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Appendices

Appendix A1: User manual

Introduction

Investigation of possible location of seismic station and study the method of data management system for maintaining those and existing data are aims of the present study. The seismic activity of inland and offshore of Sri Lanka is studied. We carry out preliminary planning that is necessary to set up a Seismic Network System in Sri Lanka. Method of seismic data collection for present study, the location of seismically active regions and the distance from the events to selected regions of Sri Lanka were analyzed and suitable locations for seismic stations were proposed using the analyzed data.

The suitable locations for seismic stations were proposed using the analyzed data. A seismic data management system and analyzing system for seismological data collected in the local seismic network are also discussed. For this purpose, QlickView software is used to analyze and present data in various patterns. Further, we discussed the method of maintaining a seismological database for efficient and effective querying and a seismological data warehouse for the analyzing processes and data mining using SQL server.

First data from various networks are stored in data warehouse. Visualizations of various cross sections, map views, depth variations, magnitude variations are done. Icons can be selected just click from the documents given below.

Keys available in the program are given below.

Details – Detailed list of database is available with name of the catalogue, timekey, latitude, longitude, depth, magnitude type, magnitude range and depth range.

Map view- Clicking this item epicenter distribution of earthquakes in map view of a given region can be plotted. Measure type, earthquake catalogue, magnitude and depth can be selected.

Cross sections – cross section of a given region can be plotted with number of earthquake that occurred in the region. Measure type, earthquake catalogue, magnitude and depth can be selected the graph – Type of the graph can be selected.

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Magnitude range – Using this selection, magnitude range can be selected.

Type of the magnitude – Magnitude range canbe selected.

Earthquake catalogue – Earthquake catalogue can be selected

Depth range – depth range can be calculated

Measure type – measure type of magnitude can be calculated.

Appendix A2: Test Plan

Introduction

The purpose of this Test Plan is to prescribe the scope of the testing activities for analyzing earthquake occurring in and around Sri Lanka.

Outline

The test Plan document has following structure.
1. Test Plan identifier
2. Introduction
3. Test Items
4. Features to be tested
5. Features not to be tested
6. Approach
7. Item pass/Fail Criteria
8. Suspension criteria and Resumption
9. Test deliverables
10. Testing tasks
11. Environmental needs
12. Responsibilities

1. Test plan Identifier

    The test plan identifier will be a unique as specified in the SIDW guidelines for earthquake data around Sri Lanka.

2. Introduction

    2.1 Objectives : This test plan consists of following objectives

    (1) facilitate for analyzing historical data
    (2) facilitate for analyzing recent data
    (3) sending earthquake warning Alert to mobile phones (registered uses only)

    2.2 Background:
    This Master Test Plan was created to provide a concrete example of a mapping from the SIDW. Such a concrete mapping is essential to assure completeness of the testing Guidelines document set. It also includes testing real time data plotting and test earthquake alert.

    2.3. Scope:

    The test plan for each category includes functionality testing of the application entities, mining data around Sri Lanka from SIDW, analyzing historical and recent

data plot third normal form regression line between the depth and the magnitude.

3. Test Items

   The item is tested for interconnectivity with SIDW.

4. Features to be tested

   The following features will be tested.
   Represent details of earthquake data around Sri lanka
   Cross section of the selected data
   Trend of the graph

5. Features not to be tested

   The functionality and interoperability of the application software in either of the system under will not be evaluated.

6. Approach

   The QlickView software is used and should be familiar to use the software.
   Functional testing of the application entities should be done.
   Functionality of input and output data should be tested. Since separated data from different network are used inserting and data mining process should be tested.
   Analyze historical and recent data.
   Plot third normal form regression line between the depth and the magnitude.
   Use a test event and test the earthquake alert is sent to registered people in the area.

7. Item pass/Fail Criteria

   For each test, the operational level should take place in proper sequence.
   100% of unit tests have been peer-reviewed and More than 95% test are executed
   Planned number of bugs expected to be found in integration test has been agreed and did not exceed planned number by more than 10%. If the depth levels <4 disappear a proper graph.

8. Suspension criteria and Resumption requirements

   Suspension criteria:
       A number of issues rose exceeding planned issue level, particularly if these are mostly high in terms of severity.
   Resumption requirements: if new functionality is released to test that permits feed more than four depth levels to plot the graph.

9. Test deliverables

   Test plan
   User manual
   Test Input Data and test Output Data

Appendix A3: Test Data

Tested historical data and recent data

1. historical Data –may 2011 magnitude 4-5 , region 33, depth 0-33 km

EQCatalog	Time Key	latitude	longitude	depth	code	region	Magnitude Type	Magnitude	Magnitude Range	Depth Range	dataset
NEIC_PDE/NEIC_PDE-W	3/2/2012 6:27:11 AM	5.1520	70.0860	10.0	426	33	MB	4.7	4 - 5	0 - 33	1
NEIC_PDE/NEIC_PDE-W	3/16/2012 8:06:36 AM	7.2320	67.6470	10.0	429	33	MB	4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC_PDE-W	3/17/2012 3:11:27 PM	3.7810	63.5130	10.0	421	33	MB	4.9	4 - 5	0 - 33	1
NEIC_PDE/NEIC_PDE-W	3/17/2012 3:12:07 PM	3.7700	63.3770	10.0	421	33	MB	4.8	4 - 5	0 - 33	1
NEIC_PDE/NEIC_PDE-W	3/17/2012 3:18:34 PM	3.7230	63.3770	10.0	421	33	MB	4.9	4 - 5	0 - 33	1

Output data

Cross section
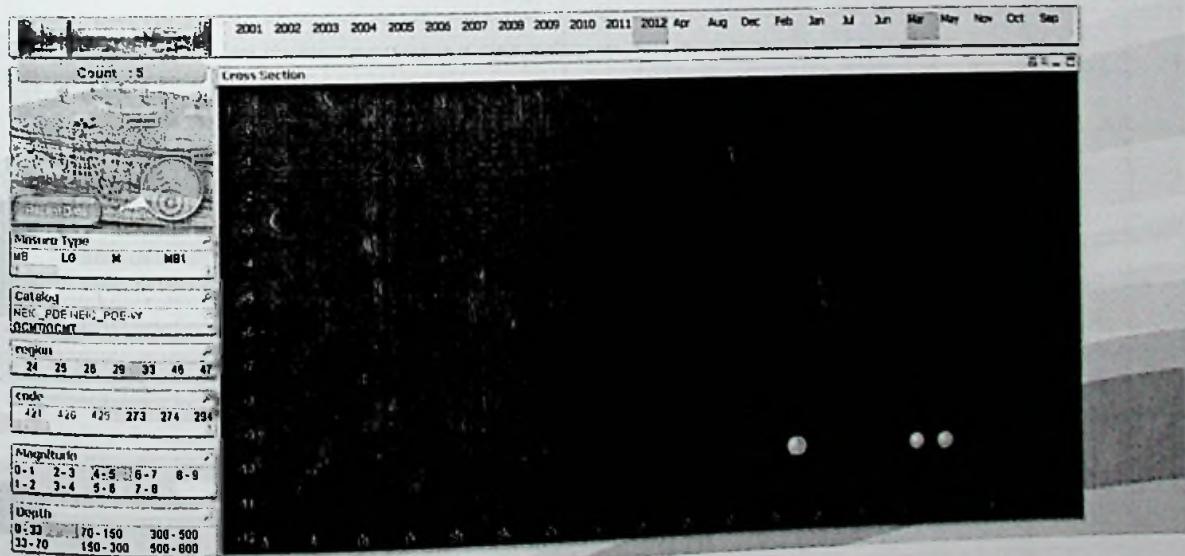
Trend of the graph
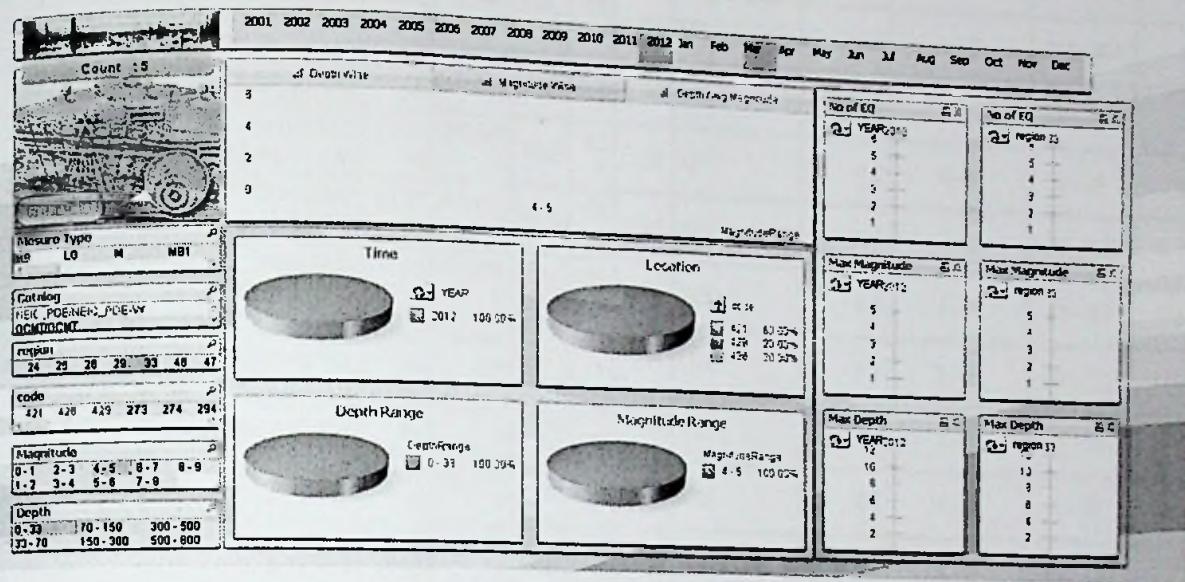
1. historical Data – year 2012 and magnitude range 4-5

EQCatalog	Time Key	latit ude	longi tude	de pt h	co de	reg ion	Magnitu de Type	Magn itude	Magnitud e Range	Depth Range	dat aset
NEIC_PDE/ NEIC_PDE- Q	9/1/2012 11:26:43 PM	2.88 30	93.68 40	10. 0	70 5	46	MB	4.4	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/2/2012 12:49:56 AM	- 5.520 0	68.587 0	10.0	42 6	33	MB	4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/3/2012 11:04:08 PM	1.013 0	91.751 0	10.0	42 0	33	MB	4.4	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/4/2012 2:59:05 AM	0.049 0	92.194 0	35.0	70 5	46	MB	4.5	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/4/2012 6:39:10 PM	4.768 0	96.184 0	52.5	70 6	46	MB	4.7	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/6/2012 6:27:11 PM	25.45 50	91.208 0	45.1	31 5	26	MB	4.5	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/7/2012 12:55:45 AM	0.095 0	98.600 0	47.3	70 6	46	MB	4.5	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/7/2012 6:58:58 AM	- 6.877 0	72.179 0	10.0	42 6	33	MB	5.2	5 - 6	0 - 33	1
NEIC_PDE/NEIC	9/7/2012	1.274	91.778	10.0	42	33	MB	4.6	4 - 5	0 - 33	1

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_PDE-Q	7:31:14 PM	0	0		0						
NEIC_PDE/NEIC _PDE-Q	9/8/2012 7:18:17 AM	6.566 0	95.580 0	248.7	70 4	46	MB	4.6	4 - 5	150 - 300	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 6:19:20 AM	13.64 30	92.848 0	30.5	70 3	46	MB	4.9	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 12:14:00 PM	2.553 0	89.893 0	10.0	42 0	33	MB	4.2	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 1:11:31 PM	10.35 80	93.475 0	35.0	70 3	46	MB	4.2	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 1:16:23 PM	10.39 70	93.408 0	50.0	70 3	46	MB	4.5	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 2:35:42 PM	10.45 90	93.616 0	38.7	70 3	46	MB	5.2	5 - 6	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 6:52:18 PM	10.54 80	93.673 0	60.3	70 3	46	MB	4.4	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 7:08:47 PM	0.869 0	92.742 0	27.0	70 5	46	MB	4.8	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 9:38:21 PM	10.43 30	93.423 0	55.0	70 3	46	MB	4.6	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/10/2012 11:14:31 PM	0.527 0	98.496 0	54.0	70 6	46	MB	4.8	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 2:24:08 AM	3.471 0	92.768 0	10.0	70 5	46	MB	4.9	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 3:20:18 AM	24.69 70	99.316 0	10.0	31 8	26	MB	4.6	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 3:21:21 AM	24.64 90	99.272 0	10.0	31 8	26	MB	5.0	5 - 6	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 11:09:46 AM	23.80 30	94.382 0	50.5	29 4	25	MB	4.8	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 12:35:27 PM	2.265 0	89.810 0	10.0	42 0	33	MB	4.4	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/11/2012 6:09:49 PM	24.41 00	93.530 0	60.4	29 4	25	MB	4.5	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/13/2012 3:04:45 PM	3.458 0	92.728 0	10.0	70 5	46	MB	4.6	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/14/2012 4:51:47 AM	-3.319 0	100.59 40	19.0	27 4	24	MS	6.3	6 - 7	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/14/2012 9:09:51 PM	-14.41 20	66.194 0	10.0	42 9	33	MB	4.4	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/16/2012 6:07:26 AM	3.583 0	90.125 0	10.0	70 5	46	MB	4.9	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/16/2012 4:17:23 PM	0.488 0	96.900 0	16.3	70 5	46	MB	4.8	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/16/2012 8:28:57 PM	0.509 0	96.895 0	35.0	70 5	46	MB	4.3	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/17/2012 7:43:24 PM	3.144 0	92.819 0	10.0	70 5	46	MB	4.3	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/17/2012 11:28:36 PM	23.34 50	100.14 90	10.0	31 8	26	MB	4.3	4 - 5	0 - 33	1

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|											
NEIC_PDE/NEIC _PDE-Q	9/18/2012 9:35:03 AM	0.5000	96.8550	35.0	705	46	MB		4.7	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/18/2012 3:59:36 PM	3.7640	92.6400	3.3	705	46	MB		4.7	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/19/2012 6:28:34 AM	22.0350	93.8810	72.3	294	25	MB		4.6	4 - 5	70 - 150	1
NEIC_PDE/NEIC _PDE-Q	9/20/2012 12:20:32 AM	0.0550	92.1260	10.0	705	46	MB		4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/20/2012 6:54:31 AM	2.6730	95.5110	35.0	705	46	MB		4.0	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/20/2012 8:47:46 PM	-0.0650	98.8170	72.1	274	24	MB		5.3	5 - 6	70 - 150	1
NEIC_PDE/NEIC _PDE-Q	9/22/2012 6:07:56 PM	5.0340	94.5500	53.1	706	46	MB		4.6	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/22/2012 8:42:48 PM	25.4590	96.6820	42.8	296	25	MB		4.6	4 - 5	33 - 70	1
NEIC_PDE/NEIC _PDE-Q	9/22/2012 9:10:01 PM	1.8430	89.5660	10.0	420	33	MB		4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/24/2012 10:14:39 AM	1.3280	99.0080	111.4	706	46	MB		4.8	4 - 5	70 - 150	1
NEIC_PDE/NEIC _PDE-Q	9/25/2012 1:41:42 AM	-5.3630	68.5360	10.0	426	33	MB		4.4	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/25/2012 2:06:18 PM	1.5460	95.0640	10.0	705	46	MB		4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/27/2012 4:01:53 PM	-2.7640	68.0540	10.0	421	33	MB		4.7	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/27/2012 5:56:19 PM	-3.7240	67.9120	10.0	421	33	MB		4.2	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/28/2012 6:57:09 AM	-3.4720	68.3370	10.0	426	33	MB		4.6	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/28/2012 7:30:12 PM	4.9060	93.9200	20.5	705	46	MB		4.3	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/29/2012 11:24:32 AM	6.1070	92.7800	23.2	704	46	MB		5.3	5 - 6	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/29/2012 8:19:09 PM	2.4720	98.4290	104.2	706	46	MB		4.8	4 - 5	70 - 150	1
NEIC_PDE/NEIC _PDE-Q	9/30/2012 12:02:25 AM	-4.2910	80.8020	10.0	425	33	MB		4.5	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/30/2012 1:52:25 AM	2.6100	89.7010	10.0	420	33	MB		4.9	4 - 5	0 - 33	1
NEIC_PDE/NEIC _PDE-Q	9/30/2012 8:43:38 PM	2.5210	89.9390	15.0	420	33	MB		4.7	4 - 5	0 - 33	1

Output data

Cross section
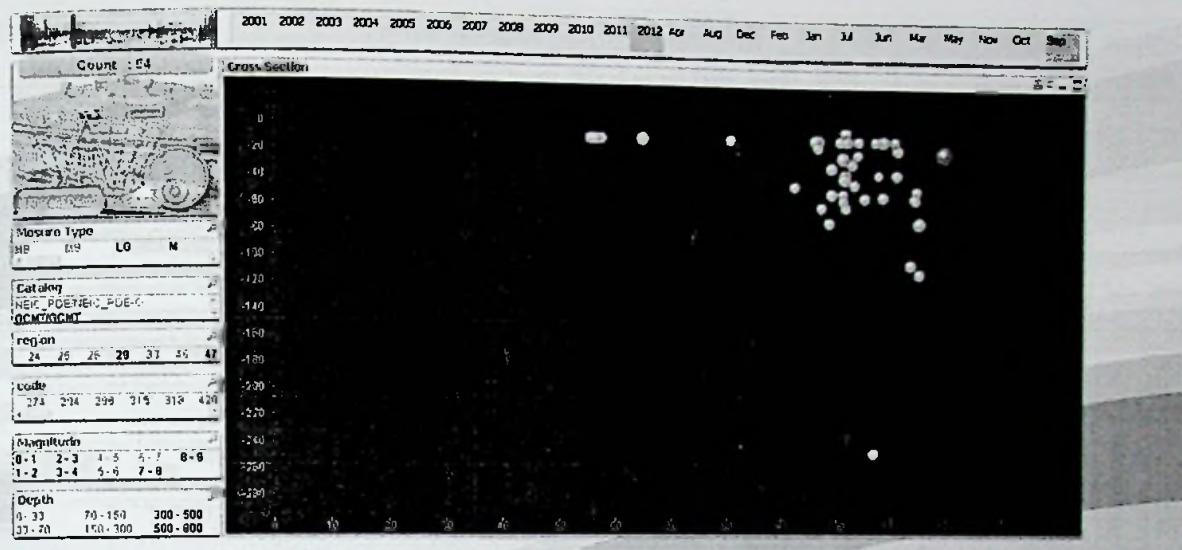
Trend of the graph
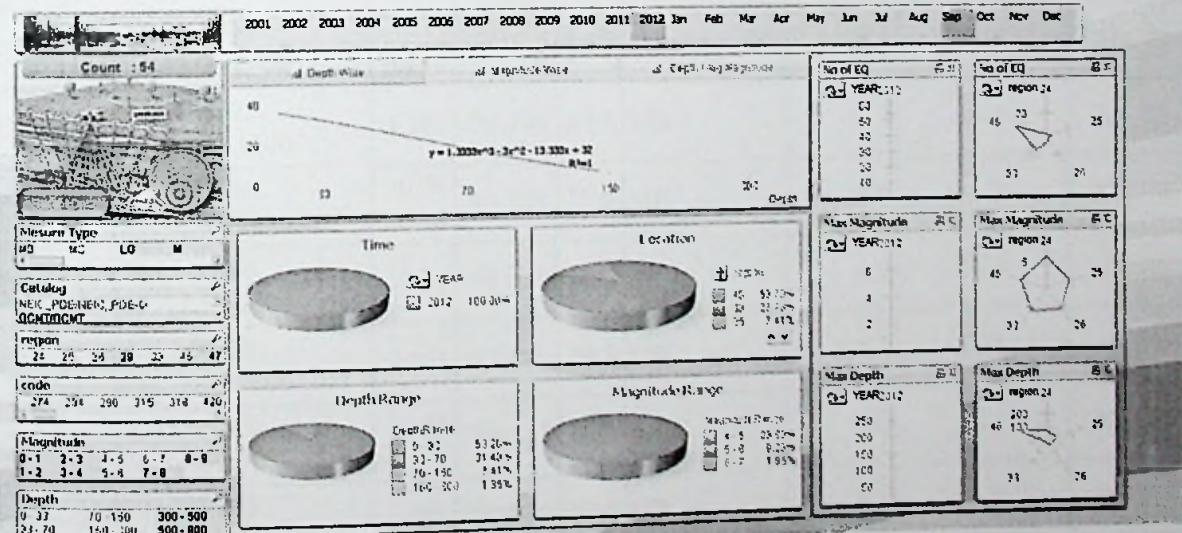
Recent Data

From   02 may to 19 may, 2013

EQCata log	Time Key	latitu de	longitu de	dept h	Magnitude Type	Magnit ude	Magnitude Range	Depth Range
QED	2013/05/19 07:49:12.0500	5.111	94.29	60.3	MB	4.7	4 - 5	33 - 70
QED	2013/05/17 21:27:56.0600	1.359	98.946	115.8	MB	4.2	4 - 5	70 - 150
QED	2013/05/16 01:11:28.1700	0.041	100.393	157.2	MB	4.7	4 - 5	150- 300
QED	2013/05/15 10:22:17.0700	1.059	97.44	41.7	MB	4.8	4 - 5	33 - 70
QED	2013/05/15 09:48:35.4000	1.063	97.397	34.2	MB	4.6	4 - 5	33 - 70
QED	2013/05/14 19:18:16.4800	0.747	92.46	11.5	MB	5.6	5 - 6	0 - 33
QED	2013/05/10 22:11:15.0100	21.908	94.716	109.5	MB	4.3	4 - 5	70 - 150
QED	2013/05/10 13:06:48.6500	- 6.175	103.67	26.5	MB	4.8	4 - 5	0 - 33
QED	2013/05/07 22:35:39.6600	1.428	98.246	73.0	MD	4.0	4 - 5	70 - 150
QED	2013/05/07 12:43:05.6700	- 5.196	101.969	38.3	MB	4.4	4 - 5	33 - 70
QED	2013/05/07 10:09:50.1500	4.283	96.196	42.9	MB	4.5	4 - 5	33 - 70
QED	2013/05/06 20:18:04.7100	20.708	99.791	37.0	MB	4.9	4 - 5	33 - 70
QED	2013/05/06 13:47:57.7600	-7.25	68.128	10.0	MB	4.3	4 - 5	0 - 33
QED	2013/05/04 08:21:49.1800	2.263	93.051	29.5	MB	4.7	4 - 5	0 - 33
QED	2013/05/03 04:16:09.7000	12.887	93.333	62.7	MB	4.5	4 - 5	33 - 70
QED	2013/05/03 03:25:43.5600	5.876	92.588	10.0	MB	4.3	4 - 5	0 - 33
QED	2013/05/02 19:40:52.4800	2.747	91.57	15.0	MB	5.3	5 - 6	0 - 33

Output data

Cross section
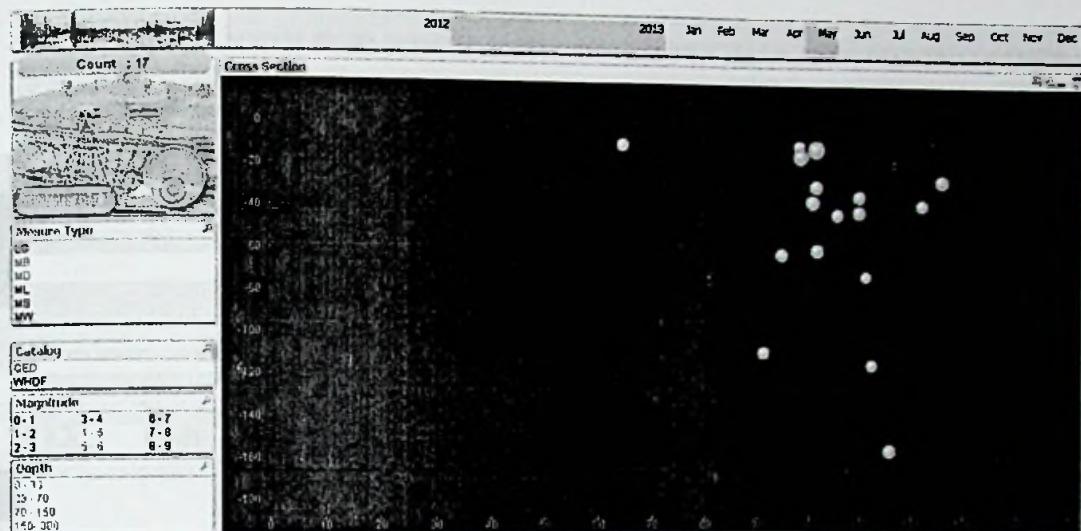
Trend of graph
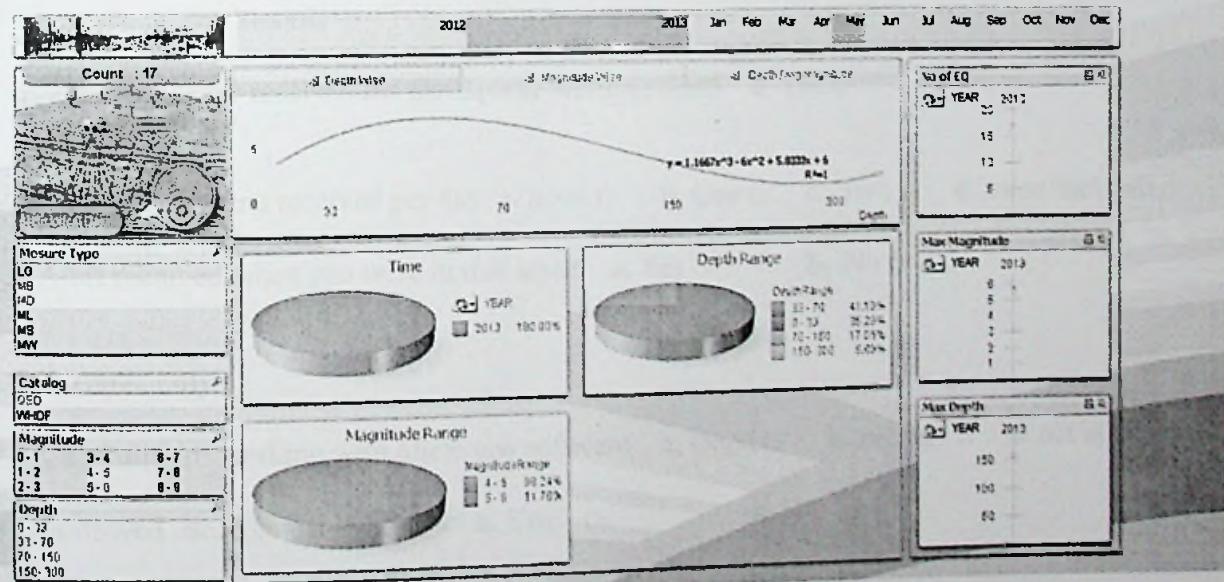
Appendix A4: Questionnaire

QUESTIONNIRE FOR RECIEVERS OF EATHQUAKE WARNING MESSAGE

Please answer all questions and tick (√) the appropriate boxes where necessary

Part A: Personal Details

1. Name:

2. Gender: **a.** Male ☐   **b.** Female ☐

3. Occupation   **a.** Yes ☐   **b.** No ☐
   if occupied

   Status of the occupation:
                    a. Public sector ☐   **b.** government sector ☐

4. Type of your Mobile phone: **a.** mobitel ☐   **a.** dialog ☐   **c.** airtel ☐   **d.** other ☐

Part B: Research Details

4. Have you ever received the earthquake warning alert?   **a.** Yes ☐   **b.** No ☐
   if yes

   How many alerts received per day: **a.** none ☐   **b.** One ☐   **c.** Two ☐   **d.** more than two ☐

6. Alert received when you were in risk area?   **a.** Yes ☐   **b.** No ☐

Researches only

7. Capability of working with qlickveiw software   **a.** Good ☐   **b.** average ☐   **c.** not at all ☐

8. Followed user manual   **a.** Yes ☐   **b.** No ☐

9. Could select time period   **a.** Yes ☐   **b.** No ☐

10. Could select depth range   **a.** Yes ☐   **b.** No ☐

11. Could select magnitude range   **a.** Yes ☐   **b.** No ☐

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12. Speed of the functions   **a.** Very good ☐   **b.** Good ☐   **c.** Average ☐   **d.** Week ☐

13. Appearance of the site   **a.** Very good ☐   **b.** Good ☐   **c.** Average ☐   **d.** Week ☐

14. Visualized correct graph   according to the selected values

Type of graph	Data representation		
Regression curve	depth wise	**a.** Yes ☐	**b.** No ☐
Third normal form ☐	Magnitude wise	**a.** Yes ☐	**b.** No ☐
Third normal form ☐	Depth/Average magnitude	**a.** Yes ☐	**b.** No ☐
Pie-chart	Time	**a.** Yes ☐	**b.** No ☐
	Depth Range	**a.** Yes ☐	**a.** No **a.**
	Magnitude Range	**a.** Yes ☐	**b.** No ☐
Cross section	**a.** correct ☐	**b.** Incorrect ☐	

15. Your own comment

....

....

Appendix A5: Overall Assessments

Assessment		Percentage of Responses (Sample size 10)				
		Very Good	Good	Average	Week	Total %
1	Speed	60.0	30.0	10.0	00.0	100.0
2	Clearance	50.0	30.0	15.0	05.0	100.0
Functionalities						
3	Visualized detail data	82.0	10.0	08.0	0.0	100.0
4	Historical Data Analysis (Depth Wise)	60.0	20.0	20.0	0.0	100.0
5	Historical Data Analysis(magnitude Wise)	80.0	15.0	5.0	0.0	100.0
6	Cross section (with Historical Data)	65.0	20.0	10.0	5.0	100.0
7	Recent Data Analysis (Depth Wise)	75.0	15.0	7.5	2.5	100.0
8	Recent Data Analysis (Magnitude Wise)	80.0	10.0	10.0	0.0	100.0