Mapping Activities in Recreational Trail With Spatial Video:  
A Case Study in Kent State University

Xin Hong, Kent State University, Kent, USA  
Jay Lee, Kent State University, Kent, USA

ABSTRACT

Understanding the usage patterns of a trail in a university environment is crucial for assessing the functionality of the trail and evaluating its impact to health in college students. This article presents a novel approach to map the usage patterns of a university trail by employing spatial video in a geographic information system (GIS) environment. Physical activities in the southeast part of the main campus of Kent State University (Kent, Ohio), were filmed by a GPS-enabled camera unit. The observed physical activities at the time of filming were coded from the videos and visualized as maps. The study finds that activities tend to concentrate near the center of campus, the farther from the campus, the fewer number of activities. The usage patterns are different between men and women. The activity zones of men are more dispersed, while those of women are more concentrated near campus center.

KEYWORDS

College Health, Geographic Information Systems, Hot Spot Analysis, Physical Activity

INTRODUCTION

Overweight and obesity has proliferated as an epidemic among all age groups in the United States. In particular, obesity among individuals age between 18 and 29 years old with some college education has increased at the most rapid rate (Centers for Disease Control and Prevention (CDC) 2016; Mokdad et al., 2003). A lack of regular physical activity has been identified as a health risk behavior among college students. Researchers have found that the college years, as the transitional time from teenage to adult, are highly influential in shaping students’ entire life-long habits. Lifestyle patterns with regard to physical activity (PA) formed during the college years may affect the reminder of the students’ lives (Racette et al., 2005; Reed and Wilson 2006). Therefore, creating a supportive campus environment for physical activities is of great importance for personal wellness among college students.

It is well documented that, walking is the most common form of exercise among individuals who are regularly active, even though nearly one third of the American adult population reported being physical inactive (CDC, 2012; Schiller et al., 2012). The issue of low levels of physical activities among American adults are also addressed in the National Prevention Strategy’s Council (2011),

DOI: 10.4018/IJAGR.2019100101

Copyright © 2019, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
The National Physical Activity Plan (Pate, 2009), and the Institute of Medicine (2012). As suggested by the 2008 Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2008), adults should engage moderate-intensity aerobic activities (e.g., brisk walking or biking) at least two and a half hours (150 minutes) per week, or vigorous-intensity physical activities (e.g., jogging) at least 75 minutes per week, or a combination of both with each last in periods at least 10 minutes, in order to gain substantial health benefits. Aerobic activities, such as brisk walking, biking, and running, consistently reduce chronic diseases and other adverse health outcomes, such as obesity, heart disease, dementia, and premature death (Lee and Buchner 2008; U.S. Department of Health and Human Services, 2008).

The objective of this study is to identify the overall use patterns and the use differences between different genders (men and women) in a university recreational trail using spatial video and hot spot analysis in a geographic information system (GIS) environment.

BACKGROUND

Physical Activity Among College Students

Although physical activity (PA) is a personal decision, actions by communities could significantly influence residents’ choices and access to PA. Community-level approaches to promote PA, especially aerobic activities, generally include enhancing availability of and access to walking trails and/or bicycle lanes in parks, roads and sidewalks. Orstad et al. (2016) found that frequency and duration of community trail use both are adversely correlated with the distance to a trail. In addition, increasing levels of outdoor recreation opportunities and natural amenities are associated with increasing physical activity and decreasing obesity prevalence (Michimi and Wimberly, 2012). The environment of university and college communities may be particularly important for affecting students’ PA behavior. On one hand, the number of student body in the U.S. postsecondary institutions has grown rapidly, for example, it increased 20 percent between 2005 and 2015 (National Center for Education Statistics 2018); on the other hand, college overweight and obesity has been identified by literature as an epidemic with a rising rate (Huang et al., 2010; Sparling, 2007). Recreational trails in university and college communities is a critical support for students’ PA behavior (Brownson et al., 2000). Reed and Wilson (2006) also revealed that there is considerable agreement between trail awareness and trail usage among university students. However, there are few studies emphasizing the impacts of university environment on physical activities among students. Even though recreational trails are proliferating in university environment across the country, minimal research has examined the use and activity patterns of the trails, let alone the gender differences in the use of the trails.

The Applications of Spatial Video

The simplest form of a spatial video comprises of a global position system (GPS)-enable video that can collect high definition video with information regarding the filming path. One of the common spatial video cameras is the Contour Plus video camera equipped with an internal GPS device (iON America, LLC, Provo, Utah). A freeware Contour® Storyteller can display both video and collection pathway. The collection pathway can be developed as a specific line feature with coordinate information in a GIS environment. The recorded information or activities in the video can be also incorporated into geographic information systems (GIS) layers through a simple coding system by using Google Earth® and ArcMap®.

Even though satellite images and aerial photos can provide critical information to know and investigate the general situations at a fine spatial scale, the study area in satellite images and aerial photos is still a comparatively large piece of area. However, spatial videos collect very fine scale data and allow for investigating site conditions which cannot be easily distinguished by satellite images or aerial photos. A number of studies have used spatial video as a spatial data resource in
Mapping Regional Landscape by Using OpenstreetMap (OSM): A Case Study to Understand Forest Patterns in Maya Zone, Mexico
www.igi-global.com/chapter/mapping-regional-landscape-by-using-openstreetmap-osm/178803?camid=4v1a