Geo-Visualization of Human Mobility Patterns and Urban Dynamics Revealed by Mobile Phone Data

Song Gao

The STKO Lab, Department of Geography, University of California, Santa Barbara

In the age of Big Data, the widespread use of location-awareness technologies has made it possible to collect large-scale spatio-temporal data for analyzing human mobility patterns and urban structures. Urban computing is emerging as a concept where sensors, devices, persons, vehicles, buildings, and streets in urban areas can be used as components to sense city dynamics to enable a city-wide computing to serve the population. Several spatio-temporal visualization methods are presented in this poster.

Eastern Cordillera, Ecuador: Two Decades of Glacial and Land Cover Change

Anna Hou, Kenta Ishii, Chuck Kha

Department of Geography, University of California, Santa Barbara

To better understand processes occurring in remote mountainous terrain, the study assessed changes in land cover, paying close attention to the glaciers on Cotopaxi and Antisana in the Eastern Cordillera region of Ecuador. Observing and quantifying changes in land cover and glacial extent serve to further knowledge of earth processes. Possible variables likely responsible for observed changes are suggested, but additional research is necessary to assess level of correlation between variables and changes.
Glacial Retreat in the Quelccaya Ice Cap, Peruvian Andes from 1975–2004
Terrell Beesley, Benjamin Siemens, John Henry Toy, and Sherwin Wan
Department of Geography
University of California, Santa Barbara
The correlation between snow and glacial coverage of the Quelccaya Ice Cap and temperature changes in the region are explored using four satellite images: Landsat MSS, TM, ETM+, and ASTER.

Downtown Santa Barbara Parking Analysis
Melissa Jensen, Qingyun Zhang, Jiaqi Zhao, Chuck Kha
Department of Geography
University of California, Santa Barbara
This GIS analysis of parking in Santa Barbara investigates the availability of parking spaces in the downtown areas, both in terms of parking infrastructure as well as of curbside parking. The total capacity of parking spaces and their locations were examined against the existing demands for parking to determine whether a parking deficiency exists and, if so, identify where it exists.

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Goleta Valley Beautiful Geospatial Project
Kristie Avila, Terry Beesley, Marcus Bernales, and Christie Fudurich
Department of Geography
University of California, Santa Barbara

Students developed a geospatial database system for the management and analysis of trees planted and maintained by Goleta Valley Beautiful (GVB), making a user-friendly mobile app for volunteers to use in the field to collect tree data, performing a field test on UCSB’s West Campus using the tree app, mosaicking aerial photographs of Goleta Valley, and analyzing GVB tree inventory with U.S. Census data.

Spatial Clustering in Python: Processing LiDAR points into objects
Shane Grigsby
Department of Geography
University of California, Santa Barbara

Estimation of vegetation biophysical parameters is needed for ecosystem models, and for retrieval of biochemical parameters using remote sensing and spectroscopy. Retrieving biophysical parameters like Leaf Area Index (LAI) is time consuming, destructive, and often inaccurate if not directly sampling leaves. Other biophysical parameters, such as Leaf Angle Distribution (LAD), are often impossible to field sample in practice. One solution that is emerging is the use of field based Light Detection and Ranging (LiDAR) to retrieve structural information, using the point data to fit biophysical parameters.
Spatial and Temporal Visualization of Tourist Movements
Anna Hou, Edward Tsang, Kayee Leung, Michael Loman, and Sizhu Wang
University of California, Santa Barbara

Many of the streetlights in Isla Vista are either broken or missing, resulting in several poorly lit and potentially dangerous areas. This project investigates street light locations and functionality, with the hypothesis that the absence of working street lights is positively correlated with areas that have higher incidences of criminal activity. The ultimate goals of this study are: to identify areas with inadequate street lighting, uncover a correlation with high criminal activities, provide suggestions for area-specific repairs or new installations to increase public safety, and inform residents the areas to avoid when walking alone at night.

Citation Map: Visualizing the Spread of Scientific Ideas through Space and Time
Yingjie Hu, Grant McKenzie, Song Gao, and Krzysztof Janowicz
The STKO Lab
University of California, Santa Barbara

Knowledge is power. The power of knowledge however, is not only about the knowledge itself, but also about how it is diffused. Many academic search engines (Google Scholar, Microsoft Academic Search, and Arnetminer) have stored citation information and provide related web services to users. However, is it enough to evaluate a publication based only on the number of citations? Can we know how a brilliant scientific idea spreads through space and time?
While some of the most visually striking representations of impacts of climate change may feature remote locations (e.g., melting glaciers and polar bears), most of the human activity represented in the images takes place in public or semi-public social spaces while activities that take place in private spaces remain largely unseen and therefore de-emphasized. While it seems obvious that news reports are intended to cover public activities that are of interest to the public, many of the activities that contribute to or can be adopted to address the climate change take place in private spaces such as homes and businesses. Implications are two-fold: first, journalists seeking to provide actionable information to the public should focus more attention on the private sphere. Second, because of the public focus inherent in news media, those who wish to communicate about climate change solutions would do well to look beyond the news media for other vehicles appropriate for this type of communication.

Analysis of the Goleta Groundwater Basin Using ArcHydro Groundwater
Dylan Berry, Mike Herrman, Bruce Stevenson, Erik Young
Department of Geography
University of California, Santa Barbara

This project analyzes the Goleta groundwater basin as a fresh water resource. The analysis utilized ArcHydro Groundwater, an ArcGIS extension, to visualize the groundwater basin from stratigraphy and water level data. The results show that the Goleta Basin contains two main aquifers that altogether can hold about 202,000 acre-feet of groundwater. This poster highlights the major steps of the analysis.
Glacial and Lake Variation in the Cordillera Blanca between 1987 and 2001
Sam Fragoso and Frank Wong
Department of Geography, University of California, Santa Barbara

Glaciers are an important source of fresh water and indicator of climate change. To reveal the temporal variation of glaciers in Cordillera Blanca region, the authors performed change detection analyses based on two sets of imagery from Landsat 5 TM and Landsat 7 ETM+. A supervised classification was performed to determine areas of glaciers and lakes in each scene, which set the foundation of classification-based change detection. Alternatively, specific band-math was applied to outline the borders of glaciers and lakes directly, based on their spectral reflectance properties. This band-math approach proved to be more accurate and reliable, showing that the glaciers expanded considerably with a slight increase in lake size in 1999–2001 when compared to 1987–1989.

Mapping with strings attached
Katharine E. Currier
Biosphere Foundation and Department of Geography
University of California, Santa Barbara

Kite Aerial Photography (KAP) has been used to collect images of the earth’s surface since the 1880s (Aber 2008). Today, lightweight digital cameras and a variety of image processing software make KAP an appealing technique for generating geospatial data on a budget. From digital elevation models to GIS-ready basemaps, KAP offers compelling reasons to go fly a kite.
**Individual and Strategy Differences in an Allocentric-Heading Recall Task**

Heather Burte and Mary Hegarty

Department of Psychological & Brain Sciences, University of California, Santa Barbara

People characterize their ability to move effectively through environmental-scale spaces by referring to their "sense-of-direction" (SOD). However, the causes of SOD differences are unknown. This poster shows the SOD and strategy differences that exist within environmental-scale spatial knowledge, in specific, using the allocentric-heading recall task (Sholl, et al., 2006).

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**Fracking on Native Lands and Water Quality**

Emily Williams, Min Zhang

University of California, Santa Barbara

Fracking is the process of injecting hundreds of chemical mixed waters at high pressure to fracture shale rocks.

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**Are Indian reservations generally located on shale basins?**

Methodology:
1) Two separate internet tools of shale plays & shale basins with reservations layer.
2) Internet tool to eliminate overlapping pentagons.

Results: Only 11% of Native American reservations are actually located on shale plays or shale basins.

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**Are Native American lands more prone to fracking?**

Methodology:
1) Use of internet tools to see how many Fracking sites are located in Native American reservations.

Results: 2.19%

2) Determine what % of areas reservations take up on shale plays/basins:

Area of reservation / area of shale plays and shale basins: Result: 4.394%

Correlation: 2.13 < 4.194

There is no correlation between Native American reservations and fracking!
Allocentric Heading Recall: The Impact of Strategies and Sense of Direction on Accuracy
Nahal Heydari, Heather Burte, and Mary Hegarty
Department of Psychological & Brain Sciences
University of California, Santa Barbara

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Regional Transportation Plan and Sustainable Communities Strategy
Santa Barbara County Association of Governments (SBCAG)

The Draft 2040 RTP-SCS and the Draft EIR have been released for public review and comment. Visit the RTP-SCS webpage to view the draft documents and learn more about the development of the 2040 Regional Transportation Plan & Sustainable Communities Strategy.

North County-Weighted Jobs, South County-Weighted Housing
Santa Barbara County Association of Governments (SBCAG)

This scenario begins with existing, adopted land uses, but uses model weightings to make specific growth allocation assumptions to place an emphasis on job growth in the North County and housing growth in the South County. Unlike Scenario 1: Future Baseline, it does not continue existing growth trends. It includes all programmed and planned RTP transportation projects.
Montecito Fire Protection Project
Jason Dale, Noah Eckhous, Kenta Ishii, and Jackie Va
Department of Geography
University of California, Santa Barbara
Timely response to medical and fire incidents is critical for the safety of a community. The national standard for response is five minutes. At the request of the Montecito Fire Department, a response time analysis was conducted to determine what the current reach is from fire stations. The one-, two-, three-, four-, and five-minute response allows fire personnel to determine which areas are underserved.

Glacial Change within the Lake District of Chile/Argentina over 22 Years between 1985–2007
Mark Safreno, Josh Edge, Nick Carver
Geography 115C Group 7
Glacial change is documented for the study area for several decades, showing that retreat is still the primary process.
In a concern for securing sustainable energy for the future a number of variables were examined to identify regions that have positive attributes to provide an adequate setting to build wind turbines as well as to identify offshore wind speeds that will provide the best theoretical power output for a series of wind turbines.

Potential Locations for Offshore Wind Energy
Ryan Hanni, Collin Baratte, and Matt Murchison
Department of Geography
University of California, Santa Barbara

We determined our locations of interest by creating a number of thematic maps. Our data layers were arranged so that we could create a hybrid of very sensitive and insensitive average offshore wind speeds in the grid. We added several variables to our data so we could perform a weighting function for each cell. Upon completion of our analysis we were able to determine the best possible wind speeds. We determined that the Pacific Northwest held the strongest potential for building offshore wind farms. The average household wind farm (11697kW) annually fed these areas as well as the potential to produce about 8609-9709 TWh per year at 30% efficiency. Every area of wind turbines placed in the hot-spot regions where highlighted as well as contributing to areas of high potential for wind energy.