Semantic Web Based Representation of VGI

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---**ABSTRACT**---
This review paper presents a study about to create qualitative VGI(volunteered geographic information) and its semantic web representation .Creation of VGI describes about to create ,use and share volumes of spatial data in an increasingly accessible fashion. This paper describes about the methods of semantic web based representation of VGI. Some ontological principle can be used for its semantic web representation.

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I. INTRODUCTION

Web mapping and location-aware mobile devices are the new advances in information technology which enabled non-experts to create, use and share volumes of spatial data in an increasingly accessible fashion. Such user-generated spatial data is usually referred to as Volunteered Geographic Information (VGI)[1]. Two fundamental challenges associated with the VGI relate to information overload and extraction of meaning. VGI application as those in which people, either in which people, either individually or collectively collect, organize and disseminate geographic information and data. The data organize in such a manner that can be used by many people. Possible way to address VGI quality is to consider the reliability of information source. In VGI who are the volunteers who collect VGI when was the information collection, how many human sensors agree on each piece of information collection etc information collected and thus they determine the reliability of information. The main VGI types are described and characterised according to the nature of the contributed data and the influence of the data contribution process on the nature of the data [2]. The method of capture of spatial data is an essential characteristic as it is closely related to the accuracy of the generated data. Some common tools can be used to create spatial data, which include Global Positioning System, Geocoding, Drawing on paper maps, Twitter etc.

In old days the map only contains the information about the well known places and important areas. But VGI can introduce that, it will give additional information about the unimportant area. The day by day updating of maps by a single person is more difficult .VGI will introduce a group work for updating the information, so updating procedure become less costly

II. SEMANTIC WEB REPRESENTATION

To make the VGI in more qualitative we use semantic web based representation. The main purpose of the Semantic Web is driving the evolution of the current Web by enabling users to find, share, and combine information more easily. The Semantic Web bases its foundation in knowledge representation and reasoning and in data management. Semantic Web data are expressed with the simple relational model defined by RDF, in which the atomic unit of information is the triple, made up of a subject, a predicate, and an object. Elements of triples can be individuals or concepts defined in vocabularies and ontologies formalized using RDF-S and OWL schema languages. By using RDF representation VGI will be more qualitative. The Resource Description Framework (RDF) can provide a framework for representing information in the Web [4]. SPARQAL language can be used to access the data from RDF. It can be used to express queries across diverse data sources, whether the data is stored as RDF or viewed as RDF via middleware [3]. SPARQL contains capabilities for querying required and optional graph patterns along with their conjunctions and disjunctions. SPARQL also supports extensible value testing and constraining queries by source RDF graph. The results of SPARQL queries can be results sets or RDF graphs. Most forms of SPARQL query contain a set of triple patterns called a basic graph pattern. Triple patterns are like RDF triples except that each of the subject, predicate and object may be a variable. A basic graph pattern matches a subgraph of the RDF data when RDF term from that subgraph may be substituted for the variables and the result is RDF graph equivalent to the subgraph. Some times RDF query language and RDF stores fail to support a large class of knowledge application.R2DB database system also be used for querying weighted RDF graph

III.   VGI CONSOLIDATION

For the preparation of VGI a number of steps are involved.ie.VGI consolidation, VGI aggregation..etc. For consolidation of VGI, human computation can be used. Human computation is a computer science technique in which a computational process is performed by outsourcing certain steps to humans. In traditional computation human give a task to a computer and all the work related to given task is done by the system without contribution of the people. But in human computation, the computer asks a person or a large group of people to solve a problem. And contribution of each person has a role in the solution of the task. Work is done by undefined group of remote workers over the internet

Applying Human computation to computer problem it involves number of steps task definition, task execution and task solution. Task definition, in which the problem to be solved is decomposed in smaller tasks that can be fed to human workers. Task execution, in which multiple human workers are given the same set of tasks and provide their contributions and   task solution, in which the partial solutions by the human workers are combined and harmonized into an integrated solution by means of an aggregation algorithm. Some data structures are used for recording the outputs of the computational tasks of the different workers. And, different dimensions can be considered when aggregating outputs: workers skills, social relations or social distance, and trust ratings.

In human computation, for stimulating the human workers, it provides a method ie.game with a purpose (GWAP). A GWAP is a gaming application that put the Human Computation task within entertaining environment.Workers become players of the game and their contribution becoming success within the game. Obtaining a high number of workers that keep contributing to the Human Computation tasks solution is thus turned into the design of a convenient game, as the contribution depends on players motivation ie. the more enjoyable the game, the higher chances to engage users in the long term. Mostly, the task is hidden in the game players are not aware that they are solving tasks, they notice only the entertaining setting. By using game application, data collection and consolidation task will be done more easily.

To consolidate VGI in a Human Computation approach, we first need to define a model to describe. The PROV model can be used for modelling the VGI. The PROV model is based on three main concepts entity, activity and agent, and their relations .An entity is any physical, digital, conceptual, or other kinds of thing that is the subject of a provenance record.

In VGI, an entity is any kind of geographic information that is collected by individuals, such as a street, a building, a park, and a local business. An entity is described by attributes and can evolve over time. Activities define how entities come into existence and how their attributes change to become new entities, often making use of previously existing entities to achieve this. Thus, activities are those actions or processes that modify entities. In VGI, an activity is the act by which an individual creates or modifies a piece of geographic information. An agent is a person, a piece of software, an organization, or other entities that can be assigned some degree of responsibility for an activity taking place. In VGI, agents are the individuals that voluntarily collect geographic information. . PROV defines a core data model for provenance for building representations of the entities, people and processes involved in producing a piece of data or thing in the world

IV.   AGGREGATION OF VGI

A 'game with a purpose' (GWAP)is a gaming application that put the Human Computation task within an entertaining environment. Workers become players of the game and their contribution is led by the desire for success within the game [7]. Here we using urbanopoly game

Urbanopoly game is a mobile location-based Game with a Purpose it is a sort of monopoly game, in which players act as landlords, whose aim is to own the largest number of properties. Those properties are called venues in the game, that are surrounding of the player's position, landlords can trade those venues, but, to conquer their opponents' venues, they have to face some game challenges that consist in providing geospatial information. This conquer is just an application in the game for stimulating the players.

The hidden purpose of Urbanopoly is, therefore, to force the players to collect up-to-date information about urban places. The application users focus on achieving their game objectives by conquering venues but, whereas enjoying the gaming setting, they provide valuable information. We can say that players voluntarily provide geospatial data for the game's sake and involuntarily contribute to a VGI collection effort. The venues are displayed on the basis of player's current location as detected by mobile device. Each user has an initial budget with which he can buy free venues. He visits a venue by clicking on a building on the map. If the venue is free and the player has enough money, he can buy it. If the venue is owned by another player, he has to spin a "wheel of fortune", (Wheel of fortune is an application providing the game, when it spins it give some question related to the geospatial information of player current location) depending on the wheel outcome, the player will be asked to face some challenges (including the hidden Human Computation tasks), which will provide him with more money. To make the game more enjoyable, the wheel outcome can also provide pure gaming characteristics. The initial data is collected about the venues from available open data sources a well-known VGI collaborative wiki and Open-Street Map. All other information is to be verified and provided by the game players.

V. CONCLUSION

The overall goal of this paper was to explore the semantic web representation of the human computation VGI. This effort represents a step towards taking better advantage of VGI whose potential is still underexploited. VGI will be allowing more people to participate the collection of geographical data and thus they increase the quality of data collection. Human computation approach is used to consolidate and aggregate VGI provenance .ie proposal of human computation as means to aggregate VGI from multiple contributor .Semantic web representation of VGI provenance through the application of a generic provenance model under standardization by the World Wide Web Consortium (W3C). a Linked Data publication mechanism on the Web through a model and ontological representation for human computation VGI .The application of all the above in a concrete case of a location-based app that collects VGI through a social game. We would like to underline the importance and the role of the Web as publication channel for VGI and its provenance. If those data are published as Open Data, the whole geoscience community can be benefited from accessing this wealth of information.

REFERENCES

[1]   M. Goodchild, "Citizens as sensors: The world of volunteered geography,"GeoJournal, vol. 69, no. 4, pp. 211–221, 2007

[2]   D. Tulloch, "Is VGI participation? From vernal pools to video games," GeoJournal, vol. 72, no. 3, pp. 161–171, 2008.

[3]   E. Prud hommeaux and A. Seaborne. (2008). "SPARQL Query Languagfor RDF" "http://www.w3.org/TR/rdf-

[4]   D. Brickley and R. Guha. (2004). "RDF Vocabulary Description Language RDF Schema" http://www.w3.org/TR/rdfschema

[5]   M.Lutz, "Ontology-based descriptions for semantic discovery and composition of   geoprocessing services," Geoinformatica, vol. 11, no. 1,pp. 1–36, 2007.

[6]   D. Beckett, T. Berners-Lee, E. Prud hommeaux, and G. Carothers." Turtle—Terse RDF Triple Language" http://www.w3.org/TeamSubmission/turtle/,2013

[7]   L. von Ahn, "Games with a purpose," IEEE Comput., vol. 39, no. 6,pp. 92–94, Jun. 2006.