Introduction

• Urban areas are expanding at a very high speed worldwide leading to a lot of environmental and social problems.
• Thus, a lot urban growth studies are focusing on predicting future Urban land use/Land cover (LULC) for sustainable urban planning.
• This study used remote sensing (RS) data to forecast future LULC development in Tianjin area, China.

Methodology

Data
• Landsat 5 TM (1995), Landsat 7 ETM+ (2005) and Landsat 8 OLI (2015) from USGS. All imageries chosen were cloud free and in the same season.
• Administrative boundary shapefile.

Pre-processing:
• No geometric and radiometric correction (already done by USGS)
• Mosaicking, Clipping, projecting, georeferencing etc.

Classification
• Training sample selection and creating signatures.
• Maximum (supervised) classification applied using ENVI 5.2 software.

Influence of major roads on LULC
• The size of each LULC class over an incrementing distance from majors roads was determined.
• Graphs displaying LULC classes vs major roads are generated.

Modeling

The Model
• Cellular Automata (CA)-Markov Chains (MC) Model was used for modeling future LULC in 2015 and compared with actual LULC map of 2015.
• CA-MC model was applied using Idrisi Software (Version 17.02).

Variables
• Distance to all LULC classes (Built, forest cropland, grassland, bareland and water) and distance to roads.
• Social data availability limitations encountered (e.g. population density).

Results

Major roads influence on LULC

LULC Modeling

Markov transition probability matrix 1995—2005


Markov transition probability matrix 2005—2015


Conclusions

• Built area increasing at a very fast rate than all other LULC classes.
• Cropland and water decreasing. This could be attributed to the fact that the classification for water include paddy fields. There could be confusion between water and cropland which require rechecking.
• Simulation and modeling results are generally good but a considerable number of miss matches observed.