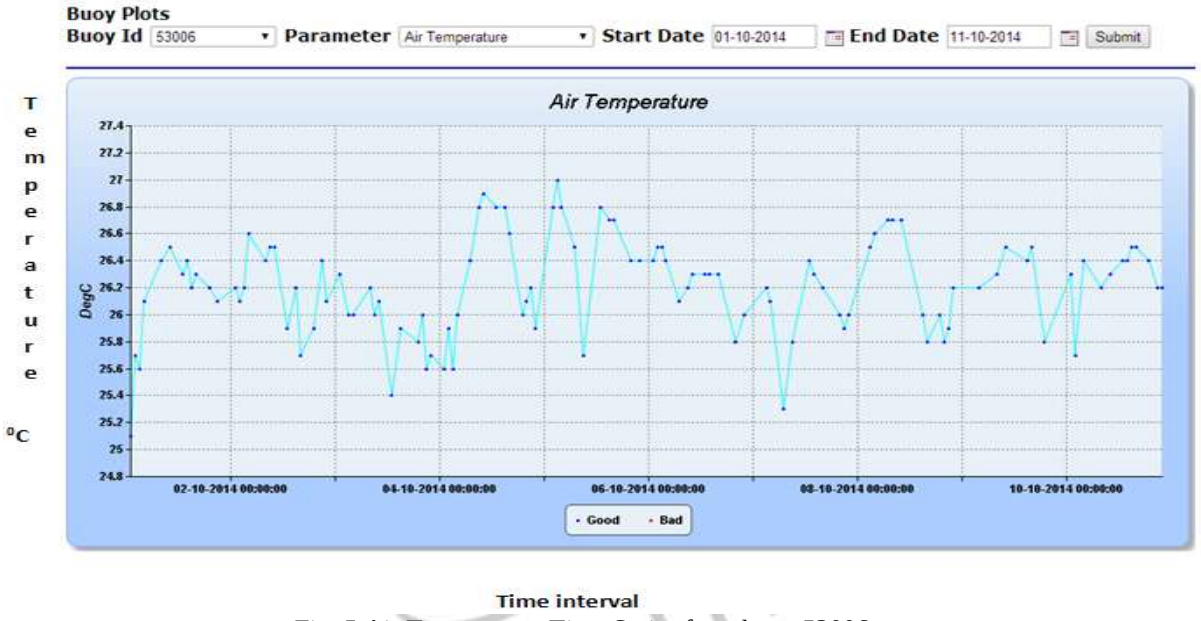

Fig: 5 Air Temperature Time Series from buoy 53006

Fig: 6 Humidity Time Series from buoy 53006

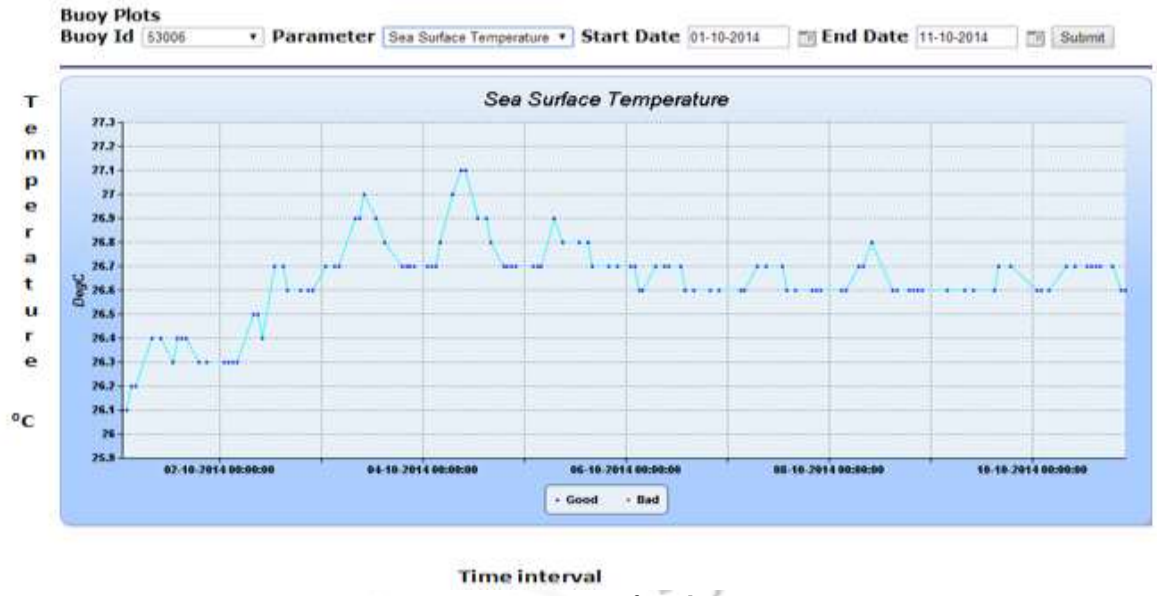

Fig: 7 SST Time Series from buoy 53006

If the data is not present in the user requested date the graph obtained will be empty.
After entering the time interval user can also download the data in spread sheet format as below.

	A	B	C	D	E	F	G	H
1	WMO ID	OBS TIME	AIR PRESSURE	AIR TEMPERATURE	HUMIDITY	WIND SPEED	WIND DIRECTION	SST
2	53006	1/10/2014 1:00	1010.3	25.1	93	7.2022	130	26.1
3	53006	1/10/2014 2:00	1010.6	25.7	91	8.2311	110	26.1
4	53006	1/10/2014 3:00	1011.3	25.6	91	8.2311	130	26.2
5	53006	1/10/2014 4:00	1011.5	26.1	90	7.7167	120	26.2
6	53006	1/10/2014 8:00	1009.6	26.4	89	6.6878	120	26.4
7	53006	1/10/2014 10:00	1008.7	26.5	90	6.6878	130	26.4
8	53006	1/10/2014 13:00	1010.4	26.3	91	7.2022	130	26.3
9	53006	1/10/2014 14:00	1011.1	26.4	91	7.2022	120	26.4
10	53006	1/10/2014 15:00	1011.3	26.2	92	7.7167	120	26.4
11	53006	1/10/2014 16:00	1011.7	26.3	92	7.2022	110	26.4
12	53006	1/10/2014 19:00	1010.6	26.2	91	6.6878	110	26.3
13	53006	1/10/2014 21:00	1009.7	26.1	91	5.1444	110	26.3
14	53006	2/10/2014 1:00	1010.5	26.2	92	4.63	120	26.3
15	53006	2/10/2014 2:00	1011.6	26.1	92	5.6589	130	26.3
16	53006	2/10/2014 3:00	1012.2	26.2	92	4.63	120	26.3
17	53006	2/10/2014 4:00	1012.5	26.6	90	5.1444	110	26.3
18	53006	2/10/2014 8:00	1010.1	26.4	90	7.2022	120	26.5
19	53006	2/10/2014 9:00	1009.9	26.5	89	6.6878	120	26.5
20	53006	2/10/2014 10:00	1009.8	26.5	89	7.7167	130	26.4
21	53006	2/10/2014 13:00	1011	25.9	92	9.26	120	26.7
22	53006	2/10/2014 15:00	1012	26.2	90	8.7456	120	26.7
23	53006	2/10/2014 16:00	1012.2	25.7	91	9.7744	100	26.6
24	53006	2/10/2014 19:00	1011.2	25.9	93	7.2022	120	26.6

FIG: 8 Global Telecommunication System data output file

To know about the atmospheric data parameters it can be used in such a way that user can get details in pictorial form and spread sheet form**.**

Number of Records of 53006: It makes the user to know about the no of records pertaining to particular id with in the organisation. User can know such details in database command prompt.

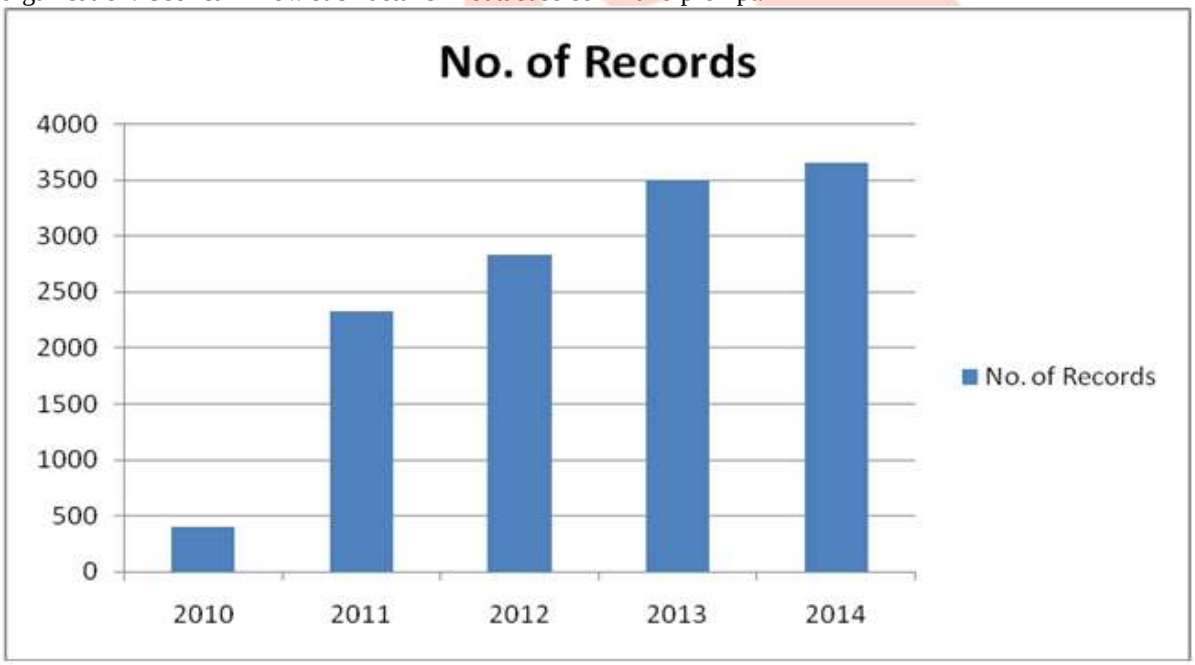

Fig:9 No of records of 53006

CONCLUSION:

The main theme of the paper Automation of Global Telecommunication System Data Processing is to make the user to know about the global telecommunication system parameters of particular area. This software has successfully met the specification given by organization. This software was designed in such a way that any person authorized could use it with little or no training. Appropriate measures have been taken to allow future modifications and extensions. For this, the software has been divided into modules. The software was designed in such a way that changes in any module do not affect the whole product. The software can be implemented on any windows editions (XP or higher) and run successfully. This project can be extended very easily under the supervised training.

The developed tool can be considered a didactic and easily accessible for the study of Global Telecommunication System parameters. However, Web GIS is always open to future improvements, both for data increasing or updating. That also can be extended for new functions/tasks. These improvements are obviously necessary for a real and continuous use of Web GIS.

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