ISEIS Report on UN-ESCAP & SSEF supported Participants in 2018-2019

Report

On

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For MSc in Geo-survey and Public Management (2018-2019)

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Institute of Space and Earth Information Science Chinese University of Hong Kong, Shatin Hong Kong

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## Master of Science in Geo-Survey and Public Management at ISEIS

The programme commenced on September 3, 2018 at the Institute of Space and Earth Information Science in the Chinese University of Hong Kong. The full-time MSc programme covers one year with three semesters. The objectives of this programme are:

- 1. Students get an appreciation of geo-information on national conditions
- 2. Be knowledgeable in geo-survey and geo-analysis methods
- 3. Be better prepared for public policy studies and precise public management

The academic staffs at ISEIS are very skilled professionals and knowledgeable in their field or area of study and all the classes were taught in English.

were superb with very high level of skills and knowledge in their field or area of study and all the classes were taught in English.

## **REPORT: Heshan GUNASEKERA**

## A. The course modules

Total courses that I took in both semester one and two were 8 courses (6 major and 2 electives). The final course project in which we write our thesis is the major course project to be taken in summer term. This will have 4 credit points. The oral defence is set later at the end of June.

#### B. Field trips

In Semester one I participated in a field trip at Tai O fishing village for the course Environmental Remote Sensing Technology, we classified a satellite image of the study area prior to the field trip and observer the true locations and compared to our classification results.

In semester two, I participated in a combined field trip for the Global Navigation Satellite System (GNSS) and Sensor Network for Environmental Monitoring course and Geoinformation Technologies for Risk and Crises Management course to Tung Ping Chau island. We tracked the whole field trip with GPS trackers provided to us by Dr. Li Gang (Lecturer of GNSS course).



#### C. Projects and ongoing research

For the last two semesters, I did 6 group projects and two individual projects. From our research and the project, I intend to continue with funding when I return to my country. Here are some outline information of the projects and research work that was carried out.

- Individual Projects
- 1. Investigating Impact of deforestation on mountain areas for landslides in Sri Lanka.

**Course - Introduction to Geo-survey and Public Management Instructor - Dr. WONG C. Janice** 

Landsat Images with 30m resolution and R, G, B and NIR Bands was selected as the data for spatial analysis. Central mountain area of the country above 300m height was selected as the study area. Satellite images of 1992 and 2001 was Classified and the overall accuracy of land use classifications were 98.20% and 97.41% respectively. It showed that the "bare land" area has been increasing and the forest cover has been decreasing when the results were compared.

Satellites images of 1988, 2006 2009 and 2018 was used to calculate NDVI and then was compared to the number of landslides events in those years except 2018. This comparison clearly shows a direct proportional relationship between the deforestation of mountain areas and the increasing of landslides incidents.

So, the results of this project are clearly emphasizing that it is very important to do reforestation in the mountain area of the country to minimize the number of annual landslides.



The below figure shows the result of the Classification.

The Relationship between Landslides and Deforestation

# Comparison of Centralities between cities having Higher Traffic Indices & Lower Traffic Indices. Course - Urban Networks Instructor - Dr. WONG C. Janice

The main goal of this network analysis project is to identify whether there is a relationship between common network centrality measures and the traffic situations in the road networks of major cities around the world.

Urban Road Network Data was retrieved as shapefiles from website called FIGSHARE. this dataset contains the Urban road networks of 80 of the most populated urban cities in the world. Then 8 cities were selected in 2 categories considering the available road network data and the current Traffic Index values retrieved from a website called NUMBEO. 2 categories are cities with good traffic management and cities with Bad traffic management.

Then the network centralities of the road networks of the selected cities were calculated in ArcGIS with the help of "Urban Network Analysis Toolbox". 3 centralities were calculated namely Betweenness Centrality, Straightness Centrality and Closeness Centrality

Finally, the average values of these calculated centralities were compared between all the selected cities along with the population densities of those cities.



- Group Projects
- 3. Investigating Invasion pattern of Sonneratia in Mai Po Nature Reserve. Course - Special Topics in GeoInformation Sciences Instructor – Prof. Hui Lin & Dr. Ann Mak Group Members - Luoma WAN & Heshan Gunasekera

This project is carried out to find out where is the Sonneratia in Mai Po, what is the distribution pattern in Mai Po area as well as to examine what factors have supported the distribution pattern. Since Sonneratia was first found in 2000 inside the Mai Po Reserve, we used high resolution image of Mai Po mangrove forest area from Google Earth in February 2000 and February 2003.

After performing various GIS operations and analysis we found that waterway is an important fact for Sonneratia distribution, but not the major driven factor. Tide is the major factor for Sonneratia distribution along with the support from the mudflat.



Sonneratia spark points detection

4. Investigating Spatial and temporal land cover changes in Xiong'an New Area in 2016-2018.

Course - Environmental Remote Sensing Technology Instructor – Prof. Hongsheng Zhang Group Members - YAN Yizhen, JIANG Xiaolu & Heshan Gunasekera

This project aims at analyzing the short-term land cover changes in order to explore the development nature of Xiong'an New Area. The remote sensing images from Sentinel-2 satellite were used for a supervised classification through the Support Vector Machine (SVM) algorithm in the three years of 2016, 2017 and 2018. The accuracy of the land cover classification ranged from 86.0% to 94.5%. The results revealed that the urban land areas were consistently increased, while the rate of expansion was decreasing in the three years. In addition, the spatial distribution of urban land cover changed into the centralization from

decentralization multipoint. These results will be helpful for understanding the development of the Xiong'an New Area.



The land cover classification maps of five classes in Xiong'an New Area in 2016-2018

5. Spatial analysis of house prices and public facilities in Shenzhen. Course - Spatial Analysis for Public Policy Instructor – Dr. Li Rongrong Group Members - Yan Yizhen, Jiang Xiaolu, Kisolel Lina Posanau & Heshan Gunasekera

This research aims at exploring the relationship between the residential house prices and public facilities through combining the geographic information system (GIS) spatial analysis and the geographical weighted regression (GWR) modelling in Shenzhen city, China. The hotspot analysis and Kriging interpolation were applied to define the spatial distribution of the residential house prices in Shenzhen city. The study defined the factors as two groups, the distances from the houses to the nearest public facilities and the number of public facilities in a certain neighbourhood of each house, respectively. The traditional ordinary least squares (OLS) models were firstly constructed to identify the key factors that significantly influenced the residential house prices. Finally, the GWR model results illustrated the residential house sto the nearest public factor of the distances from the houses to the nearest public share by the factor of the distances from the houses to the nearest public share by the factor of the distances from the houses to the nearest public facilities. Among, the variables that were considered as factors contributing to house prices was subway, mall and secondary school.





**GWR** Prediction Results

6. Identification of high-risk tree collapse area during typhoon in Hong Kong. **Course - Geoinformation Technologies for Risk and Crises Management** Instructor – Prof. Hongsheng Zhang Group Members - Chan Ching Yan Alice, Wang Tianyi & Heshan Gunasekera

By identifying the high-risk tree collapse area, we can make prevention in advance to reduce the adverse effect.

With the help of advanced remote sensing technology, we can easily produce risk map like this which help to do better risk management. We believe that the technology will become more advance in the future and the result could be produced with high accuracy.

In this project we produced a Tree Collapsing probability Disaster Risk Map of Hong Kong with the help of Sentinel-2 Satellite images and several GIS tools.



# TREE COLLAPSE DISASTER RISK MAP



# 预览已结束, 完整报告链接和二维码如下:

https://www.yunbaogao.cn/report/index/report?reportId=5\_1028

