Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)


HTT32-01 Room:203 Time:May 26 11:00-11:15

# Historical consideration on the relationship among surveying, geomorphology and GIS

OGUCHI, Takashi[1*]

[1]CSIS, Univ. Tokyo

Surveying and geomorphology are related disciplines because both deal with the shape of earth surfaces. Their relationship changed historically with the progress of related technologies, concepts and materials including photogrammetry, geomorphometry, digital elevation models and GIS. This paper discusses such historical issues and presents future perspectives.

Keywords: surveying, geomorphology, GIS

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HTT32-02 Room:203 Time:May 26 11:15-11:30

# Geomorphic classification of mountainous catchments based on the stream power law

IKEMI, Hiro[1*] ; SATO, Tatsuro[1] ; KASAHARA, Tamao[2] ; SHIMATANI, Yukihiro[1]

[1]Faculty of Engineering, Kyushu University, [2]Faculty of Agriculture, Kyushu University

Geomorphic classification of mountainous catchments based on the stream power law

Keywords: Moutainous catchment, Geomorphic classification, DEM, GIS, Stream power law, Kikuchi river basin

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HTT32-03 Room:203 Time:May 26 11:30-11:45

# Mapping and analyzing landforms around archaeological sites in Kayseri region, Turkey

HAYAKAWA, Yuichi S.[1*] ; OBANAWA, Hiroyuki[2] ; YOSHIDA, Hidetsugu[3] ; NARUHASHI, Ryutaro[1] ; OKUMURA, Koji[4] ; ZAIKI, Masumi[5]

[1]Univ. Tokyo, [2]Chiba Univ., [3]Meiji Univ., [4]Hiroshima Univ., [5]Seikei Univ.

Physical environments including landforms have significantly affected human activities in ancient periods. Geographical analysis on such environments around archaeological sites is therefore essential for the understanding of ancient cultural developments. Although detailed topographic maps in remote areas are often limited, recent technologies including measurement equipment and GIS have enabled on-site acquisition of such maps for geographical surveys. Here we apply the methodology of laser measurement, SfM-MVS (structure-from-motion multi-view stereo) photogrammetry and GNSS (global navigation satellite system) for detailed, high-definition topographic mapping of characteristic landforms around archaeological settlements (mainly B.C. 3000 - A.D. 1000) in Kayseri region, central Turkey. The landforms include alluvial fans, fault scarps, plains with lakes and hummocks in debris avalanche deposits. The resultant data, including high-resolution DEMs (digital elevation models) and orthorectified photographs, allow analyzing land surface structures and geomorphological mapping. The data will be further examined to clarify spatiotemporal relationships of archaeological settlements and landforms.

Keywords: geoarchaeology, landform classification, digital elevation model, SfM-MVS photogrammetry

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HTT32-04 Room:203 Time:May 26 11:45-12:00

# A high-resolution estimation of the PM2.5 distribution by the R and the GIS applications

OMORI, Akiho[1] ; YAMAKAWA, Junji[1*]

[1]Graduate School of Natural Science and Technology, Okayama University

A relatively high precision and high resolution spatial distribution of the PM2.5 in the south part of the Okayama prefecture, Japan was estimated by the Universal Kriging method and the FOSS4G GIS softwares. The observation data of the PM2.5 were obtained from the Environmental data service site of the Okayama prefecture. The geospatial open data about the research field that used in the research were served by the government research institutes. The spatial analysis were executed by the R (R core team, 2014) and its spatial libraries, maptools (Bivand and Lewin-Koh, 201 4), rgdal (Bivand, Keitt and Rowlingson, 201 4) and gstat (Pebesma, 201 4). The geospatial representation and qualitative analysis of the estimated distribution were performed by the QGIS (QGIS Development Team, 2014) and the Google earth (Google, 2015). The time variant of the PM2.5 concentration by the each observatories in the area were show some correlation to the SPM10 concentration data. The estimated PM2.5 distribution seems to show that the relatively tight relation to the geospatial factors in the research area. The estimation of a time variant change of the PM2.5 distribution will be required of the further research.

Keywords: PM2.5, Spatial statistics, Kriging, R-language, gstat, FOSS4G

Japan Geoscience Union Meeting 2015
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HTT32-05 Room:203 Time:May 26 12:00-12:15

# GIS training course in the College of Land, Infrastructure, Transport and Tourism

KOARAI, Mamoru[1*]

[1]College of Land, Infrastructure, Transport and Tourism

The College of Land, Infrastructure, Transport and Tourism is prepared 8 GIS training course for government workers and local government workers. The period of GIS training course is about one week.

GIS training courses are also prepared for the policy of the Ministry of Land, Infrastructure, Transport and Tourism such as management of facilities, disaster prevention and city planning. There is also ”regional information communication” training course aiming at the citizen participation type polity using SNS and geospatial information. The College use ArcGIS or free GIS software QGIS as GIS engine in GIS training course.

The participation number of GIS training courses is small, but the degree of satisfaction is high by a questionnaire survey to a participation trainee. It is important for the increase of participation number that many local governments know existence of GIS training courses. Hearing survey is caring to know the spread situation of GIS in local governments. The outline of these survey results will be also reported by this presentation.

Keywords: GIS education, College of Land, Infrastructure, Transport and Tourism, local government

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HTT32-06 Room:203 Time:May 26 12:15-12:30

# Investigation of indoor positioning estimation technology by spatial structure modeling of railway signboards

SHIMIZU, Tomohiro[1*] ; YOSHIKAWA, Shin[2]

[1]JR-West Japan Consultants Company, [2]Osaka Institute of Technology

The acquisition of the outdoor location information has become convenient and precise by the appearance and development of the satellite positioning technology.Recently, it has become more high-precise positioning on a centimeter level since the launch of the quasi-zenith satellite in 2010.So, the various services utilizing the location information have been produced.In this way, the location information has become more important and essential as a kind of social infrastructures.Under such circumstances, the acquisition of location information in the indoor environment where the satellite radio wave cannot reach is widely regarded as the next important step.

In this study, the authors are going to investigate the indoor positioning estimation technology focused on the railway station.In the railway station, the various needs, such as the improvement of amenities, the smoothly pedestrian movement, the universal design associated with an aging society, the creation of a compact space appropriate for the population decline society and so on, have been required.In particular, the development of the railway station with multiple functions coped with various kinds of business has been recently promoted in the metropolitan areas.So, the spatial structure of the railway station has been complicate because it has been required to play various daily roles for urban residents.In particular, the accurate acquisition of positional information is more important in the indoor environment such as the big railway station of today which does not increase only the complexity but also the worth as public property.

Therefore, the authors have been investigating an indoor positioning estimation technology in the railway station space.Especially, they paid their attention to the signboards of important information indicating ”positional relations of the space” in the railway station.This study has obtained a certain result as an indoor positioning technology through the previous investigation of ”the extraction of a signboard from the photograph”, ”the estimation of the area from effective visual field range”, ”the estimation of the point location by photogrammetry technology”.In particular, the authors revealed that it was effective to use the sign database, including the size and direction of signboards, the type and number of pictograms, three dimensional coordinates of pictograms’ center point and so on, for estimating a self-localization.

In this study, they are going to estimate an indoor position using continuously the sign database by modeling the spatial structure in the railway station.Specifically, they are going to set ”influence area of sign boards”, ”the relation of signboards” by using spatial tessellations analysis in computational geometry to estimate a self-localization in the indoor environment.First of all, they generated the Voronoi diagram and the Delaunay triangulation by using spatial tessellations analysis to express the spatial structure models of railway signboards.Moreover, they extracted a domain close to the real space by using GIS.

In future, it is necessary to improve the accuracy of the spatial structure modeling by taking the spatial components like pillars and walls other than the signboards into consideration. In addition, the authors have to develop the actual application system using ICT (information communication technology) that can automatically estimate an indoor position from the photograph.

Keywords: railway station space, railway signboards, indoor positioning, computational geometry

Japan Geoscience Union Meeting 2015
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HTT32-07 Room:203 Time:May 26 12:30-12:45

# Analysis of green landscape in Umeda, Osaka

MURANO, Taichi[1*] ; YOSHIKAWA, Shin[2] ; TANAKA, Kazunari[3]

[1]Osaka institute of technology, [2]Osaka institute of technology, [3]Osaka institute of technology

Recently, the expectation for green environment has been grown as the amenity in a city.However, it's difficult to reserve green in a wide area in the present urban space. Accordingly, the green environment is provided in not only the conventional space such as streets and parks but also various spaces of building and its surroundings.Namely the city has created the proper green environment different from the suburban area. In other words, by rapid progress of the information technology, the spread of smart devices advances.As the social networking service such as Twitter and Facebook has been generalized widely, the data called big data has been created. The big data in public attention in various fields will be a clue for the qualitative improvement of the city in the field of urban and landscape design.In this study, the author aimed at the big data and the green environment in the central city area.

They used a photograph community site in the social media with the various kinds.The scenes taken really as photos are uploaded to the photograph community site as a photo images.It's possible to grasp how the people visiting there are seeing a landscape. It is thought that many green landscapes may be photographed in the central city area where a variety of green landscape is created.Therefore, the purpose of this study is to analyze the landscape structure of green environment by using a photograph community site.GIS (Geographic Information Systems) and CAD/CG are utilized for Umeda district, the central city area in Osaka.

As a result, the authors could grasp the green landscape liked in the central city area by utilizing big data in this study.

Keywords: green environment, central city area, pecial information technology, social media

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HTT32-08 Room:203 Time:May 26 14:15-14:30

# Analysis of regional landscape in Kobe Kitano neighborhood

NAKATANI, Kyohei[1*] ; YOSHIKAWA, Shin[2] ; TANAKA, Kazunari[2]

[1]Graduate school of Engineering,Osaka Institute of Technology, [2]Faculty of Engineering,Osaka Institute of Technology

In recent years, the landscape value has been reviewed with the reflection on urban development in the period of high economic growth. Especially, the problems related to landscape design like tourism are attracted public attention in Japan.Kobe Kitano neighborhood, the case study area in this study, is known as a tourist's destination although it is still residential area.It is very close relationship between tourism resources and landscape resources.In particular, it is a important attraction in tourism to enjoy the exotic atmosphere in Kobe Kitano neighborhood.The main factor is the visual information, that is the characteristic landscape in Kitano neighborhood.In this study, the authors collect photos taken in the Kitano neighborhood through social media and analyze the landscape by using GIS.In particular, they try to understand the regional characteristics with land use and building structure, and to analyze the regional landscape.Also, they carry out the landscape analysis on the relationship between the viewpoint and subject using the shooting center position of the photos.As a result, the authors found the landscape characterizing and representing the region.

Keywords: Social media, Regional characteristics, Landscape analysis

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HTT32-09 Room:203 Time:May 26 14:30-14:45

# Landscape transition in Takamatsu, Sanuki

TAKAHASHI, Yoshinao[1*] ; YOSHIKAWA, Shin[2] ; TANAKA, Kazunari[2]

[1]Graduate School of Engineering,Osaka Institute of Technology, [2]Faculty of Eng.,OIT

Recently, Japanese cities have lost the characteristic culture and historical landscape with urban development. Takamatsu is a port town spatially formed and developed by the sea for a long time. It used to be centered on the Takamatsu castle. Changing into the modern city, however, the urban structure has transformed into the traffic base called as the gateway to Shikoku from the castle town.

Therefore, in this study, the authors try to analyze and understand the historical transition in Takamatsu by utilizing historical records and spatial information technology, and constructing the database about historical environment. Finally they try to find the relationship between the changes in the urban structure and the transportation. Actually, by using GIS based on collected books and maps, they are constructing the spatial database to clarify the transition of the city and understanding the historical changes in a plan view from the early modern times to the present day. And, they are trying to express the typical cityscape of each age through the cityscape simulation by using the three-dimensional urban model modeled by CAD/CG.

When the three-dimensional urban model is constructed, it is important to reproduce exactly the terrain such as coastline and rivers in those days.Therefore, the authors have reproduced the terrain based on the current elevation data. As the result of the comparison between now and then, the cityscape has been changed dramatically on each viewpoint. In particular, there was the major change on the west side of the castle, and the symbol of the early modern times was lost. But there is a place where history and culture are inherited even though the highway is still lined with modern shops.

In this study, the cityscape transition of Takamatsu is grasped by the comparison between now and then on various viewpoints.

Keywords: three-dimensional urban model, landscape simulation, castle town