Program

Education, Maps and the Internet and Ubiquitous Mapping

Pre-ICC Commission Meeting

2017 Williamsburg, Virginia

June 30th 2017

8:15 to 8:30 Welcoming Session – Commissions Co-Chairs

8:30 to 10:00 Map Coding Session 1

Coding for Map Applications on the Platform of WeChat Mini Programs

Min Lu, Ruochen Si, and Masatoshi Arikawa

WeChat is the most popular social media application in China, and by 2016 it has over 889 million active users. It is not just a smartphone app of instant messaging and photo sharing, but a platform providing various powerful functions from e-commerce, payment service, to ticket booking, taxi calling, and even city services. At the beginning of 2017, WeChat rolled out a new feature ″Mini Programs″, which can provide users with light, instant and disposable applications within the WeChat App. Especially, it focuses on Online to Offline (O2O) scenarios. With a great number of users, there is a great potential to create new map-based and location-based services. WeChat has released a development environment for programmers to develop Mini Programs, which is a framework mainly based on HTML5. However, as the framework is an encapsulation with newly defined file structure, components, APIs and some of the grammar, it is not compatible with HTML5, and the results cannot run on usual web browsers. As WeChat is not popular in the international market compared to the situation in China, this coding presentation will start with a brief introduction on WeChat and Mini Programs. The framework and development environment will be then introduced with some technical details. Finally, the participants can experience coding for creating a map application using the map and location information APIs of WeChat Mini Programs. As the tool for coding and the official website are currently in only Chinese language, the presenters will prepare materials including translated documents, important words of the interface, and sample codes, and they will help in all the procedures. We expect to make a good chance for the participants to understand what is going on with the most popular app in China, which may bring us new possibilities of mobile map applications.

10:00 to 10: 30 Break

10:30 to 12:00 Map Coding Session 2

3D Web Mapping with JavaScript - Exercises with 3D features, Surface Models and Profiles.

Sverre Iversen, Geological Survey of Norway

"threejs" is an Open Source JavaScript framework. Inspired by an implementation of threejs at the Norwegian Mapping Authority, we started our own implementation in threejs for geological maps and geological profiles.

12:00 to 1:15 – Group Lunch William & Mary Dining Hall

13:30 to 15:00 Map Coding Session 3

Geospatial Data Scraping

Paul Hunt, University of Nebraska Omaha

Have you ever seen a map on the internet and wished you had the data locally to conduct spatial analysis? Maps and geospatial data are ubiquitous on the web. In many instances these maps or mapping applications are dynamic, rendered on-the-fly and designed for user interaction. In the world of web mapping, a common technology protocol has been the use of JavaScript Object Notation (JSON) files to store and render dynamic geospatial data overlaying a static contextual base map. JSON is based on JavaScript which is a powerful web scripting tool that serves as the foundation for many mapping applications. Due to the nature of JavaScript, these mapping applications are interpreted client-side. On the client, during the spatial data request, usually in the form of Asynchronous JavaScript and XML (AJAX), the server has to format and send the JSON representation of the requested spatial data to the local machine. The returned spatial JSON data is then used in a JavaScript based client-side mapping application. This paper will discuss strategies on how to access and store this spatial data so it can be used in geographic research and spatial analysis.

15:00 to 15:30 Break

15:30 to 17:00 Map Coding Session 4

Maps with User Interactively - Shiny and R

Rex G. Cammack, University of Nebraska Omaha USA

In statistical research, most of the newest statistical methods and visualization of data are being developed in an open architecture system R. In R data analysis system, there are numerous methods of handling, analyzing and visualizing data. In this map coding session, we will show you how to setup both are system and use the R Studio development to make maps do spatial analysis and visualize the results. In the second part of the map coding session you will learn how you can use an R Package Shiny to make you map element more user interactive for both data investigation/exploration.

18:30 – 20:00 – Dining out – On your own

July 1st 2017

8:30 – 10 :00 - Paper Session 1

A method measuring the shapes of building features based on a machine self-learning algorithm

Lei Ma, Haowen Yan, Weifang Yang, Lanzhou Jiaotong University

Geometric shapes of the areal features of geographies is considered as the most significant element among the spatial properties (i.e. spatial relation, direction, topology and semantics) when settling some spatial problems such as map generalization and spatial clustering analysis. Among the geological area features, building features account for a large proportion and its geometric shapes are complex and hard to describe through an algorithm accurately. Thus, an effective method to measure the building shapes is of importance. This presentation will demonstrate a new way to describe the building shapes which is based on a machine self-learning algorithm and show its effectiveness. The machine self-learning algorithm is based on the Convolutional Neural Networks designed for image recognition and classification in the Deep Learning field and the Auto Encoder algorithm designed for dimension reduction or machine self-learning technics. Combining the two classical algorithms could setup a well feature studying neural networks for a large dataset of building shapes and provide a good way to apply the pre-trained networks to quantify the building shapes. This model works well to describe the building shapes and the accuracy of the shapes' descriptions well conform to the visual similarity the among the building subjects.

Added value to map apps - HTML5, Search, 3D, Profiles, Social Media, PDF and Speed

Sverre Iversen, Geological Survey of Norway

To be able to create dynamic 3D visualizations on a mobile device with no installed software or data, you need a web application which communicate with web services. This is the story of how we implemented device independent applications in responsive web design with 3D visualizations.

Semi-georeferencing for accurate position mapping from base maps to target map through intermediary maps

Ruochen Si, Min Lu, and Masatoshi Arikawa

Maps are important tools for spatial communications and are widely used in people's lives. Different kinds of maps have different characteristics. Web mapping and mobile mapping have powerful location-based service (LBS) functions, but they are not detailed or attractive in local areas. Local illustrated maps and map signboards are more detailed and thematic for local area but do not have LBS to help map reading.
To combine advantages of the two kinds of maps, relative researches mainly use georeferences to connect analogue map images with to base maps to mapping position between the different maps. Accurate georeferencing and positioning require enough number of corresponded spatial objects on target map and on base maps to build connections between the different kinds of maps. However, in practice, there may be insufficient spatial objects for georeferencing to ensure high positioning results, especially for old maps on which may spatial objects has changed.
In this presentation, we will present a method of semi-georeferecing to increase positioning accuracy for the above case. First, we will review characteristics of conventional georeferencing that directly connects target map to base maps. Next, we will introduce the method of semi-georeferencing that connects target map to base maps through intermediary maps to increase positioning accuracy on the target map. Then, a field experiment to find remains of oil docks of former Kashiwa Air Port on an old areal photograph will be explained to prove the feasibility of semi-georeferencing. Finally, we will draw conclusions and introduce future work.

Parameter Choices for Animated Web Maps with Vector Fields

Pyry Kettunen, Juha Oksanen and Tapani Sarjakoski

Use of animation is increasing in web maps along with adoption of HTML5 and associated visualization libraries and platforms, such as D3.js and CARTO. Consequently, empirically argumented research on good design of cartographic animation has become as crucial as that on static maps. Different kinds of web map animations shall be subjected to user experiments and effects of animation parameters on interpretation of animations shall be found, in order to produce cartographic animations more user-friendly through appropriate parametrization of underlying tools. We studied empirically animation parameters of a popular vector field web map called earth that visualizes atmospheric and ocean vector fields by large amounts of slowly vanishing animated line particles. We conducted our experiment in laboratory and web environments with a total of 73 participants who performed 2 tasks on wind field animations with 3 distinct values of 4 parameters that were available for modification in

the source code of the map. They also selected their preferred animation from the shown, and lastly, looked through an animation with sequentially changing wind fields in order to point for the most windy region over all animation. Results of the study show surprising stability of pointing efficiency independent of animation parameters. More detailed experimental set-up, results, discussion, and conclusions will be presented in the workshop.

GeoSpatial Data Scraping

Paul Hunt, University of Nebraska Omaha

Have you ever seen a map on the internet and wished you had the data locally to conduct spatial analysis? Maps and geospatial data are ubiquitous on the web. In many instances these maps or mapping applications are dynamic, rendered on-the-fly and designed for user interaction. In the world of web mapping, a common technology protocol has been the use of JavaScript Object Notation (JSON) files to store and render dynamic geospatial data overlaying a static contextual base map. JSON is based on JavaScript which is a powerful web scripting tool that serves as the foundation for many mapping applications. Due to the nature of JavaScript, these mapping applications are interpreted client-side. On the client, during the spatial data request, usually in the form of Asynchronous JavaScript and XML (AJAX), the server has to format and send the JSON representation of the requested spatial data to the local machine. The returned spatial JSON data is then used in a JavaScript based client-side mapping application. This paper will discuss strategies on how to access and store this spatial data so it can be used in geographic research and spatial analysis.

10:00 to 10:30 Break

10:30 to 11:45 Paper Session 2

Mapping Lightning

James Carter, Emeritus Professor – Western Illinois University

Throughout history the mapping of lightning has been based on accumulating records of observations of persons on the ground. Generally, this has been something like "the average number of days lightning has been observed". Normally, such data have been based on observations at official weather stations over many years.

Now a variety of technologies are employed to record lightning events, which vary between cloud to ground, cloud to cloud and within the same cloud. They are still developing technologies and processes to monitor lightning activities, but there is now enough data collected systematically to produce maps of lightning in near real time in some areas.

With electronic technologies and the Internet, it has become possible to record a lightning event and disseminate warnings about the probability of lightning in particular areas. Because lightning can cause significant disruptions in our modern society the forecast and recording of such events have value. Thus, some of the observation and dissemination of lightning data is propriety.

This presentation examines some of the maps of lightning available over the Internet. Two years ago, the author monitored maps of lightning strikes moving over his area, on two different computers accessing entirely different sensing systems. The data captured were similar in most cases but the maps differed in terms of design. Mapping lightning is now a subject worthy of our attention.

How to Teach Web Mapping According to Those Who Do

Carl Sack, University of Wisconsin Madison

Web maps are everywhere. Are we preparing our students to make an impact on the world of online cartography? How should we be teaching mapping on the open web? This talk will present the results of an interview study with cartography and GIS instructors across North America who teach web mapping. These instructors were asked to describe what they teach and how they teach it and to reflect on what they would consider best practices for web mapping curriculum design. Their insights reveal innovative ideas for teaching this complex technical subject matter to build the next generation of 21st Century cartographers

Web resources for the *Mapping in the Cloud* book: Maintaining an online code library as an educational resource

Michael P. Peterson University of Nebraska Omaha

Released in 2014, the *Mapping in the Cloud* book is an attempt to bring coding into the cartography/GIS classroom. In addition to the book, an extensive set of web resources were also made available through the associated http://maps.unomaha.edu/cloud/ website. There have been a number of changes since the book was released. In an online world, these changes can be easily integrated into the website. The changes and additions to the code examples are described here along with some general trends for the future of mapping in the cloud.

Cartographic Production as a Means of Academic Program Assessment

Rex G. Cammack and Michael Peterson University of Nebraska Omaha

Many academic programs in the United States require a method for programs assessment. At the University of Nebraska Omaha, the geography program has adopted a mean of assessment under the Student Learning Outcome(SLO) model. This SLO model focuses on what students' product in this case a cartography map product. Other SLO models can review test performance or even professional certification of students. In this research, student SLO map products will reviewed and a discussion on how to access map products in relationship to assessing a programs ability to education geographer majors will be summarized.

11:45 to 13:00 Group Lunch William & Mary Dinning Hall

13:15 to 20:00 Tidewater Regional Tour – optional

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