The 40th Annual

Applied Geography Conference

CONFERENCE PROGRAMS

MAIN EVENT

Port Canaveral, Florida

November 13-17, 2017

RESEARCH PRESENTATIONS

Session A 8:00 AM – 9:30 AM

REGIONAL AND LOCAL GEOGRAPHIES
Room: Adventure
Chair: *Yichung Xie*, Eastern Michigan University, Ypsilanti, MI

Stop and Frisk as a Tool for the Communication of Urban Space
Jay L. Newberry, Binghamton University, Binghamton, NY

Mapping Private School Enrollment and White Flight within U.S. Metropolitan Areas
Charlie Zhang, University of Louisville, Louisville, KY

Detecting Long-Term Trend of Climate Change and Their Spatial Variations Caused by Regional and Local Environments through Computational Data Mining
Yichun Xie, Eastern Michigan University, Ypsilanti, MI

Session B
9:45 AM – 11:15 AM

CLIMATE AND AGRICULTURAL
Room: Adventure
Chair: *Richard A. Earl*, Texas State University, San Marcos, TX

Agricultural Intensification in the Midwest: Impacts on Regional Surface Humidity
Andrew Hill, Minnesota State University, Mankato, MN

Integration of the Wind River Reservation Agricultural Management Plan & A Clearinghouse of Reservation Environmental, natural resources, and Cultural Data
William J. Gribb, *Ginger Paige*, *Paddington Hodza*, *Roger Coupal*, *Kirk Scheffler*, and *Samantha Rosado*, University of Wyoming, Laramie, WY

Precipitation to Peak Discharge Relationships in the Eastern Texas Hill Country

Richard A. Earl, *Heather Wooten*, *Joel Sherrouse*, and *Sarita Hedgepeth*, Texas State University, San Marcos, TX

URBAN GEOGRAPHY
Room: Voyager
Chair: *Wei Song*, University of Louisville, Louisville, KY

"City Space": A Network View on Passenger Vehicle Purchasing in Chinese Cities
Daqian Liu, Chinese Academy of Science, China; *Wei Song*, University of Louisville, Louisville, KY; *Jia L*u, Valdosta State University, Valdosta, GA; *Chunyan Xie*, FAW-Volkswagen Automotive Company, Ltd, China

Making Sense of Trends in Mcropolitan Areas
Charles C. McShane, University of North Carolina – Charlotte, Charlotte, NC

Analyzing the Contribution Factors for New Construction and Demolition Using Random Forest Regression
Nathan Ron-Ferguson, University of Memphis, Memphis, TX

Shrinking or Growth: Demographic Characteristics, Economy and Spatial Responses to Population Decline in Resource-Exhausted City of Yichun
Zhimin Liu, Chunliang Xiu, and Wei Song, Northeast Normal University, China

Session C
1:00 PM – 2:30 PM

ENVIRONMENT: TORNADOES AND HURRICANES
Room: Adventure
Chair: *James B. Elsner*, Florida State University, Tallahassee, FL

Elasticity of Tornado Causalities
Tyler Fricker, Florida State University, Tallahassee, FL

Intense Hurricane Strikes Serve as Geologic Agents on the Mcfaddin National Wildlife Refuge, Texas
Joshua Hodge, Texas State University, San Marcos, TX

Structural Property Exposure and Losses from Tornadoes in Florida
James B. Elsner, Florida State University, Tallahassee, FL

MEDICAL GEOGRAPHY
Room: Voyager

Chair: *Jia Lu*, Valdosta State University, Valdosta, GA

Acellular Pertussis Vaccination: A Multiscale Geographic Analysis
David Mills, Texas State University, San Marcos, Texas

Examining Social Network and Children's Eating Behaviors with Latent Class Model
Yingru Li and Ting Du, University of Central Florida, Orlando, FL

A Spatiotemporal Analysis of Vaccine Preventable Measles Outbreaks in the United States by Using Informally Collected Data
Amanda Martin and *Kang Shou Lu*, Townson University, Towson, MD

Emergency Planning in South Georgia
Jia Lu, Valdosta State University, Valdosta, GA

Session D
2:45 PM – 4:15 PM

REMOTE SENSING OF ENVIRONMENT
Room: Adventure
Chair: *Jennifer L. R. Jensen*, Texas State University, TX

Methods for Assessing the Credibility, Relevance, and Legitimacy of the UNFCCC REDD+ Forest Reference Emission Levels (FRELs)
Brian A. Johnson, Institute for Global Environmental Straggles

Analysis of Urban Sprawl in Edwardsville and Glen Carbon, Illinois Using Remote Sensing and Population Data
Hilda U. Onuoha and *Shunfu Hu*, Southern Illinois University Edwardsville, Edwardsville, IL

Digital Terrain Model Generation Using Structure from Motion: Inference of Canopy Closure on Product Accuracy
Jennifer L. R. Jensen and *Matthew Washburn*, Texas State University, San Marcos, TX

FOOD DESERTS AND TRANSPORTATION
Room: Voyager
Chair: Timothy Mulrooney, North Carolina Central University, Durham, NC

Spatial Spillover Effects of High-Speed Railways: Evidence from Northeast China
Qiao Li, Northeast Normal University, Changchu, China and Rensselaer Polytechnic Institute, Troy, NY

Mapping Activities in Recreational Trial with Spatial Video: A Case Study at Kent State University

Xin Hong, Kent State University, Kent, OH

A Comparison of Raster-Based Travel Time Surfaces against Vector-Based Network Calculations as Applied in the Study of Rural Food Deserts
Timothy Mulrooney, North Carolina Central University, Durham, NC

Session E
4:30 PM – 6:00 PM

POLITICAL GEOGRAPHY
Room: Adventure
Chair: *Jonathan C. Comer*, Oklahoma State University, Stillwater, OK

Topographic Reconstruction & Representation of Vigo Co. Conservation Club
Jacob Rayl, Indiana State University, Terre Haute, IN

The Production of 'Traitorous' Network under the Khmer Rouge: An Empirical Analysis of Genocidal Executions
James A. Tyner, Kent State University, Kent, OH

Exploring Spatial Patterns of Recreational Drone Ownership
Jonathan C. Comer and *Thomas A. Wikle*, Oklahoma State University, Stillwater, OK

LAND USE LAND COVER AND TOURISM
Room: Voyager
Chair: *Victor Mesev*, Florida State University, Tallahassee, FL

Understanding the Driving Factors for Grassland Vegetation Change Patterns by Spatial Association Analysis
Zongyao Sha, Wuhan University, Wuhan, China

Made in America – Consumer experience Tourism in the Factory Tour Capital of the World
Deborah Che, Southern Cross University, Bilinga, QLD, Australia

Location Intelligence with Beacons and Sensors in Commercial Real Estate
Grant Ian Thrall, University of Florida, Gainsville, FL

The Land Use/Land Cover Dichotomy Visualized with Bivariate Maps and Sankey Flow Diagrams
Victor Mesev and Georgianna Strode, Florida State University, Tallahassee, FL

AGC 2017

Kent State Symposium

November 10, 2017

Session Schedule

Session 1 (8:00 to 9:20 am)

Room: 305, McGilvrey Hall, Kent State University, Kent Campus

Research Paper Session – *General Geographic Applications*

Focus: A session including a wide spectrum of papers covering the diverse field of location intelligence, including an opportunity for general discussion.

Chair: Tony Hernandez

Presentations:

1. Oluwaseun Egbinola: Application of Geographical Information Systems (GIS) and Remote Sensing (RS) Techniques in Predicting Malaria Exposure in Nigeria

2. Xinyue Ye, Bing She and Shuming Bao: A Framework of Social Media Data and Census Data Fusion

3. John Green: Spatial Enrollment Patterns in South Dakota Public Universities, 2006 to 2015

4. Qiao Li: Spatial Spillover Effects of High-Speed Railways: Evidence from Northeast China

5. Murray D. Rice, Ron Kalafsky, and Ross Brown: The Geography of High-Growth Firm Acquisition in the United States

Morning Break 1 (9:20 to 9:35 am)

Session 2 (9:35 to 10:40 am)

Room: 305, McGilvrey Hall, Kent State University, Kent Campus

Research Paper Session – *Location Intelligence: Business and Data Applications*

Focus: A session including a wide spectrum of papers covering the diverse field of location intelligence, including an opportunity for general discussion.

Chair: Murray Rice

Presentations:

1. Mohammed-Rabiu Abubakari and Louisa M. Holmes: Food Accessibility – Grocery Store Locations and Neighborhoods in Binghamton, NY

2. Thomas J. Christoffel: 2020 Census Challenge: A Functional Sub-State District/ Regional Council Dataset for Research, Policy and Programming in the U.S.

3. Xuebin Wei and Xinyue Ye: How People Perceive El Nino on Twitter

4. William Graves: Demographic Data Vendor Bias and Retail Location Inefficiencies

Morning Break 2 (10:40 to 10:55 am)

Session 3 (10:55 am to noon)

Room: 305, McGilvrey Hall, Kent State University, Kent Campus

Research Focus Session – "The Retail Real Estate Aftermath of Department Store Closures: Target Canada"

Chair and Introducer: Murray Rice, University of North Texas; *Speaker:* Tony Hernandez; *Discussant:* Larry Carlson

Luncheon (noon to 1:30 pm)

Room: Kent State University Conference Hotel

Luncheon Speaker: Vince Corno, Brixmor Property Group

Topic – *Reflections on Retail Real Estate Research*

Session 4 (1:30 to 3:00 pm)

Room: 305, McGilvrey Hall, Kent State University, Kent Campus

Panel Session – *Geography and Retail Change*

Focus: Stores are closing, malls are changing, and E-commerce continues to evolve. This session attempts to make sense of these fundamental developments and explore the role that geographers can play in helping retailers and developers navigate through a turbulent age.

Chair: Clay Hallman; *Panelists:* Ken Smith, Kenard E. Smith & Associates; Larry Carlson, Carlson & Associates; Joe Tokosh, Kent State University; Dave Daleiden; Daleiden & Associates; Vince Corno, Brixmor Property Group

Afternoon Break (3:00 to 3:15 pm)

Session 5 (3:15 to 4:30 pm)

Room: 305, McGilvrey Hall, Kent State University, Kent Campus

Panel Session – *The Location Analytics Challenge*

Focus: Challenges on keeping current on research, including data and analytical issues. To set up the panel discussion, the session will begin with a presentation from Joe Aversa on current research practices, based on recent Ryerson University survey research on the analytical practices of Canadian business.

Chair: Tony Hernandez; *Panelists:* Clay Hallman, Simon Property Group; Ken Smith, Kenard E. Smith & Associates; Larry Carlson, Carlson & Associates; Joe Aversa, Ryerson University; Dave Daleiden, Daleiden & Associates

Informal Group Dinner (starting at 6:00 pm)

Venue plans to be announced at the conference

Abstracts

MAIN EVENT
Port Canaveral, Florida
November 13-17, 2017
RESEARCH PRESENTATIONS

ENVIRONMENTAL STUDIES
Room 1
Chair: *Yichung Xie*, Eastern Michigan University, Ypsilanti, MI

THE CHALLENGE OF ENVIRONMENTAL JUSTICE MEASUREMENT AND ASSESSMENT AND DATA ENVELOPMENT ANALYSIS Edwardo L. Rhodes (rhodes@indiana.edu), Indiana University, Bloomington, IN

Abstract

A major dimension, if not the major dimension, of environmental justice analysis discussions is the measurement and assessment of environmental justice conditions and situations. This is especially true within the context of environmental justice involving areal space. The study explores various components of the environmental justice measurement and assessment challenge within the context of an evaluation tool from management science: data envelopment analysis. An approach to the identification and measurement of comparative environmental justice is outlined. That is comparing relative levels of environmental justice differences across communities. This study includes the major categories of environmental justice covering placement in time, geographic specific, population specific, and economic specific problems. The author argues that the major problem facing environmental justice analysis has been controversy over measurement choices especially the choices of simultaneously or jointly evaluating multiple risks. Data envelopment analysis is demonstrated to have the potential for addressing several of these challenges.

STOP AND FRISK AS A TOOL FOR THE COMMODIFICATION OF URBAN SPACE Jay L. Newberry (jnewber@binghamton.edu), Binghamton University Department of Geography, Binghamton, NY

Abstract

One of the more controversial issues of our time concerns the law enforcement practice called stop-and-frisk. While many cities tend to conduct these stops, New York City took it to an extreme stopping over 5.1 million people over a twelve-year period with more than 80-percent of those stopped being minorities and 90-percent of all persons stopped being innocent. The vast racial disparities in the stops drew charges of profiling and quota based policing which has been the subject of increasing academic interest. This research, however, takes a different approach to understanding the racial disparities by examining an economic aspect in the stop locations. Specifically, this research engages Ronald Kramer's (2012) supposition that the overly aggressive stop-and-frisk aimed at minorities in some locales was more about the commodification of urban space and less about the suppression of crime. Preliminary analysis using data reduction techniques on the 2014 stop-and-frisk figures for New York City revealed that areal transitions (gentrifying areas) increased the probabilities of Blacks and Hispanics being stopped. Conversely, the probability of Whites being stopped in the very same areas decreased.

Key Words: stop-and-frisk, racial profiling, racial disparities, broken windows, urban crime

DETECTING LONG-TERM TREND OF CLIMATE CHANGE AND THEIR SPATIAL VARIATIONS CAUSED BY REGIONAL AND LOCAL ENVIRONMENTS THROUGH COMPUTATIONAL DATA MINING Yichun Xie (yxie@emich.edu), Eastern Michigan University, MI

Abstract

Climate change is a global phenomenon but is modified by regional and local environmental conditions. Moreover, climate change exhibits remarkable cyclical oscillations and disturbances, which often mask and distort the long-term trends of climate change we would like to identify. Inspired by recent advancements in data mining, we experimented with empirical mode decomposition (EMD) technique to extract long-term change trends from climate data. We applied GIS elevation model to construct 3D EMD trend surface to visualize spatial variations of climate change over regions and biomes. We then computed various time-series similarity measures and plot them to examine spatial patterns across weather-stations. We conducted a case study in Inner Mongolia based on daily records of precipitation and temperature at 45 meteorological stations from 1959 to 2010. The EMD curves effectively illustrated the long-term trends of climate change. The EMD 3D surfaces revealed regional variations of climate change, while the EMD similarity plots disclosed cross-station deviations. In brief, the change trends of temperature were significantly different from those of precipitation. Noticeable regional patterns and local disturbances of the changes in both temperature and precipitation were identified. The trends of change were modified by regional and local topographies and land covers.

Key Words: climate change; empirical mode decomposition; Inner Mongolia; similarity plot; trend surface

GEOGRAPHY EDUCATION

Room 2

Chair: *R. Denise Blanchard-Boehm*, Texas State University, San Marcos, TX

MAPPING PRIVATE SCHOOL ENROLLMENT AND WHITE FLIGHT WITHIN U.S. METROPOLITAN AREAS

Charlie Zhang (c.zhang@louisville.edu), and Matthew Ruther (matthew.ruther@louisville.edu), University of Louisville, Louisville, KY

Abstract

While urban issues such as school segregation and white flight are inherently geographical, limited research in the spatial social science literature has investigated the contemporary patterns of how parents exercise school choice between different school systems and among a variety of school districts within each metropolitan area. The purpose of this research is to investigate racial/ethnic disparities in public and private school enrollment across metropolitan areas in the U.S., with a primary focus on revealing evidence of white flight into private schools or from urban to peripheral districts as consequences of unprecedented demographic change and education reform policies in the last two decades. The overarching hypothesis of this research is that persistent decreases in the proportion of white students in urban public schools in U.S. metropolitan areas are attributable not only to demographic changes in these areas, but also to the exodus of white students into private academies and white outmigration from central city to suburbs or from one suburb to another. National datasets on school district demographics and school enrollment (1990-2014) from the U.S. Census and the National Center for Education Statistics (NCES) will be analyzed using GIS-based mapping and spatial panel modeling techniques. Findings from this research project will not only provide guidance for urban school district policies, but also enhance our understanding of the geographies of education phenomena in a metropolitan context.

Key Words: Demographic changes, private school enrollment, white flight, urban and suburban, metropolitan area.

DEFINING A PROCESS OF EDUCATION COMMUNICATION BETWEEN LEADERS IN K-12 GEOGRAPHIC EDUCATION AND CLASSROOM TEACHERS OF GEOGRAPHY

R. Denise Blanchard (rb06@txstate.edu), Texas State University, San Marcos, TX and Matthew T. Patton (mpatton@unomaha.edu), University of Nebraska Omaha, Omaha, NE

Abstract

Currently, the relationships and communication networks between K-12 teachers and leaders in geographic education are incomplete. In an effort to understand more fully the relationships that exist between K-12 geography teachers and leaders in geographic education, the process of education communication must first be addressed. Accordingly, the authors present a theorized process of communication between information disseminated by geographic education leaders and acceptance/action by K-12 classroom teachers of geography. This paper blends mass communication and persuasion theory, traditional educational communication literature, and K-12 geographic education literature. To conceptualize this, the authors examine communication in terms of "hearing," "understanding," believing/internalizing," "perceiving," and "confirming." Hearing incorporates the messages being put forth. Understanding includes the characteristics of each message and the characteristics of each receiver (educator). Message and receiver characteristics determine the success or failure of message receipt, which includes belief/internalization, perception, and confirmation. The interplay between message and receiver characteristics acts as the basis for statistical analysis.
Key Words: K-12 Geographic Education, Education Communication, Mass Communication, Persuasion Theory, Process Theory of Communication

CLIMATE AND AGRICULTURAL

Room 1

Chair: *Richard A. Earl*, Texas State University, San Marcos, TX

AGRICULTURAL INTENSIFICATION IN THE MIDWEST: IMPACTS ON REGIONAL SURFACE HUMIDITY

Andrew Hill (andrew.hill@mnsu.edu), Minnesota State University, Mankato, MN

Abstract

Changes in human population growth rates due to modern medical advancements has ultimately resulted in drastic land use change which is evident on a global scale. In support of this population growth an intensified agricultural system has occurred with the Midwest Corn Belt as a prime example. While an often-overlooked factor, land use changes can have a significant effect on climatic processes.

Increases in soil moisture availability combined with modern agricultural practices has likely resulted in the anthropogenic elevation of surface humidity and dew point temperature. Commensurate with this change is a modification of surface energy balances resulting in decreased daily temperature ranges from diurnal cooling and elevated nocturnal minimums. Increased atmospheric moisture also has a direct effect on human comfort through a decrease in evaporative cooling capacity.

Analysis of historic USDA agricultural statistics highlighting yields, land use allocation, plant population rates, and modern agricultural technology development will aid in the understanding of subsequent effects on surface humidity. These variables along with historic dew point and minimum/maximum temperature data from 59 NWS first order stations will provide a possible statistical link between agricultural development in the Midwest and effects on surface humidity. Further field work will provide a current multi-level canopy model of transpiration and stomatal conductance rates for regionally grown corn and soybeans with considerations for soil moisture availability and atmospheric vapor pressure deficit. This will allow accurate scaling up to field levels to predict overall atmospheric moisture contributions at determined mid-day transpiration maximums over the course of the 2017 growing season.

Key Words: agriculture, climate, humidity

INTEGRATION OF THE WIND RIVER RESERVATION AGRICULTURAL MANAGEMENT PLAN AND A CLEARINGHOUSE OF RESERVATION ENVIRONMENTAL, NATURAL RESOURCE AND CULTURAL DATA
William J. Gribb (planning@uwyo.edu), Ginger Paige, Paddington Hodza, Roger Coupal, Kirk Scheffler, and Samantha Rosado, University of Wyoming, Laramie, WY

Abstract

The resultant Native American reservation system in the United States is structured to provide minimal economic development capability. However, through a series of court cases, development of natural resources, and successful management strategies, reservations are beginning to expand their success in economic development. The Big Horn Adjudication provides for the expansion of irrigation water to portions of the Wind River Reservation (WRIR) that can potentially increase agricultural production. The WRIR through the development and implementation of an agricultural resource management plan can direction and establish the procedures to better manage that increase. The plan is a community-based policy document that addresses nine major issues on the Reservation; agricultural management, water management, land tenure, land leasing, agricultural economics, rangeland management, cropland management, wildlife-livestock interactions, and environment and natural resource information management and access.

The WRIR Agricultural Resource Management Plan, however, is only one aspect of addressing the issues confronting the Reservation. The lack of readily available environmental and natural resource information is a barrier to the Eastern Shoshone and North Arapaho Tribal Councils, along with the major tribal agencies, e.g., Tribal Water Engineer's Office, in decision making. This project assisted the WRIR in development of their Agricultural Resource Management Plan and their digital environmental and natural resource clearinghouse. The query-based web-site provides both decision-makers and citizens with the ability to examine potential areas for agricultural development, e.g., linking soil capability, water access, slope constraints, and flood potential. This capability is coupled with the expansion of WRIR sovereignty by implementing the Agricultural Resource Management Plan.

Key Words: Wind River Reservation, GIS, Agricultural Resource Management Plan, Clearinghouse

PRECIPITATION TO PEAK DISCHARGE RELATIONSHIPS IN THE EASTERN TEXAS HILL COUNTRY
Richard A. Earl (re02@txstate.edu), Heather Wooten, Joel Sherrouse, Sarita Hedgepeth, Dept. of Geography, Texas State University, San Marcos, TX 78666

Abstract

The eastern Texas Hill Country is notorious for its extreme storm precipitation amounts and resulting flood discharges. The resulting flash floods contribute to Texas leading the U.S. in automobile flood fatalities. These floods produce considerable groundwater recharge to the Edwards Aquifer. A better knowledge of precipitation to peak flood discharge relationships can improve flood hazard warning and provide estimates of groundwater recharge from ungaged ephemeral streams.

We used the USGS Slope Area method to calculate peak discharges on four streams on the Texas State Freeman Ranch, approximately 6 miles west of downtown San Marcos, with drainage areas between 18.8 and 0.3 mi^2. We used NWS, CoCoRaHS, and Lower Colorado River Authority (LCRA) Hydromet precipitation data. Reference unit runoff and flood volume runoff were determined from nearby USGS and LCRA gages for similar sized drainages. We determined that a minimum of 4 in/24 hrs was required to produce quickflow, a value that could be modified by antecedent precipitation in the previous 1 to 3 days. Approximately 360-acre feet of runoff would be produced by each 1,000 ft^3 /sec peak stream flows with approximately one third becoming recharge on streams without dams and higher on streams with flood detention dams.

Key Words: Texas floods, flood hazards, stream recharge

URBAN GEOGRAPHY
Room 2
Chair: *Wei Song*, University of Louisville, Louisville, KY

"CITY SPACE": A NETWORK VIEW ON PASSENGER VEHICLE PURCHASING IN CHINESE CITIES Daqian Liu (liudaqian@iga.ac.cn), Chinese Academy of Sciences, China; Wei Song (wei.song@louisville.edu), University of Louisville, Louisville, KY; Jia Lu (jlu@valdosta.edu), Valdosta State University, Valdosta, GA; Chunyan Xie (chunyanxie@126.com), FAW-Volkswagen Automotive Company Ltd, China.

Abstract

Inspired by the work of 'product space' initially proposed by Hidalgo et al. (2007), we extend the method to explore the similarity between the Chinese cities based on the data of automobile sales in each city in 2012. The automobile market in each city is shared by different manufacturers and the proximity between two cities is calculated based on the similarity or relatedness of both market structures. The spatial pattern of the city space built based on the proximities of automobile markets among cities using GIS mapping technology is examined. This study also proposes some interpretations with respect to the specific spatial pattern of the "city space".

The analysis indicates that cities with higher proximity tend to be similar. According to the indices of proximity among cities, four geographical city clusters are detected which will be named: Southeast developed city-cluster, North China city-cluster, Northeast city cluster and West city-cluster. By analyzing the characteristics of cities in each cluster, it is discovered that cities in the same cluster have many common features, while cities in different clusters exhibit obvious variances, especially in terms of economic status and dominant automakers.

The analysis of centrality demonstrates that generally the index of centrality is negatively associated with the cities' economic status embodied by per-capita disposable income of urban residents. To a large extent, the geographical distribution of the centrality coincides with the economic map in China.

Key Words: Automobile market structure, city space, proximity, spatial relatedness, centrality, China.

ANALYZING THE CONTRIBUTING FACTORS FOR NEW CONSTRUCTION AND DEMOLITION USING RANDOM FOREST REGRESSION Nathan Ron-Ferguson (nfergusn@memphis.edu) University of Memphis, Memphis, TN

Abstract

Construction and demolition permits are good indicators of where cities are growing or declining and can help planners and city officials better understand local trends in growth and population change. Combining permit information with data relating to socioeconomic or physical characteristics can reveal contributing factors that may relate to a greater incidence of one or the other and can aid practitioners in crafting policy that encourages or discourages growth.

This paper explores contributing factors to rates of construction or demolition in the Memphis, TN region using random forest regression. It uses over 200 socioeconomic, demographic, and built environment variables to explore which characteristics have contributed to construction or demolition permits over a 12-year period. Results indicate that the variables that have the greatest impact on both construction and demolition include the distance to the CBD, the average age of all buildings, and population density, factors that are most closely correlated with patterns of sprawl. However, when considering locations that have the greatest amount of infill development (construction minus demolition), variables relating to the built environment (distance to schools, parks, etc.), begin to feature more

prominently which seems to indicate the importance of land use policy when encouraging reinvestment in the core city.

Key Words: infill, random forest, sprawl, construction, demolition

MAKING SENSE OF TRENDS IN MICROPOLITAN AREAS Charles C. McShane (ccmcshan@uncc.edu), UNC-Charlotte

Abstract

The urban-rural divide in the United States has garnered renewed attention as most metropolitan areas continue to grow while non-metropolitan areas stagnate or decline. In the middle of the urban-rural spectrum are micropolitan areas with both urban and rural characteristics. Formally recognized by the U.S. Census Bureau in 2003, these county-based areas consist of an urbanized area between 10,000 and 50,000 population. More than 27 million Americans, 8.5% of the total population, live in 537 micropolitan areas.

Between 2010 and 2016 micropolitan areas grew by only 0.3% compared to the national growth rate of 4.7%. But micropolitan growth was anything but even across the country. For example, 302 and 551 micropolitan areas stagnated or lost population between 2010 and 2016, while 58 micropolitan areas grew faster than the national average. In addition, per capita income in micropolitan areas in 2015 ranged from $23,552 in Arcadia, Florida, to $143,486 in Jackson, Wyoming.

This paper describes economic and demographic trends among U.S. micropolitan areas from 2000 to 2016 with a focus on pre- and post-recession performance. The trends identified will be used to suggest a possible strategy for developing micropolitan area typologies.

SHRINKAGE OR GROWTH: DEMOGRAPHIC CHARACTERISTICS, ECONOMY AND SPATIAL RESPONSES TO POPULATION DECLINE IN RESOURCE-EXHAUSTED CITY OF YICHUN Zhimin Liu (liuzm291@nenu.edu.cn), Chunliang Xiu (xiucl@nenu.edu.cn), Northeast Normal University, Changchun, China; Wei Song (w0song03@louisville.edu), University of Louisville, Louisville, KY

Abstract

Urban shrinkage, mainly characterized by population decline, is widely spread as a paradigm of urban development pattern that breaks the traditional perception. Urban shrinkage in resource-exhausted cities during their transformation periods is overwhelming and reprehensive. Thorough investigations are much needed to address this very important phenomenon in urban development.

Based on the population census and other survey data, this paper employed statistic methods, GIS-based spatial analytical tools, and landscape pattern indexes to explore the City of Yichun's demographic characteristics, economy and spatial responds to urban changes, intending to determine whether or not Yichun indeed has experienced an apparent urban shrinkage.

Research results reveal that, first, Yichun's population decreased by 10% in the whole urban areas when forestry resources were exhausted. But the population of central urban areas has not declined, on the contrary, it has continued growing from 55,052 to 246,103. Second, the growth rate of GDP has slowed down but the absolute value of GDP still increased. Third, as to urban space, it was expanding in the form of filler growth and the efficiency of land use has been improved remarkably. So we think that it is to some extent a false proposition that Yichun is a shrinking city.

Key Words: urban shrinkage, population decline, resource-exhausted city, Yichun

ENVIRONMENT: TORNADOES AND HURRICANES

Room 1
Chair: *James B. Elsner*, Florida State University, Tallahassee, FL

ELASTICITY OF TORNADO CAUSALITIES Tyler Fricker (tfricker@fsu.edu), Florida State University, Tallahassee, FL

Abstract

Tornadoes are violent wind storms capable of producing catastrophic damage along with mass casualties. According to the National Oceanic and Atmospheric Administration, tornadoes account for nearly one fifth of all natural hazard fatalities in the United States. Most tornadoes cause relatively few, if any, casualties but the potential for large losses is always high when a violent tornado strikes a city. Using reports over the period 2007-2015, Fricker et al. (2017) show that tornado casualties increase by 21% with a doubling of the population under the path and increase by 33% with a doubling of energy dissipation. The difference in these rates, known as 'elasticities', show that, on average, changes in energy dissipation have been relatively more important in explaining tornado casualties than changes in population. Here, I use a geographically weighted regression to find where elasticity values differ across the contiguous United States. Areas of high energy elasticity indicate where the underlying population is highly vulnerable to tornado casualties. Identifying these vulnerable areas allows us to delve further into the socioeconomic and sociodemographic variables that make some places more susceptible to casualties than others, all else being equal.

INTENSE HURRICANE STRIKES SERVE AS GEOLOGIC AGENTS ON THE MCFADDIN NATIONAL WILDLIFE REFUGE, TEXAS Joshua Hodge (Jbh113@txstate.edu), Texas State University, San Marcos, TX

Abstract

This study investigates the spatial extent of two recent hurricane storm surge sediment deposits on coastal marshes on the McFaddin National Wildlife Refuge in Southeastern Texas. Previous research in summer 2014 found hurricane sediment deposits from Hurricanes Rita and Ike.

Research conducted in summer 2017 involved digging shallow trenches on a transect about 760 m west of the transect in the previous study. Preliminary results indicate that the Hurricane Ike deposit has been identified at five trench sites in the current transect, and that the deposits thin out further inland. Future research will involve work on three more transects stretching from High Island, Texas to Sabine Pass, Texas.

The goal of this study is to discover spatial variations in recent storm surge sediment deposits in relation to the landfall locations of Hurricanes Rita and Ike. The findings of this study should provide valuable knowledge about the sedimentary response of coastal marshes subject to storm surge deposition and useful guidance to public policy aimed at combating the effects of sea level rise on coastal marshes along the northern Gulf of Mexico coastline.

Key Words: hurricane storm surge sediment deposits, coastal marshes, McFaddin National Wildlife Refuge, sedimentary response, sea level rise

STRUCTURAL PROPERTY EXPOSURE AND LOSSES FROM TORNADOES IN FLORIDA James B. Elsner (jelsner@fsu.edu), Florida State University, Tallahassee, FL

Abstract

Property losses from tornadoes in Florida are estimated by combining a one-km spatial grid of structural values from the Department of Revenue's 2014 cadastral database with historical tornado events since 1950. There are 91,180 cells in the state with at least some structural value. Total and residential structural values total $942 billion and $619 billion, respectively. Over the period 1950 through 2015 there were 3,233 individual tornado reports in the state with a peak frequency during July.

Property value exposed to tornadoes is estimated using a geometric model for the path. Annual statewide total and residential structural property exposure to tornadoes is estimated at $171 million and $103 million, respectively with the largest exposures during February. A regression model quantifies the relationship between actual losses since 2007 and exposures. A doubling of the residential exposure increases actual recorded losses by 26% since 2007 and a doubling of non-residential exposure increases losses by 21% controlling for changes over time.

Randomization of the historical tornado paths provides alternative exposure scenarios that are used to determine the probability of extreme loss years. Results from the Monte Carlo algorithm indicate a 1% chance that the annual loss will exceed $430 million and a .1% chance that it will exceed $1 billion. These findings, and the procedure to obtain them, should help property insurance and reinsurance companies gauge the risk of losses and prioritize management actions.

Key Words: tornadoes, property exposure, Florida, cadastral database

MEDICAL GEOGRAPHY

Room 2

Chair: *Jia Lu*, Valdosta State University, Valdosta, GA

ACELLULAR PERTUSSIS VACCINATION: A MULTISCALE GEOGRAPHIC ANALYSIS David Mills (dam203@txstate.edu), Texas State University, San Marcos, TX

Abstract

The substance of the Acellular Pertussis vaccination is reviewed using a multi-scale geographic analysis. Global, country, and state scale data were aggregated from the World Health Organization, Eurosurveillance, and the Texas Department of State Health Services. Data was analyzed for correlation using simple linear regression analysis and non-parametric methods.

The results from this research demonstrate that countries using the Acellular Pertussis vaccination show an intensification of Pertussis prevalence compared to countries using Whole-cell Pertussis vaccination, high vaccination rates compared to moderate vaccination rates using Acellular Pertussis vaccination do not correlate to a difference in Pertussis prevalence, and conscientious exemptions in schools do not affect Pertussis prevalence.

This data was gathered and analyzed to promote current and future research of Acellular Pertussis Vaccination efficacy and effectiveness, to propose a need for discussion regarding current vaccination strategies, and to encourage the re-evaluation of healthcare policies used to help protect at-risk populations from Pertussis.

Key Words: pertussis, vaccination, acellular pertussis, disease prevalence, vaccination efficacy

MAPPING ACTIVITIES IN RECREATIONAL TRAIL WITH SPATIAL VIDEO: A CASE STUDY IN KENT STATE UNIVERSITY Xin Hong (xhong1@kent.edu), Kent State University, Kent, OH 44240

Abstract

Recreational trails facilitate outdoor leisure activities and increase the population of physical activities. Understanding the use patterns of a trail is crucial for assessing the functionality of the trail and evaluating public health among the local population. This paper presents a novel approach to map the use patterns of a university trail by combining spatial video and Geographic Information System (GIS). Six videos, with each video being 30 minutes long, were captured by a GPS-enabled camera along the trail in the southeast of Kent State University, Kent, OH. Physical activities in the trail, were coded from the videos and presented on maps using GIS. The study finds that activities tend to concentrate near the center of campus; the farther from the campus, the fewer number of activities. The use patterns are found to be

different between males and females. The activity zone of males is more dispersed than females, while the activity zone of females is more concentrated near to campus. This study has the potential for providing useful information to the use and safety assessments for university recreational trails.
Key Words: spatial video, recreational trail, physical activity, safety

EXAMINING SOCIAL NETWORK AND CHILDREN'S EATING BEHAVIORS WITH LATENT CLASS MODEL
Yingru Li (yingru.li@ucf.edu) and Ting Du (TingDu@knights.ucf.edu), University of Central Florida, Orlando, FL

Abstract

The prevalence of childhood obesity has increased markedly over the past several decades. Unhealthy diet plays an increasingly important role in children's weight problem. Children's dietary patterns are influenced by a wide range of determinants, such as self-perception towards weight or health status, social environment, and family sociodemographic factors. Social network, namely the relationship with peers, friends, families, and communities, is an important aspect of a person's social environment, which might influence his/her eating behaviors and weight status.

This study aims to assess the effects of social network on children's diet and weight. Data of children aged 8-15 was extracted from the National Health and Nutrition Examination Survey 2011-2012 for analysis. Latent class models were constructed to examine whether social network and self-perception influences children's eating behaviors and how specific social relationships (e.g. family, peers, school) were associated with unhealthy diet. Results show that children with strong social network or self-perception towards their weight preferred to eat at home rather than dine out. Among different types of social relationships, family/parents-based network was most influential to children's eating behaviors.
Key Words: Social network, childhood obesity, eating behaviors

A SPATIOTEMPORAL ANALYSIS OF VACCINE PREVENTABLE MEASLES OUTBREAKS IN THE UNITIZED STATES BY USING INFORMALLY COLLECTED DATA

Amanda Martin and Kang Shou Lu (kshoulu@townson.edu) , Department of Geography and Environmental Planning

Towson University , Towson, MD 21252

Abstract

Measles is one of the most contagious viruses spread primarily by respiratory droplet. Nearly 10% of people are susceptible during an outbreak and the death rate can reach 2-3 cases per 1000. Measles was once common diseases in childhood in the past but now is rarely seen in the United States thanks to medical advances in vaccination. However, it has redrawn public concerns due to increasingly frequent outbreaks over the past decade. This paper examines the recent spatiotemporal trends, patterns, and determinants of increased measles outbreaks in the United States. By using a larger set of data collected from 2008-2014, we identified 123 outbreaks with total 817 cases over the study period. Among cases with sources of strains identified, 62.79 percent were imported, mainly from Asia and European countries. The data also revealed a clear seasonal pattern of outbreaks which previous studies found absent in the highly vaccinated country. While measles outbreaks are clustered in the metropolitan areas near the major international airports in California, New York and Ohio, their spatial distribution is largely determined by variations in vaccine rates and population as indicated by a negative binomial regression

analysis. It is hoped that the findings can be used for planning and prioritizing the disease control effort in the future.

EMERGENCY PLANNING IN SOUTH GEORGIA Jia Lu (jlu@valdosta.edu), Valdosta State University, Valdosta, GA

Abstract

Family emergency planning is important to everyone in the community. Studies have shown that planning for emergency is important to reduce the impact of disasters, and lack of planning may be an underlying cause in some cases for loss of properties and human lives. Given the recent disaster in South Georgia, it is essential to gauge the preparedness of our community regarding disasters and other emergencies. However, no such study has been conducted for South Georgia so far.

The objective of this project is analyze family emergency planning in South Georgia. We surveyed hundreds of local residents regarding their family emergency planning. The survey was conducted both in person and online, and the results were analyzed in detail. We conclude that there is a lack of planning for significant numbers of residents in case of emergency, and many of them are not aware of the need for emergency planning. There is also a gap in emergency preparedness among people with different incomes, genders, and education levels. We suggest our government officials to increase the education of emergency planning and provide more assistance for our residents in their planning.

Key Words: Emergency Planning, Quantitative Analysis

REMOTE SENSING OF ENVIRONMENT

Room 1

Chair: *Jennifer L. R. Jensen*, Texas State University, TX

METHODS FOR ASSESSING THE CREDIBILITY, RELEVANCE, AND LEGITIMACY OF THE UNFCCC REDD+ FOREST REFERENCE EMISSION LEVELS (FRELs) Brian A. Johnson (johnson@iges.or.jp), Hiromitsu Samejima, Masayuki Kawai, Kazuo Matsushita, Ikuko Matsumoto, Yasuo Takahashi, Sana Okayasu. Institute for Global Environmental Strategies, Hayama, Kanagawa, Japan

Abstract

REDD+ is a policy framework under which developing countries can receive results-based payments (RBPs) for reducing greenhouse gas emissions in the land-use/land-use change and forestry (LULUCF) sector. To receive RBPs, the UNFCCC requires countries to develop: **(1)** a national forest monitoring system (NFMS) that incorporates remote sensing and ground-based forest carbon inventory data, and **(2)** a projection of future emissions (a "forest reference emission level", or FREL) based on the NFMS. RBPs are planned to be based on countries' actual emissions in relation to their projected emissions. Because of this, the FRELs may be influenced by scientific factors (e.g. remote sensing data quality and data availability) as well as policy factors (e.g. governments' desires to ensure or maximize the RBPs received). In this study, we developed several quantitative indicators to assess credibility (scientific quality of the NFMSs), relevance (level of fitness with UNFCCC's policy objectives), and legitimacy (perceived fairness and balance) of the 26 NFMSs and FRELs submitted to the UNFCCC as of June 2017. We also evaluated relationships (e.g. tradeoffs) between these three criteria. Credibility, relevance, and legitimacy (CRELE) are frequently measured/assessed in the science-policy interface (SPI) literature, but no existing studies have focused on the NFMS/FREL process.

Key Words: remote sensing, science-policy interface, forest monitoring, deforestation, forest degradation

ANALYSIS OF URBAN SPRAWL IN EDWARDSVILLE AND GLEN CARBON, ILLINOIS USING REMOTE SENSING AND POPULATION DATA Hilda U. Onuoha, Shunfu Hu (shu@siue.edu), Southern Illinois University Edwardsville, Edwardsville, IL

Abstract

Rapid urbanization is one of the many critical global issues. This very significant social and economic phenomenon has brought about much debate in the past twenty years and has become a very important policy issue. Understanding the dynamics and patterns of the urbanization is important to develop appropriate policies and make more informed planning decisions. Many factors to influence the urbanization or urban sprawl have been identified, including population. In this study, urban sprawl in Edwardsville and Glen Carbon, Illinois is analyzed spatio-temporally using remote sensing images acquired from 1990 to 2015, and its relationship with the population change during the same period is investigated.

The objectives of this study are to: (a) identify the major land use changes in the Edwardsville/Glen Carbon area from 1990 to 2015; (b) analyze the rate of urban growth and its relationship to population change in the area from 1990 to 2015; and (c) identify the spatial pattern of the urban growth in the study area. Using multi-temporal satellite images to classify and derive changes in land cover classes during the 1990-2015 period, results showed that the land cover classes with major changes are the urban/built-up land and agricultural/grassland, with a steady increase in the former and steady decrease in the latter. Results also show the highest rate of increase in urban land was between 2000 and 2010. Both urban land and population show an increase during 1990 – 2015, but urban land shows a higher rate of increase, indicating urban sprawl. To analyze urban growth pattern, the study area was divided into three zones: Northeast, Southeast, and West. The Southeast zone showed the highest amount of the urban sprawl with "infill" type of growth.

Key Words: Urban land growth, remote sensing, population change, Edwardsville, Illinois

DIGITAL TERRAIN MODEL GENERATION USING STRUCTURE FROM MOTION: INFLUENCE OF CANOPY CLOSURE ON PRODUCT ACCURACY Jennifer L.R. Jensen (jjensen@txstate.edu), Matthew Washburn, Texas State University, San Marcos, TX

ABSTRACT

To date, several studies have reported that Structure from Motion (SfM)-dervied DTMs offer comparable accuracy to lidar survey datasets. However, few studies have examined the influence of vegetation canopy on the accuracy of DTM products generated using SfM. For this study, we sought to characterize the influence on vegetation canopy closure on SfM-derived DTMs. We collected images using a GoPro 3+ mounted on a 3DR 88+ UAS on October 28, 2016 over the Freeman Center research site in San Marcos, Texas. Canopy closure measurements were obtained for 28 plots distributed throughout the study site and processed using ForestCrowns software to derive closure estimates. The imagery was processed using the standard AgiSoft Photoscan workflow to produce a very dense 3D point cloud, which was then filtered and classified into ground and non-ground classes. DTMs generated from the SfM ground points and a prior lidar acquisition were compared using four canopy closure classifications. Generally, both DTM_{lidar} and DTM_{SfM} appear to be most consistently accurate over non-vegetated plots. Surprisingly, both the SfM and lidar DTMs exhibited the largest absolute error in Low canopy closure plots. Under Medium and High canopy closures, both DTM_{lidar} and DTM_{SfM} exhibited *lower* error than Low canopy closure plots.

FOOD DESERTS AND TRANSPORTATION

Room 2

Chair: Timothy Mulrooney, North Carolina Central University, Durham, NC

SPATIAL SPILLOVER EFFECTS OF HIGH-SPEED RAILWAYS: EVIDENCE FROM NORTHEAST CHINA Qiao Li (liq869@nenu.edu.cn), Northeast Normal University, Changchun, China, and Rensselaer Polytechnic Institute, Troy, NY

Abstract

The aim of this study is to summarize the primary literature on public infrastructure and regional economic growth by some methods based on empirical results. This paper examines the spatial spillover effects of public transportation infrastructure in northeast China, which is regarded as a controversial area according to some policies. The total data consists of 47 cities from the area during the period from 2004-2014 which are chosen to be output and input variables. The shortest travel time between two cities with high-speed railways and geographic distance are collected to set up spatial weight matrices. After getting all the logarithms of the data and the first-order difference, and the spatial econometrics models were used to estimate the spillover effects. The accessibility of every city changed a lot from 2004 to 2014, so that the accessibility is chosen to reflect the infrastructure development. The results indicate that positive and significant spillover effect exists after the construction of high speed railways (HSR) that means HSR is not only beneficial to the connected cities but also to the near cities.

Key Words: transportation geography, spatial spillover, econometrics

A COMPARISON OF RASTER-BASED TRAVEL TIME SURFACES AGAINST VECTOR-BASED NETWORK CALCULATIONS AS APPLIED IN THE STUDY OF RURAL FOOD DESERTS Timothy Mulrooney (tmulroon@nccu.edu), North Carolina Central University, Durham, NC

Abstract

While the term 'food desert' is gaining popularity in contemporary literature, there is debate as to how tenets of this phenomenon can be quantitatively measured. One of these tenets, proximity to food resources, can be measured within a digital GIS (Geographic Information System). Metrics such as Euclidean and network distance represent planimetric distance measurements between locations and resources, but do not represent the empirical cost that serves as a barrier (time and/or money) to those who utilize these resources. While the vector data model has been the standard by which these calculations are done, raster-based travel time surfaces can serve as a faster, replicable and scalable alternative. However, little research has been done to test the efficacy of these surfaces and their alignment with vector-based calculations. In this research, we developed two travel-time surfaces for a rural region in southeastern North Carolina. One represented travel times to grocery stores and another represented travel time to convenience stores. We found travel times derived from these surfaces were statistically consistent with vector-based counterparts. When utilized correctly using an appropriate scale and spatial resolution, these surfaces have the potential to be effective tools in the study of food deserts.

Key Words: Food Insecurity**,** Geographic Information System**,** Travel-time, Travel Surfaces

POLITICAL GEOGRAPHY

Room 1

Chair: *Jonathan C. Comer*, Oklahoma State University, Stillwater, OK

TOPOGRAPHIC RECONSTRUCTION & REPRENSENTATION OF VIGO CO. CONSERVATION CLUB Jacob Rayl (jrayl@sycamores.indstate.edu), Indiana State University, Terre Haute, IN

Abstract

The Vigo County Conservation Club (VCCC) was established in 1938 and is located north of Seelyville, Indiana, just shy of the north-western Vigo Co. line at 10382 Grotto Rd, Terre Haute, IN 47805. The Conservation Club consists of 385 acres, including a campground, amenities, and many trails. The mission of the Vigo County Conservation Club "*...is to promote and protect the trees, shrubs and lakes. Also to guard against poachers and unauthorized hunters so that the wildlife can live and roam freely on our grounds.*" The club is open to members and the public (only for special events) and operates in cooperation with the Department of Natural Resources of the State of Indiana.

The Vice President of the VCCC recognized that a map modernization project was needed to allow Club members and public visitors complete use of the property. After further analysis of the data the VCCC holds, it was clear that they had almost no digital geographic data, and relied primarily on hand drawn paper maps. Using a Trimble GPS unit field data (points, lines, polygons) were captured. Manipulation of the data, using select tool features (point-to-line, categorization) provided accurate and precise placement of all features at the VCCC. Furthermore, a track log was taken to record the distances of each trail in real time and all variations in the trails up to a five-meter variation.

Using ArcMap, a complete reconstruction and digital map of the Vigo County Conservation Club was successful, and more accurate maps and data are now available to club members and the public.

Key Words: ArcMap, GIS, Reconstruction, Vigo Co. Conservation Club

THE PRODUCTION OF 'TRAITOROUS' NETWORKS UNDER THE KHMER ROUGE: AN EMPIRICAL ANALYSIS OF GENOCIDAL EXECUTIONS James A. Tyner (jtyner@kent.edu), Kent State University, Kent, OH

Abstract

During the Cambodian genocide approximately 200 security-centers were established by the Communist Party of Kampuchea, better known as the Khmer Rouge. One of these institutions, designated as S-21, served as a political-military facilitated that functioned in part to identify and execute 'traitors' to the Party. This research paper builds on earlier work to document and empirically analyze the production of 'strings of traitors' that allegedly operated throughout the country to undermine the Khmer Rouge. This paper contributes not only to the understanding of the Cambodian genocide but provides a methodology for the empirical analysis of mass violence in other contexts.

EXPLORING SPATIAL PATTERNS OF RECREATIONAL DRONE OWNERSHIP Jonathan C. Comer (jon.comer@okstate.edu) and Thomas A. Wikle, Oklahoma State University, Stillwater, OK

Abstract

In 2016 monthly sales of unmanned aerial vehicles (drones) to U.S. consumers exceeded 15,000 units with the largest number purchased for recreational uses such as aerial photography and videography. Concerned about safety and personal privacy, some states and cities have implemented laws and ordinances restricting the use of drones in parks and in the vicinity of public events. Likewise, federal agencies such as the National Park Service prohibit all recreational drone use on some of the lands they manage. The Federal Aviation Administration (FAA) has also placed restrictions on drone use through requirements that drones be flown no higher than 400 feet above the surface and that airport mangers receive prior notification if a drone will be used within five miles of an airport. In June 2016, the FAA also began requiring drones weighing more than 0.55 pounds to be registered through an online system.

This paper explores the extent to which restrictions and other factors such as limited open space, influence spatial patterns of recreational drone ownership. Data comes from the FAA drone registry database (460,000+ records), U.S. National Aerospace System boundaries, and the U.S. Census of Population. We investigated the relationship between recreational drone ownership as defined by zip code counts and socio-demographic factors tied to communities including population density, income,

and education level. An additional variable investigated was the influence of federal airspace restrictions including proximity to airports.

Key Words: drones, airspace, privacy, geofences

LAND USE LAND COVER AND TOURISM

Room 2

Chair: *Victor Mesev*, Florida State University, Tallahassee, FL

UNDERSTANDING THE DRIVING FACTORS FOR GRASSLAND VEGETATION CHANGE PATTERNS BY SPATIAL ASSOCIATION ANALYSIS Zongyao Sha (zongyaosha@163.com), Wuhan University, Wuhan, China; Ruren Li (cerrli@sjzu.edu.cn), Shenyang Jianzhu University, Shenyang, China

Abstract

Spatial data mining provides a critical approach to understand the interactions between geographical events related to human-economic or natural processes. A typical example of those geographical events is land cover changes which could be attributed to human activities or/and climate changes.

In this work, we applied spatial association analysis to explore the grassland vegetation changes (GVCs) during 2000-2015 in Inner Mongolia (IM), China. The research coupled various datasets, including vegetation index from remote sensing images, and meteorological and socio-economic datasets. GVCs were categorized into three groups, vegetation recovery (or improvement) (VR), vegetation deterioration (or degradation) (VD) and no obvious trend (NOT). Our hypothesis concerning critical factors on the GVC patterns included, 1) VR and VD were reflected by its neighboring characteristics of GVCs, 2) VR and VD were consistent with the GVCs pattern in the previous stage, 3) VR and VD were closely related to the vegetation productivity. To test those hypotheses, the factors potentially related to vegetation recovery (VR) and vegetation degradation (VD) were studied by binary logistics regression (BLR) model using different predictors to explain the dependent variable of VR or VD. Our model considered both spatial and temporal context, i.e., including the past GVC pattern for the current location and the neighborhood characteristics of GVCs for the location in the previous period, to explain the GVCs dynamics and thus proved more powerful capability to predict grassland vegetation changes (recovery or degradation) in the future.

MADE IN AMERICA – CONSUMER EXPERIENCE TOURISM IN THE FACTORY TOUR CAPITAL OF THE WORLD Deborah Che (deborah.che@scu.edu.au), Southern Cross University, Bilinga, QLD, Australia

Abstract

York County, Pennsylvania has branded itself the "Factory Tour Capital of the World." As a hub of consumer experience tourism, York County has developed the Sweet Treats and Salty Eats food tourism trail, which focuses on the intersection of its industrial and agricultural heritage through its snack food manufacturing industry, and the Made in America Tours event, which invites visitors to see the places behind their favorite products. This paper will first discuss factors in the development of the geographically-concentrated snack food industry as well as those for manufacturing and distribution more generally, including York County's central location. Then the paper will focus on the importance for tourism development of 1) this clustering which today provides tourists with a concentration of snack food companies, as well as manufacturers ranging from artisan shops to Harley-Davidson, that find factory tours valuable in educating visitors about their distinct products; 2) York County's location in the center of Pennsylvania's #1 tourist region which also contains Gettysburg, Lancaster County, and Hershey; and

3) the affordability of visiting that has enabled York's tourism industry to better weather economic downturns and attract family-oriented events.
Key Words: consumer experience tourism, industrial heritage tourism, culinary tourism

LOCATION INTELLIGENCE WITH BEACONS AND SENSORS IN COMMERCIAL REAL ESTATE
Grant Ian Thrall (thrall@ufl.edu and grant@thrall.us), Ph.D., Principal, Business Geography Advisors, Professor (ret'd) and Fellow, Informatics Institute, College of Engineering, Miller Center for Retail, Warrington College of Business, University of Florida Gainesville FL 32608.
Abstract
NAIOP (National Association of Industrial and Office Parks & Commercial Real Estate Development Association, NAIOP.org) are investigating for its membership the deployment of RFID tags, and their receiver beacons. Analogous to a very small area GIS, the technology will track employees and visitors, equipment, documents, raw materials and finished goods inventory, as they move through the facility.

A goal is to highlight ways that CRE (commercial real estate) professionals can use the data they collect from the technology.The research will review academic literature and trade publications on Beaconing and RFID. The research will then reach out to NAIOP's 18,000 members with an online questionnaire to determine the interest, adoption, use, type of technology adopted, vendor adoption or inhouse installation, cost of adoption, issues including maintenance and data security. Are people concerned about being tracked? How is the data collected used? The third phase is to project the rate of future adoption and anticipate future changes in the technology and its uses.

Grant Ian Thrall's participation on this project, and his student assistants, are funded by NAIOP Research Foundation. NAIOP is a Presidential Member of the American Real Estate Society (http://www.ARESnet.org). Professor Grant Ian Thrall is a former President of ARES.

SUMMIT REGISTERS IN THE SOUTHERN APPALACHIANS Clayton J. Whitesides (cwhitesid@coastal.edu), Coastal Carolina University, Conway, SC
Abstract
A common tourist activity in mountain landscapes is summiting the local highpoint of a region. Increased tourism, however, coupled with population growth and globalization, has increased demand on mountains and may have long-term consequences on visitor experience and environmental conditions. Analysis of trailhead and summit registers has identified hiker origin and common hiking times and fee systems have been proposed to limit overcrowding and reduce ecological damage. Most research on these topics has occurred in the American West and little is known about summit registers on mountains in the American Southeast. The summits of Cheaha Mountain, AL, Brasstown Bald, GA, Black Mountain, KY, Mount Mitchell, NC,
Sassafras Mountain, SC, Clingman's Dome, TN, and Mount Rogers, VA were visited between 2014-2016 to search for past and present summit registers. Local visitor centers and land managers were also visited and contacted to learn about the history of each mountain summit and acquire access to summit registers.

Interestingly, of the seven summits, only Cheaha Mountain and Brasstown Bald maintain formal summit registers. An informal register was found on the summit of Sassafras Mountain, but the remainder of the peaks contained no record of past or present registers. Increased vandalism and ecological damage was documented on summits without registers. On peaks with logbooks, the location of the register appeared to be important in reducing vandalism. In addition to the presence or absence of logbooks, land ownership and fees also influenced vandalism and ecological degradation. Free, public summits contained more vandalism than free, private summits, for example. Better understanding of summit registers and

fee systems on mountains in the American Southeast is necessary for appropriate management of regional summits.

Key Words: summit register, Southern Appalachians, tourism, mountain environments, degradation

THE LAND USE / LAND COVER DICHOTOMY VISUALIZED WITH BIVARIATE MAPS AND SANKEY FLOW DIAGRAMS

Victor Mesev (vmesev@fsu.edu) and Georgianna Strode (gstrode@fsu.edu), Florida State University, Tallahassee, FL

Abstract

Land use implies some degree of anthropogenic disturbance, but the dichotomy with land cover is commonly used interchangeably, especially when anthropogenic disturbance is ambiguous, say managed forestland or abandoned agricultural fields. Cartographically, land use and land cover are also represented interchangeably within common map legends, giving the impression that the landscape is a seamless continuum of land use parcels spatially adjacent to land cover tracts. We believe this is misleading, and feel we need to reiterate the well-established symbiosis of land uses as amalgams of land covers; in other words, land covers are subsets of land use. Our work addresses this spatially complex and frequently ambiguous relationship, and posits that bivariate cartographic techniques are an ideal vehicle for representing both types simultaneously. Specifically, we explore the use of nested graphic symbology where land cover is represented as circles nested within land use squares. We also investigate bivariate legends for representing statistical covariance as a means for visualizing the combinations of land use and cover, and we apply Sankey flow diagrams to further illustrate the complex, multifaceted relationships between land use and land cover. Our work is demonstrated on data representing land use and cover data for the US state of Florida.

Key Words: bivariate maps, land use/land cover, statistical legends

AGC 2017
Kent State Symposium
November 10, 2017

Session 1 (8:00 to 9:20 am)

Research Paper Session – *General Geographic Applications*

Focus: A session including a wide spectrum of papers covering the diverse field of location intelligence, including an opportunity for general discussion.

Chair: Tony Hernandez

APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING (RS) TECHNIQUES IN PREDICTING MALARIA EXPOSURE IN NIGERIA. Oluwaseun Egbinola (newcreationman1@yahoo.com), University of Ibadan, Ibadan, Nigeria.

Abstract

In the developing world, malaria is a leading cause of mortality and morbidity most especially in Sub-Saharan Africa where the transmission rates are highest thus making it a major impediment to economic development. Despite several initiatives to curb the spread, the disease still persists and is re-emerging. The African situation is actually the worst where the number of deaths is actually increasing. The reasons for the re-emergence and persistence of malaria are many and varied. Environmental changes, economic reasons, declining control programs and mosquito and parasites adaptation to insecticides and drugs all contribute to the development of the disease.

Significant progress in monitoring of the environmental and anthropogenic factors which influences the reduction and the re-emergence of the disease have been made through developments within the past three decades in the field of GIS and Remote Sensing. Analyses resulting from the combination of GIS and Remote Sensing have improved knowledge of the biodiversity influencing malaria and can help decision makers to better allocate limited resources in the fight against the disease.

This paper will look into how variables such as temperature, rainfall, humidity, surface water, and vegetation, ownership and usage of bednet facilities which are all significant predictors for malaria infection can be analyzed using GIS and RS techniques in understanding the spatial and temporal dynamics of malaria infection in Nigeria.

Key Words: Geographical Information Systems (GIS), Remote Sensing (RS), Malaria

HOW PEOPLE PERCEIVE EL NINO ON TWITTER Xinyue Ye (xye5@kent.edu), Kent State University, Kent OH. Xuebin Wei (weixx@jmu.edu), James Madison University, Harrisonburg VA

Abstract

Social media, such as Twitter, Facebook, YouTube, etc., have become a critical resource where people gather and exchange information. Due to their fast dissemination and massive participation, the credibility of contents on social media is significant. In this paper, we investigated how people perceive El Nino, an extreme weather condition, on Twitter. We have collected Tweets mentioning 'El Nino' from December 2016 to January 2017, and geocoded most of the Tweets based on coordinates, place names or users' locations on their profiles. We have identified a significant increase of Twitter discussions about El Nino when a series rainstorms inundated California in January 2017. Although there were no recorded El Nino events during those rainstorms, many people, even some news media, mistakenly attributed that weather disaster to an El Nino condition. Our findings indicate that massive discussions on social media don't guarantee credibility of the contents. Public perceptions can be misled on social media.

Key Words: GIS, Twitter, El Nino, Public Perception

SPATIAL ENROLLMENT PATTERNS IN SOUTH DAKOTA PUBLIC UNIVERSITIES, 2006 TO 2015 John Green (john.green@jacks.sdstate.edu), South Dakota State University, Brookings, SD

Abstract

In 2013, South Dakota State University announced their intention to increase campus enrollment numbers by over 2000 students over a five-year period. That enrollment goal was based on record high in-state enrollment trends in public universities in South Dakota from 2006 to 2010. However, in the period between 2011 and 2015, in-state enrollments at public universities in the state dropped by 3000 students.

That enrollment decline has created budget shortfalls and campus planning issues at all six public universities in the state. The spatial patterns of enrollment in the state reveal trends that may aid

university officials in recruitment efforts. While distance and proximity create some obvious enrollment footprints for each school, other factors may be more responsible for statewide enrollment decline.

This paper uses Location Quotient scores and Spatial Gravity models to quantify market supply and enrollment probabilities for public universities in South Dakota. The results indicate that geographically targeted marketing may significantly increase enrollment at some public universities in South Dakota.

Key Words: gravity model, market delineation, post-secondary education

SPATIAL SPILLOVER EFFECTS OF HIGH-SPEED RAILWAYS: EVIDENCE FROM NORTHEAST CHINA Qiao Li (liq869@nenu.edu.cn), Northeast Normal University, Changchun, China, and Rensselaer Polytechnic Institute, Troy, NY

Abstract

The aim of this study is to summarize the primary literature on public infrastructure and regional economic growth by some methods based on empirical results. This paper examines the spatial spillover effects of public transportation infrastructure in northeast China, which is regarded as a controversial area according to some policies. The total data consists of 47 cities from the area during the period from 2004-2014 which are chosen to be output and input variables. The shortest travel time between two cities with high-speed railways and geographic distance are collected to set up spatial weight matrices. After getting all the logarithms of the data and the first-order difference, and the spatial econometrics models were used to estimate the spillover effects. The accessibility of every city changed a lot from 2004 to 2014, so that the accessibility is chosen to reflect the infrastructure development. The results indicate that positive and significant spillover effect exists after the construction of high speed railways (HSR) that means HSR is not only beneficial to the connected cities but also to the near cities.

Key Words: transportation geography, spatial spillover, econometrics

THE GEOGRAPHY OF HIGH-GROWTH FIRM ACQUISITION IN THE UNITED STATES Murray D. Rice (Murray.Rice@unt.edu), University of North Texas, Denton, TX; Ron Kalafsky, University of Tennessee, Knoxville, TN; Ross Brown, University of St. Andrews, St Andrews, Scotland.

Abstract

What happens to entrepreneurial, high-growth firms (HGFs) is an important but under-studied aspect of regional economic development. This paper investigates the subset of HGFs that are acquired by other businesses, with a specific focus on how these acquisitions vary geographically. The research analyzes three aspects of these acquisition transactions for the US *Inc. 500* group of HGFs: the geography of *Inc. 500* firms being acquired, the geography of the firms completing these acquisitions, and the structure of the network connecting the two. The analysis demonstrates that the geographies of acquired and acquiring firms are distinctive, with many business communities in the US core being net acquirers of HGFs while business communities in peripheral regions of the US appear as net sellers. The paper defines and interprets these results, linking HGF acquisition activity to regional economic vitality and broader issues in the study of business and regional economic development.

Key Words: High Growth Firm, Inc 500, regional economic development, United States.

Session 2 (9:35 to 10:40 am)

Research Paper Session – *Location Intelligence: Business and Data Applications*

Focus: A session including a wide spectrum of papers covering the diverse field of location intelligence, including an opportunity for general discussion.

Chair: Murray Rice

FOOD ACCESSIBILITY: GROCERY STORE LOCATIONS AND NEIGHBORHOODS IN BINGHAMTON NY
Mohammed-Rabiu Abubakari (mabubak2@binghamton.edu), Louisa M. Holmes (lmholmes@binghamton.edu), Binghamton University, Binghamton NY

Abstract

Background: Recent literature on nutrition posited the existence of "food deserts," or residential areas lacking sufficient access to nutritious food options. Several studies indicate that areas with lower individual and neighborhood-level socioeconomic status (SES) have less access to healthy food options than areas with higher SES, and is detrimental to individual health. In this study, we examine relationships between grocery store locations and SES in Binghamton, NY – a former manufacturing town that now relies on the local university for growth.

Methods: Using American Community Survey 2011-2015 block group data, we analyze residential proximity to healthy food outlets in Binghamton in ArcGIS 10.4. Particularly, we evaluate the associations between median income, vehicle ownership and proximity to grocery stores.

Findings: We find no differences in proximity to supermarkets by income; Binghamton residents live within ½-mile of two groceries on average. However, there exist disparities in vehicle access; 96% of residents of higher-income areas own at least one car compared to 85% for those in lower-income areas with a car.

Key Words: Food Accessibility, Food deserts, Neighborhood Food Environment.

2020 CENSUS CHALLENGE: A FUNCTIONAL SUB-STATE DISTRICT/REGIONAL COUNCIL DATASET FOR RESEARCH, POLICY AND PROGRAMMING IN THE U.S.
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Abstract

The promotion of multi-jurisdictional regional approaches for local development have been made since the 1920s. Metropolitan Councils of Government and regional planning commissions were incentivized and promoted in States from 1950s on. State agencies routinely use sub-state districts, though region boundaries vary agency to agency.

By Executive Order in 1972, Virginia Governor A. Linwood Holton required all State agencies using sub-state districts to use the 1968 defined Planning Districts or multiples. This administrative action enabled a rich regional dataset for agencies and the public, as all data was grouped by the PD number which acted as a FIPS region code and enabled planning coordination.

Most States have sub-state districts for localities, but there is no consistent numbering that may serve as a FIPS code. The only complete sub-state national data set of regions is at the County level. MSA geography does not cover all localities. Eurostat began the Nomenclature of Territorial Units for Statistics (NUTS) classification system for EU territory in the 1970s for regional analysis. It is proposed that an effort begin now for a system that would be ready for sub-state district aggregation of 2020 Census data. The author proposed a prototype in the 2013 AG volume.

Key Words: development, planning, sub-state, region, multi-jurisdictional, State

A FRAMEWORK OF SOCIAL MEDIA DATA AND CENSUS DATA FUSION
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Abstract

This paper will introduce a framework and a platform implementing the data fusion of social media data and census data fusion. The platform will present the newly developed web based tools and

their applications for spatial studies. The paper will discuss how social media data sources, such as QQ data, can be quickly extracted, quantified, spatialized, and integrated with census data for spatial studies. Several tools will be introduced, including a web-based platform, China Geo-Explorer, to assist researchers to explore data through interactive charts, maps, and reports in real-time. China Geo-Explorer is a web-based spatial data service that allows easy access to a rich collection of unique, authoritative, and comprehensive information from government statistics, population and economic censuses, and many other data sources in a spatially integrated system with many powerful functions for exploratory spatial data analysis. Over the past few years, CGE have integrated a large amount of data from population censuses and economic censuses of China of different years with more than 6,500 variables in a web based spatial system. Data sources in this database include demographic and business information for all geographies in the People's Republic of China (PRC), including 31 provinces, 345 prefecture cities, 2,873 counties, and over 50,000 townships. Those census data of different years have been integrated with the base maps at different administrative levels. The census data came from the National Bureau of Statistics of China. The original map data came from the National Geomatics Center of China. Those base maps have been adjusted so that the data from different sources and years can be comparable across the time and space. These census data provide comprehensive information for population and business for all Mainland China at different administrative levels and different census years. The economic census data provide detailed business unit information, including companies, social organizations as well as religious institutions such as Buddhist temples, Taoist temples, Islam mosques, and Christin churches. Researchers can easily visualize the patterns, trends, and correlations of big data and census data in an on-demand fashion. Some case studies will be demonstrated for applications in spatial social science and humanities studies.

Key Words: Social Media Data; Census Data; Data Fusion; Spatial Social Science and Humanities

DEMOGRAPHIC DATA VENDOR BIAS AND RETAIL LOCATION INEFFICIENCIES William Graves (bgraves@uncc.edu), University of North Carolina at Charlotte; Brian Gerney, Gerney Research Group.

Abstract

Business geographers devote considerable effort to develop models of space to answer complex spatial questions. Unfortunately, little thought is given to the accuracy of the input data in these models. This paper examines the accuracy of tract level population and income data reported for the second quarter of 2015 from five spatial-demographic data vendors (Experian, Synergos/PopStats, ScanUS, ESRI and EASI) by comparing their estimates to American Community Survey (ACS) 5 year estimates. Data are compiled for 80 Census tracts in the 40 fastest growing US metropolitan areas. Little agreement between data vendors was found – mean absolute percent errors (MAPE) for the 2015 population estimates were 8.9% greater than the ACS and MAPE for the 2015 median household income was 11.98% greater than ACS. A significant spatial variation in the magnitude of these errors was also found. MAPE values were consistently larger for urban tracts (11.85% MAPE for population and 14.7% for income) and lower for suburban tracts (6.09% and 9.27%). The magnitude of this bias grew after controlling for the size of tracts, errors increased substantially with urban tracts (MAPE values of 26.8% for population and 40.48% for income) while error rates in larger suburban tracts decreased. The biases we identified is likely to result in flawed location analysis in rapidly growing in-town neighborhoods and have important implications for retail development in revitalizing neighborhoods. Strategies for minimizing the impact of this error and for improving demographic data quality will also be discussed.