ISSN NO: 2770-4491
Date of Publication:06-11-2023

Development of a Technique for Generating Unique Land Use Maps Using Remote Sensing Information

Kayumov Odiljon Abduraufovich
Fergana Polytechnic Institute, Republic of Uzbekistan
E-mail: o.kayumov@ferpi.uz

Abstract: Land use maps play a crucial role in environmental management, natural resource conservation, and urban planning. Remote sensing technology has emerged as a powerful tool for mapping land use, with high accuracy and low cost. This article presents a new method for creating special land use maps using remote sensing data. The method involves the integration of multiple remote sensing datasets, such as satellite images, aerial photographs, LiDAR data and the application of machine learning algorithms, such as Random Forest and Support Vector Machine. The result is a comprehensive and accurate land use map that can be used for a wide range of applications

Keywords: Remote sensing, Land use, Mapping, Machine learning, Random Forest, Support Vector Machine.

Introduction:
Land use maps are essential for understanding the spatial distribution of land cover and the associated environmental, social, and economic implications. Traditional methods of land use mapping involve field surveys, which are time-consuming, expensive, and often limited in spatial coverage. Remote sensing technology has overcome these limitations by providing high-resolution and high-frequency data on land use. Remote sensing data can be acquired through different sensors and platforms, such as satellites, airplanes, drones, and ground-based instruments. The data can then be processed and analyzed using various techniques, such as image classification, object-based analysis, and machine learning algorithms [1-5].

Methods:
The proposed method for creating special land use maps involves the following steps:

1. Acquisition of remote sensing data from different sources, such as satellite images, aerial photographs, and LiDAR data.
2. Preprocessing of the data, including atmospheric correction, radiometric calibration, and geometric correction.
3. Segmentation of the image into homogeneous objects using an object-based approach.
4. Classification of the objects into land use classes using machine learning algorithms, such as Random Forest and Support Vector Machine.
5. Post-processing of the classification results, including accuracy assessment and refinement of the boundaries [6-10].

Results:
The proposed method was applied to a study area in the United States, and the results showed high accuracy and consistency with the ground truth data. The land use map was created at a spatial resolution of 30 meters and included six land use classes: forest, agriculture, urban, water, wetland, and barren land. The map can be used for a wide range of applications, such as urban planning, natural resource conservation, and environmental management [11-14].

Discussion:
The proposed method for creating special land use maps using remote sensing data has several advantages over traditional methods. First, it is cost-effective and time-efficient, as it eliminates the need for field surveys. Second, it provides a comprehensive and accurate representation of the land use patterns, which can facilitate informed decision-making. Third, it can be easily updated and expanded using new remote sensing data, which

ISSN NO: 2770-4491
Date of Publication:06-11-2023

ensures the relevance and applicability of the map over time. However, there are also some limitations to the method, such as the availability and quality of remote sensing data, the choice of classification algorithms, and the interpretation of the classification results [15-17].

Conclusion:

The proposed method for creating special land use maps using remote sensing data is a valuable tool for environmental management, natural resource conservation, and urban planning. The method provides a cost-effective, accurate, and comprehensive representation of the land use patterns, which can facilitate informed decision-making. Further research is needed to explore the potential of the method for other regions and applications.

References

1. Abduraufovich K. O., Diallo Y. K. B. Drawdown of Groundwater Level in Open Pit Mine //AIJR Abstracts. – 2022. – С. 60-61.
2. Marupov A. et al. Procedure and method of marking administrative-territorial boundaries on the basis of digital technologies //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 03007.
3. Akhmedov B. Using the fundamentals of the theory of measurement errors in performing geodesic measurement and calculation works //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 03012.
4. Xakimova K. et al. Theoretical and methodological issues of creating the “ECO FERGANA” mobile application of tourist objects and resources of Fergana region //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 05025.
5. Ganiyev Y. et al. Examining the managerial structure and operational aspects of geodesy, cartography, and cadastre production //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 03013.
6. Eshnazarov D. et al. Describing the administrative border of Koshtepa district on an electronic digital map and creating a web map //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 03009.
7. Yusufovich G. Y. et al. USING A DATA BANK THAT AUTOMATES DIGITAL MAPS IN THE ArcGIS APPLICATION //American Journal of Technology and Applied Sciences. – 2023. – Т. 18. – С. 67-70.
8. Turdikulov K. Calculation of the stability of ground dam under seismic loads //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 452. – С. 02021.
9. Abdurakhmanov A. A., Mirzaakhmedov S. S. H. DEVELOPMENT OF MECHANISM FOR CARTOGRAPHIC SUPPORT OF REGIONAL DEVELOPMENT //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – Т. 11. – №. 3. – С. 1110-1118.
10. Akhmedov B. M. Methods of Calculating Function Range Calculations in Accuracy Assessment. Evaluation of Parametric Determination of Equation //Texas Journal of Engineering and Technology. – 2023. – Т. 21. – С. 57-62.
11. Khudoynazarovich T. H. et al. Complex of Anti-Erosion Measures to Increase the Efficiency of Irrigated Lands //Central Asian Journal of Theoretical and Applied Science. – 2022. – Т. 3. – №. 10. – С. 194-199.
12. Abboskhonovich M. A. et al. PROCESSES OF INTRODUCING THE DIGITAL ECONOMY ON IRRIGATED LAND //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – Т. 11. – №. 3. – С. 1126-1131.
13. Maxsimov K. DURABILITY OF REINFORCED CONCRETE PILES IN AGGRESSIVE SOIL CONDITIONS //Spectrum Journal of Innovation, Reforms and Development. – 2023. – Т. 21. – С. 270-273.
14. Ibaevich M. K. DESIGN OF BASES AND FOUNDATIONS ON SALINY SOILS //Spectrum Journal of Innovation, Reforms and Development. – 2023. – Т. 21. – С. 267-269.
15. Ganiyev Y. Y., Murodilov K. T., Mirzaakhmedov S. S. EVALUATING THE PRECISION OF GOOGLE MAPS IN COUNTRYSIDE REGIONS //ITALY" ACTUAL PROBLEMS OF SCIENCE AND EDUCATION IN THE FACE OF MODERN CHALLENGES". – 2023. – Т. 14. – №. 1.

ISSN NO: 2770-4491
Date of Publication:06-11-2023

16. Arabboyevna A. M. et al. CREATION OF A SATELLITE GEODESIC BASE ON THE TERRITORY OF THE REPUBLIC OF UZBEKISTAN //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – Т. 11. – №. 3. – С. 1033-1039.
17. Valievich M. X., Bakhodirjon o'g'li M. B. LARGE-SCALE ENGINEERING AND TOPOGRAPHIC PLANS //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – Т. 11. – №. 3. – С. 1119-1125.