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The Concept of Agriculture Markup Language: AgrML

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ABSTRACT: Data collection is gigantic task, once collected, how to preserve and how to represent is an important requirement. Data of various types and shapes cannot be represented as simple text on web. To represent domain specific data on the web, custom markup language is used. Markup language specifies code for formatting, both the layout and style, with in a text file. In this paper a concept of new markup language for agricultural domain, known as Agriculture Markup Language (AgrML)is developed by using XML. AgrML represents agriculture data in graphical and textual format on the web. The developed markup language represents information about crop, soil, land and water resource status.

KEYWORDS: AgrML, SVG, XML, Xlink, Xpointer.

I. INTRODUCTION

Markup language is used for defining and presenting complex data of various fields. Markup language gives the facility to manipulate the text by remarking them. Markup languages are mostly human readable because designed symbol are written in a way to distinguish them from the text. There are various types of markup languages like HTML, XML, XHTML etc. All markup language uses tags for programming. These tags are either predefined or defined by the developer. In XML developer defines the tags at the time they required. XML gives the facility to define new symbol or codes using tags. These tags are become a link to markup. Markup refers to the sequence of character or other symbol that we insert at certain places in a text or word processing file to indicate how the file should look like when it is printed or displayed or to describe the document logical structure. The markup indicators are often called tags.

All the complex data fields want a markup language to represent their complex data. Agricultural data is also complex and semi-structured so we are using XML to design agricultural markup language. The title of this agriculture markup language is AgrML. AgrML is an XML encoding for the transport and storage of agricultural information, including both the agricultural data and the properties of agricultural features, in the distributed environment. AgrML serves as a modeling language for agricultural system as well as an open interchange format for agriculture transaction on the internet. AgrML is designed to represent graphical view of agricultural data and attributes. It shows the area wise individual crop value and situation with the help of text and graphical view. It also shows water resource and land-soil quality and area by textual and by spatial geometrical symbol. These geometrical symbols are designed by scalable vector graphic (SVG), this method is quite program based code is written in XML document type. Symbols are the combination of circles, lines, points, polygons and other geometrical shape. Scalable vector graphics is an XML-based vector image format for two-dimension graphics with support for interactivity and animation. SVG image and their behaviors are defined in XML text files.

II. AGRML MODEL

AgrML contains a rich set of primitives which are used to build application specific schema or application language these includes crop, land image, soil information, time, unit of measure, topology, directions, weather, metrology and geometrical graphics. AgrML, information about crop, soil, land and water measure are stored in a database. Information about metrology varies time to time so it is taken from global database. Using this markup language the condition and quality of crop, soil, and water resources can be seen. Availability and quality shows by geometrical

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symbol and color variations. Dark color for more availability and light color for low availability. There are more geometrical symbols like circle, line and many more to represent elements. To view a particular location image the information about specific location has to be searched by entering the exact name of that location. Axis coordinate is also used to locate the desired location.

AgrML profiles are logical restriction to AgrML, and may be expressed by a document, an XML schema or both. Informatics data is stored in database. XML extract these data by Xlink and Xpointer. These profiles are intended to simplify adoption of AgrML.

Features, AgrML defines features distinct from geometry objects. A feature is an application object that represent a physical entity e.g. land, river, lake, crop. A feature may or may not have geometric aspects. A geometric object defines a location or region instead of physical entity and hence is different from a feature. In AgrML , a feature can have various geometric aspects or characteristics of the feature to share a geometry property with one another by using a remote property reference on the shared geometry property. For example, a river feature in a particular AgrML application schema might have a position given by the primitive AgrML geometry object type line.

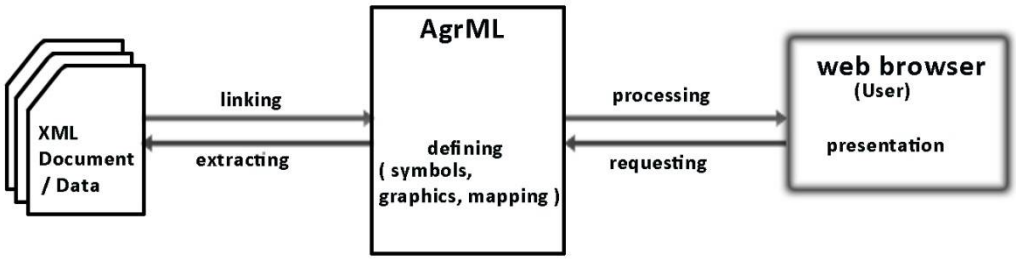

Fig. 1 AgrML processing view

In Fig.1 Markup language work between the XML document/database and web browser. XML documents are link to the markup language to represent data to the user level. Data stored in XML document. AgrML extract that data to show. Query from users are performed by XQuery and XPointer.

Application schema of AgrML is design to expose an application agricultural data with AgrML. This schema describes the objects type whose data is stored or be extracted from the geo-sensor. For example, an application for metrology may define object type place, humidity, speed of air, rainfall and view point in its application schema. These object types in turn reference the primitive object types defined in the AgrML standard.

```
<?xml version=”1.0”?>
<xs:element name=”water_resource”>
<xs:complextype>
<xs:sequence>
<xs:element name=”location” type=”xs:string”/>
<xs:element name=”river” type=”xs:string”/>
<xs:element name=”water_quantity” type=”xs:integer”/>
<xs:element name=”distance” type=”xs:integer”/>
</xs:sequence>
</xs:complextype>
</xs:element>
<xs:element  name=”metrology”>
<xs:complextype>
<xs:sequence>
<xs:element name=”location” type=”xs:string”/>
<xs:element name=”humidity” type=”xs:string”/>
```

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```
<xs:element name=”rainfall” type=”xs:integer”/>
<xs:element name=”tempreture” type=”xs:integer”/.
</xs:sequence>
</xs:complextype>
</xs:element>
<xs:element name=”crop”>
<xs:complextype>
<xs:sequence>
<xs:element name=”name” type=”xs:string”/>
<xs:element name=”time” type=”xs:integer”/>
<xs:element name=”duration” type=”xs:integer”/>
</xs:sequence>
</xs:complextype>
</xs:element>
</xs:schema>
```

AgrML geometries encodes the AgrML geometries, or geometric characteristics, of agricultural objects as elements within AgrML documents according to the "vector" model. The geometries of those objects may describe, for example, land, rivers, and water resources. All agriculture elements represented as a special symbol. SVG is a vector based image, this is not bitmapped because of this type of image has high resolution and not scattered on zooming. We can design any symbol by using scalable vector graphics for physical things like river, land, lake, well, crop, location, rainfall area and for more many objects. SVG uses line, circle, polygon, point, polyline to design these vector graphic images. Code for some geometrical symbols of physical object

Symbol for river

```
<!DOCTYPE html>
<html>
<body>
<h1>Symbol for river</h1>

<svg height="100" width="150">
<line x1="10" y1="50" x2="50" y2="10" style="stroke:rgb(0,0,255);stroke-width:4"/>
  <svg height="100" width="150">
    <line x1="50" y1="10" x2="70" y2="50" style="stroke:rgb(0,0,255);stroke-width:4"/>
    <svg height="100" width="150">
    <line x1="70" y1="50" x2="110" y2="10" style="stroke:rgb(0,0,255);stroke-width:4"/>
    </svg>
    </svg>
</svg>

</body>
```

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```
<!DOCTYPE html>
<html>
<body>
<h1>polyline for land area boundary</h1>
 area of land may be variable
<svg height="100" width="100">
  <polyline points="10,10 20,30 20,50 50,80 80,100 100,100 100,80 70,60 40,30 15,20 10,10" style="fill:none;stroke:black;stroke-
width:2"/>
  </svg>

</body>
</html>
```

object	River	Land area (boundary)	Lake/ Pond	Well	Grains	Green crop	Rainfall
symbol							

Legend for AgrML

Coordinates, in AgrML used to locate the specified location, with the help of coordinate axial value we can reach to the desired place. In AgrML we search with the location name and then this name links to coordinate and then extract desired result form that place. Coordinate element is <Agrml:coordinates>.

Linking in AgrML Xlink and Xpointer is used to link various document and locations, linking one place to another with the current XML technology it is possible to build linked agriculture data set and image of one place can linked to the data and image of another location. Xlink is an out lines link, the source points only to a link database and it is the link database that provides the pointer to specific XML element in the target document. The link is thus not hard coded in either document. This is of great importance in relation to AgrML as it makes it possible to build scalable, distributed agricultural data set. We can create plot index based on crop type. Even more importantly, the Xlink and Xpointer make it possible to build application specific indexes for a data.

III. RESULTS

All functions and concepts are working properly. In Fig.1 agriculture data is stored in XML documents and these documents are also related to each other logically. Markup language uses these data to show on the web browser in graphical and textual view. SVG is a best coding based tool to design vector graphics. All above legends of agriculture's designed by SVG. Two SVG coding snapshot are pasted above for river symbol graphics and area boundary .For each object their is a special symbol designed in SVG. There are special functions for each geometry in SVG. This Markup language supports in browsers to represent agriculture domain object and data results.

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IV. CONCLUSION AND FUTURE SCOPE

AgrML is a valuable and extensible custom markup language, it easily deals with unstructured agriculture data. It can represent all the physical objects of agriculture domain on the web. It can represent stored data graphically efficiently. AgrML is a great new way to look at stored data and spatial information using XML encoding. The inherent transformability and accessibility of AgrML will open a whole new domain AgrML in agriculture data information management.

Agriculture is not a new thing and it will never eliminate from earth, it is an oldest legacy. AgrML is sufficient to compute and present agricultural data, In future there will be need of more graphical symbols to represent more complex information. It should be enabled in all web browsers to support agriculture data information management. Future will be more and more complex so there is a need of more efficient technique to handle such complexities of agricultural domain.

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BIOGRAPHY

Narendra kumar Gupta is Assistant professor in the department of Computer Science and Engineering, SHIATS, Allahabad (Deemed University). He has around 18 years of teaching and industrial experience.He has completed his UG & PG from ALLAHABAD UNIVERSITY. He is pursuing PhD from SHIATS. He is expertise in RDBMS, Web Technologies, Data Mining & warehousing and Object Oriented Technology. He has guided more than 45 PG students and has more than 10 National & 15 International Reputed Journals publication.

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