

Reference

- | No | Description |
|-----|---|
| [1] | Kuddus, M.A., Tynan, E. McBryde, E. (2020). Urbanization: a problem for the rich and the poor?. Public Health Rev 41, 1. https://doi.org/10.1186/s40985-019-0116-0 |
| [2] | Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A meta-analysis of global urban land expansion, PLoS One, 6(8): e23777. DOI: https://doi.org/10.1371/journal.pone.0023777 |
| [3] | Kennedy G. Food security in the context of urban sub-Saharan Africa. Internet paper for food security, food Africa, internet forum 31 March–11 April 2003;2009. |
| [4] | Angel, S., Parent, J., Civco, D. L., Blei, A. M., & Potere, D. (2011). The dimensions of global urban expansion: Estimates and projections for all countries, 2000–2050. Progress in Planning, 75(2): 53–107. |
| [5] | Teller, J. (2021). Regulating urban densification: What factors should be used? Buildings & Cities, 2(1): 302–317. DOI: https://doi.org/10.5334/bc.123 |
| [6] | Alirol E, Getaz L, Stoll B, Chappuis F, Loutan L. Urbanisation and infectious diseases in a globalised world. The Lancet infectious diseases. 2011;11(2):131-41. |
| [7] | Friedmann, J., Sorensen, A., (2019). New Scales of Mega-conurbation in Asia. International Planning Studies Volume 24, 2019 - Issue 1 |

- [8] Burchell, R. W (1998). The costs of sprawl-revisited. Report 39. Transit Cooperative Research Program, Transportation Research Board. (Washington DC: National Academy Press, 1998).
- [9] Zhang, B (2004). Study on Urban Growth Management in China, China: Xinhua Press.
- [10] Sudhira, H.S., Ramachandra, T. V. (2007). Characterising Urban Sprawl from Remote Sensing Data and Using Landscape Metrics. Proceedings of 10th International Conference on Computers in Urban Planning and Urban Management, PR Brazil : Iguassu Falls.
- [11] Fouberg, E. H., Murphy, A. B., DeBlij, H. J. (2012). Human Geography: People, Place, and Culture. 10th ed. John Wiley & Sons Inc. ISBN-10: 1118514653.
- [12] Cobbinah, P. B., Darkwah., R. M. (2016). African Urbanism: The Geography of Urban Greenery.” Urban Forum 27 (2): 149–165.
- [13] Xu, G., Dong, T., Brandful, P. , Jiao, L., Sumari, N. S., Chai, B., Liu, Y. (2019). Urban Expansion and Form Changes across African Cities with a Global Outlook: Spatiotemporal Analysis of Urban Land Densities. Journal of Cleaner Production 224: 802–810.
- [14] Fenta, A. A., Yasuda, H., Haregeweyn, N. , Belay, S., Hadush, Z. , Gebremedhin, M. A. (2017). The Dynamics of Urban Expansion and Land Use/land Cover Changes Using Remote Sensing and Spatial Metrics: The Case of Mekelle City of Northern Ethiopia. International Journal of Remote Sensing 38 (14): 4107–4129.

- [15] Sumari, N. S., Tanveer, H., Shao, Z., Simon, E. (2019). Geospatial Distribution and Accessibility of Primary and Secondary Schools: A Case of Abbottabad City, Pakistan. Proceedings of the International Cartographic Association 29th International Cartographic Conference (ICC 2019), Tokyo, Japan, July, 15–20.
- [16] Squires, G. D. (2002). Urban Sprawl and Uneven Development of Metropolitan America. In Urban Sprawl: Causes, Consequences and Policy Responses. Washington DC: The Urban Institute Press.
- [17] Ewing, R. (1997). Is Los Angeles-style sprawl desirable? Journal of the American Planning Association 63, 107-126.
- [18] Galster, G. (2001). Wrestling sprawl to the ground: defining and measuring an elusive concept. Housing Policy Debate 12, 681-717.
- [19] Song, Y. (2005). Smart growth and urban development pattern: a comparative study. International Regional Science Review 28, 239.
- [20] Torrens, P. (2006) Annals of the Association of American Geographers 96, 248-275.
- [21] Torrens, P. ,Alberti, M. (2000). Measuring sprawl. Paper 27 ed. London: Center for Advanced Spatial Analysis, University College London.
- [22] Tsai, Y., (2005). Quantifying urban form: compactness versus 'sprawl'. Urban Studies 42, 141-161.
- [23] Heimlich, R. E., Anderson, W. D. (2001). Developing the urban fringe and beyond: impacts on agriculture and rural land. Report Number 803. (USDA Economic Research Service: Washington, DC.

- [24] Carruthers, J. I., Ifarsson, G. F. (2002). Fragmentation and sprawl: evidence from interregional analysis. *Growth and Change* 33, 312-340.
- [25] Pendall, R. (1999). Do land use controls cause sprawl? *Environment and Planning B* 26, 555-571.
- [26] Brueckner, J. K. (2000). Urban sprawl: diagnosis and remedies. *International Regional Science Review* 23, 160-171.
- [27] Gillham, O., (2002). *The Limitless City: A Primer on the Urban Sprawl Debate*. (Washington DC: Island Press.
- [28] Daniel, T., (1999). *When city and country collide: Managing growth in the metropolitan fringe*. Washington DC: Island Press.
- [29] Carruthers, J. I., (2003). Growth at the fringe: The influence of political fragmentation in United States metropolitan areas. *Papers in Regional Science* 82, 475-499.
- [30] sikkimtourism.gov.in/Public/Planning/weatherandclimate accessed online as on 30 April 2025
- [31] www.esikkimtourism.in/sikkim-weather-in-may/ accessed online as on 1 May 2025
- [32] Zhilin, L. I., Gong, X., Chen, J., Mills, J., Songnian, L. I., Zhu, X. U., Peng, T. I., Hao, W. U. (2020). Functional Requirements of Systems for Visualization of Sustainable Development Goal (SDG) Indicators. *Journal of Geovisualization and Spatial Analysis* 4: 5.

- [33] Effat, H. A., Shobaky, M. A. E. (2015). Modeling and mapping of urban sprawl pattern in Cairo using multi-temporal landsat images, and Shannon's entropy. *Advances in Remote Sensing* 4.4 (2015): 303-318.
- [34] Zhang, T. (2001). Community features and urban sprawl: the case of the Chicago metropolitan region. *Land Use Policy* 18, 221-232.
- [35] Hirschhorn, J. S. (2001). Environment, quality of life, and urban growth in the new economy. *Environmental Quality Management* 10, 1-8.
- [36] Zhilin, L. I., Gong, X., Chen, J., Mills, J., Songnian, L. I., Zhu, X. U., Peng, T. I., Hao, W. U. (2020). Functional Requirements of Systems for Visualization of Sustainable Development Goal (SDG) Indicators. *Journal of Geovisualization and Spatial Analysis* 4: 5.
- [37] Zhou, L., Sun, Q., Dang, X., Wang, S. (2019). Comparison on Multi-Scale Urban Expansion Derived from Nightlight Imagery between China and India. *Sustainability* 11: 4509.
- [38] Zhang, L., Weng, Q., Shao, Z. (2017). An Evaluation of Monthly Impervious Surface Dynamics by Fusing Landsat and MODIS Time Series in the Pearl River Delta, China, from 2000 to 2015. *Remote Sensing of Environment* 201 (August): 99–114.
- [39] Fu, Y., Lu, X., Zhao, Y., Zeng, X., Xia, X. (2013). Assessment Impacts of Weather and Land Use/Land Cover (LULC) Change on Urban Vegetation Net Primary Productivity (NPP): A Case Study in Guangzhou, China. *Remote Sensing* 5 (8): 4125–4144.

- [40] Sumari, N., Xu, G., Ujoh, F., Korah, P. I., Ebohon, O. J., Lyimo., N. N. (2019). A Geospatial Approach to Sustainable Urban Planning: Lessons for Morogoro Municipal Council, Tanzania. *Sustainability* 11 (22):6508.
- [41] Nzunda, E. F., Midtgaard., F. (2019). Deforestation and Loss of Bushland and Grassland Primarily Due to Expansion of Cultivation in Mainland Tanzania (1995–2010). *Journal of Sustainable Forestry* 38 (6): 509–525.
- [42] Huang, X., Wang, C., Li. Z. (2018). A near Real-time Flood-mapping Approach by Integrating Social Media and Post-event Satellite Imagery. *Annals of GIS* 24 (2): 113–123.
- [43] Hu, T., J. Yang, J., Li, X., P. Gong., P. (2016). Mapping Urban Land Use by Using Landsat Images and Open Social Data. *Remote Sensing* 8 (2):2.
- [44] Liu, L. Meng. L. (2020). Patterns of urban sprawl from a global perspective." *Journal of Urban Planning and Development* 146.2.
- [45] Downs, A. (1999). Some realities about sprawl and urban decline. *Hous. Policy Debate* 10 (4): 955–974.
- [46] Espindola, D., Mira, G., Carneiro, E., Façanha, A. C., (2017). Four decades of urban sprawl and population growth in Teresina, Brazil." *Applied Geography* 79 (2017): 73-83.
- [47] Richards, J. A. (2012). *Remote sensing digital image analysis: An introduction*. Springer.
- [48] Espindola, G., Camara, G., Reis, I., Bins, L., & Monteiro, A. (2006). Parameter selection for region-growing image segmentation algorithms using spatial autocorrelation. *International Journal of Remote Sensing*, 27(14), 3035e3040.

- [49] Garouani, E., Abdelader, (2017), Analysis of urban growth and sprawl from remote sensing data: Case of Fez, Morocco. *International Journal of Sustainable Built Environment* 6.1 (2017): 160-169.
- [50] Sumari, N. S., Tanveer, H., Shao, Z., Simon, E. (2019). Geospatial Distribution and Accessibility of Primary and Secondary Schools: A Case of Abbottabad City, Pakistan. *Proceedings of the International Cartographic Association 29th International Cartographic Conference (ICC 2019)*, Tokyo, Japan, July, 15–20.
- [51] Pendall, R. (1999). Do land use controls cause sprawl? *Environment and Planning B* 26, 555-571.
- [52] Sapena, M., & Ruiz, L. Á. (2019, January). Analysis of land use/land cover spatio-temporal metrics and population dynamics for urban growth characterization. *Computers, Environment and Urban Systems*, 73, 27–39. doi:10.1016/j.compenvurbsys.2018.08.001
- [53] Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., Wu, J., Bai, X., & Briggs, J. M. (2008, February). Global Change and the Ecology of Cities. *Science*, 319, 756–760. doi:10.1126/science.1150195
- [54] Abd, H. A.-R., & Alnajjar, H. A. (2013). Maximum likelihood for land-use/land-cover mapping and change detection using Landsat satellite images: A case study “South of Johor”. *International Journal of computational Engineering research (IJCER)* IJCER| June 2013| VOL 3 ISSUE 6.
- [55] Fahad, K. H., Hussein, S., & Dibs, H. (2020, January). Spatial-Temporal Analysis of Land Use and Land Cover Change Detection Using Remote Sensing

and GIS Techniques. IOP Conference Series: Materials Science and Engineering, 671, 012046. doi:10.1088/1757-899x/671/1/012046

- [56] Hathout, S. (2002, November). The use of GIS for monitoring and predicting urban growth in East and West St Paul, Winnipeg, Manitoba, Canada. *Journal of Environmental Management*, 66, 229–238. doi:10.1006/jema.2002.0596
- [57] Dwivedi, R. S., Sreenivas, K., & Ramana, K. V. (2005, April). Cover: Land-use/land-cover change analysis in part of Ethiopia using Landsat Thematic Mapper data. *International Journal of Remote Sensing*, 26, 1285–1287. doi:10.1080/01431160512331337763
- [58] Hahs, A. K., McDonnell, M. J., McCarthy, M. A., Vesk, P. A., Corlett, R. T., Norton, B. A., . . . Williams, N. S. (2009, October). A global synthesis of plant extinction rates in urban areas. *Ecology Letters*, 12, 1165–1173. doi:10.1111/j.1461-0248.2009.01372.x
- [59] TV, R., Aithal, B. H., & Sanna, D. D. (2012, August). Insights to urban dynamics through landscape spatial pattern analysis. *International Journal of Applied Earth Observation and Geoinformation*, 18, 329–343. doi:10.1016/j.jag.2012.03.005
- [60] Soffianian, A., Nadoushan, M. A., Yaghmaei, L., & Falahatkar, S. (2010). Mapping and analyzing urban expansion using remotely sensed imagery in Isfahan, Iran. *World applied sciences journal*, 9, 1370–1378.
- [61] Gardner, A. S., Moholdt, G., Wouters, B., Wolken, G. J., Burgess, D. O., Sharp, M. J., . . . Labine, C. (2011, April). Sharply increased mass loss from glaciers

and ice caps in the Canadian Arctic Archipelago. *Nature*, 473, 357–360.
doi:10.1038/nature10089

- [62] Liverman, D. M., & Cuesta, R. M. (2008, July). Human interactions with the Earth system: people and pixels revisited. *Earth Surface Processes and Landforms*, 33, 1458–1471. doi:10.1002/esp.1715
- [63] Loveland, T. R., & Mahmood, R. (2014, October). A Design for a Sustained Assessment of Climate Forcing and Feedbacks Related to Land Use and Land Cover Change. *Bulletin of the American Meteorological Society*, 95, 1563–1572. doi:10.1175/bams-d-12-00208.1
- [64] Sleeter, B. M., Wilson, T. S., Sharygin, E., & Sherba, J. T. (2017, November). Future Scenarios of Land Change Based on Empirical Data and Demographic Trends. *Earth's Future*, 5, 1068–1083. doi:10.1002/2017ef000560
- [65] Etter, A., McAlpine, C., Wilson, K., Phinn, S., & Possingham, H. (2006, June). Regional patterns of agricultural land use and deforestation in Colombia. *Agriculture, Ecosystems & Environment*, 114, 369–386. doi:10.1016/j.agee.2005.11.013
- [66] Manandhar, R., Odeh, I. O., & Ancev, T. (2009, July). Improving the Accuracy of Land Use and Land Cover Classification of Landsat Data Using Post-Classification Enhancement. *Remote Sensing*, 1, 330–344. doi:10.3390/rs1030330
- [67] Álvarez-Cabria, M., Barquín, J., & Peñas, F. J. (2016, March). Modelling the spatial and seasonal variability of water quality for entire river networks:

Relationships with natural and anthropogenic factors. *Science of The Total Environment*, 545–546, 152–162. doi:10.1016/j.scitotenv.2015.12.109

- [68] Herold, M., Gardner, M. E., & Roberts, D. A. (2003, September). Spectral resolution requirements for mapping urban areas. *IEEE Transactions on Geoscience and Remote Sensing*, 41, 1907–1919. doi:10.1109/tgrs.2003.815238
- [69] Bajocco, S., De Angelis, A., Perini, L., Ferrara, A., & Salvati, L. (2012, March). The Impact of Land Use/Land Cover Changes on Land Degradation Dynamics: A Mediterranean Case Study. *Environmental Management*, 49, 980–989. doi:10.1007/s00267-012-9831-8
- [70] Liu, Y., Yao, C., Wang, G., & Bao, S. (2011, November). An integrated sustainable development approach to modeling the eco-environmental effects from urbanization. *Ecological Indicators*, 11, 1599–1608. doi:10.1016/j.ecolind.2011.04.004
- [71] Yu, Y., Tong, Y., Tang, W., Yuan, Y., & Chen, Y. (2018, January). Identifying Spatiotemporal Interactions between Urbanization and Eco-Environment in the Urban Agglomeration in the Middle Reaches of the Yangtze River, China. *Sustainability*, 10, 290. doi:10.3390/su10010290
- [72] Kielkowska, J., Tokarczyk-Dorociak, K., Kazak, J., Szewrański, S., & van Hoof, J. (2018, March). Urban Adaptation to Climate Change Plans and Policies – the Conceptual Framework of a Methodological Approach. *Journal of Ecological Engineering*, 19, 50–62. doi:10.12911/22998993/81658

- [73] Hegazy, I. R., & Kaloop, M. R. (2015, June). Monitoring urban growth and land use change detection with GIS and remote sensing techniques in Daqahlia governorate Egypt. *International Journal of Sustainable Built Environment*, 4, 117–124. doi:10.1016/j.ijbsbe.2015.02.005
- [74] Dadashpoor, H., Azizi, P., & Moghadasi, M. (2019, March). Land use change, urbanization, and change in landscape pattern in a metropolitan area. *Science of The Total Environment*, 655, 707–719. doi:10.1016/j.scitotenv.2018.11.267
- [75] Kowalewski, A., Markowski, T., & Śleszyński, P. (2020). Kryzys polskiej przestrzeni, źródła, skutki i kierunki działań naprawczych.
- [76] Śleszyński, P., Kowalewski, A., Markowski, T., Legutko-Kobus, P., & Nowak, M. (2020, July). The Contemporary Economic Costs of Spatial Chaos: Evidence from Poland. *Land*, 9, 214. doi:10.3390/land9070214
- [77] Jensen, J. R., & Cowen, D. C. (2011, April). Remote Sensing of Urban/Suburban Infrastructure and Socio-Economic Attributes. *Remote Sensing of Urban/Suburban Infrastructure and Socio-Economic Attributes*, 153–163. Wiley. doi:10.1002/9780470979587.ch22
- [78] Butt, A., Shabbir, R., Ahmad, S. S., & Aziz, N. (2015, December). Land use change mapping and analysis using Remote Sensing and GIS: A case study of Simly watershed, Islamabad, Pakistan. *The Egyptian Journal of Remote Sensing and Space Science*, 18, 251–259. doi:10.1016/j.ejrs.2015.07.003
- [79] Foley, J. A., DeFries, R., Asner, G. P., Barford, C., Bonan, G., Carpenter, S. R., . . . Snyder, P. K. (2005, July). Global Consequences of Land Use. *Science*, 309, 570–574. doi:10.1126/science.1111772

- [80] Mosammam, H. M., Nia, J. T., Khani, H., Teymouri, A., & Kazemi, M. (2017, June). Monitoring land use change and measuring urban sprawl based on its spatial forms. *The Egyptian Journal of Remote Sensing and Space Science*, 20, 103–116. doi:10.1016/j.ejrs.2016.08.002
- [81] Jarah, S. H., Zhou, B., Abdullah, R. J., Lu, Y., & Yu, W. (2019, January). Urbanization and Urban Sprawl Issues in City Structure: A Case of the Sulaymaniah Iraqi Kurdistan Region. *Sustainability*, 11, 485. doi:10.3390/su11020485
- [82] Dewan, A. M., & Yamaguchi, Y. (2009, July). Land use and land cover change in Greater Dhaka, Bangladesh: Using remote sensing to promote sustainable urbanization. *Applied Geography*, 29, 390–401. doi:10.1016/j.apgeog.2008.12.005
- [83] Europe, U., & others. (2016). Statistics on cities, towns and suburbs.
- [84] Eckert, S. (2011). Urban Expansion and its impact on urban agriculture - remote sensing based change analysis of Kizinga and Mzingu Valley - Dar Es Salaam, Tanzania. Urban Expansion and its impact on urban agriculture - remote sensing based change analysis of Kizinga and Mzingu Valley - Dar Es Salaam, Tanzania. BIS Verlag. doi:10.7892/BORIS.9061
- [85] Melchiorri, M., Florczyk, A., Freire, S., Schiavina, M., Pesaresi, M., & Kemper, T. (2018, May). Unveiling 25 Years of Planetary Urbanization with Remote Sensing: Perspectives from the Global Human Settlement Layer. *Remote Sensing*, 10, 768. doi:10.3390/rs10050768

- [86] Castanho, R. A., Naranjo Gómez, J. M., & Kurowska-Pysz, J. (2019, March). Assessing Land Use Changes in Polish Territories: Patterns, Directions and Socioeconomic Impacts on Territorial Management. *Sustainability*, 11, 1354. doi:10.3390/su11051354
- [87] Gibas, P., & Majorek, A. (2020, February). Analysis of Land-Use Change between 2012–2018 in Europe in Terms of Sustainable Development. *Land*, 9, 46. doi:10.3390/land9020046
- [88] Macleod, R. D., & Congalton, R. G. (1998). A quantitative comparison of change-detection algorithms for monitoring eelgrass from remotely sensed data. *Photogrammetric engineering and remote sensing*, 64, 207–216.
- [89] Tayyebi, A., & Pijanowski, B. C. (2014, May). Modeling multiple land use changes using ANN, CART and MARS: Comparing tradeoffs in goodness of fit and explanatory power of data mining tools. *International Journal of Applied Earth Observation and Geoinformation*, 28, 102–116. doi:10.1016/j.jag.2013.11.008
- [90] Jose, D. M., & Dwarakish, G. S. (2020, September). Uncertainties in predicting impacts of climate change on hydrology in basin scale: a review. *Arabian Journal of Geosciences*, 13. doi:10.1007/s12517-020-06071-6
- [91] Jose, D. M., & Dwarakish, G. S. (2021, May). Bias Correction and Trend Analysis of Temperature Data by a High-Resolution CMIP6 Model over a Tropical River Basin. *Asia-Pacific Journal of Atmospheric Sciences*, 58, 97–115. doi:10.1007/s13143-021-00240-7

- [92] Saxena, A., Jat, M. K., & Clarke, K. C. (2021, March). Development of SLEUTH-Density for the simulation of built-up land density. *Computers, Environment and Urban Systems*, 86, 101586. doi:10.1016/j.compenvurbsys.2020.101586
- [93] Abijith, D., Saravanan, S., Singh, L., Jennifer, J. J., Saranya, T., & Parthasarathy, K. S. (2020). GIS-based multi-criteria analysis for identification of potential groundwater recharge zones - a case study from Ponnaniyar watershed, Tamil Nadu, India. *HydroResearch*, 3, 1–14. doi:10.1016/j.hydres.2020.02.002
- [94] Agrawal, A., Kumar, N., & Radhakrishna, M. (2007, September). Multispectral image classification: a supervised neural computation approach based on rough-fuzzy membership function and weak fuzzy similarity relation. *International Journal of Remote Sensing*, 28, 4597–4608. doi:10.1080/01431160701244898
- [95] Abijith, D., & Saravanan, S. (2021, September). Assessment of land use and land cover change detection and prediction using remote sensing and CA Markov in the northern coastal districts of Tamil Nadu, India. *Environmental Science and Pollution Research*, 29, 86055–86067. doi:10.1007/s11356-021-15782-6
- [96] Halmy, M. W., Gessler, P. E., Hicke, J. A., & Salem, B. B. (2015, September). Land use/land cover change detection and prediction in the north-western coastal desert of Egypt using Markov-CA. *Applied Geography*, 63, 101–112. doi:10.1016/j.apgeog.2015.06.015

- [97] Dibs, H., Al-Hedny, S., & Karkoosh, H. A. (2018). Extracting detailed buildings 3D model with using high resolution satellite imagery by remote sensing and GIS analysis; Al-Qasim Green University a case study. *International Journal of Civil Engineering and Technology*, 9, 1097–1108.
- [98] Butenuth, M., Gösseln, G. v., Tiedge, M., Heipke, C., Lipeck, U., & Sester, M. (2007, October). Integration of heterogeneous geospatial data in a federated database. *ISPRS Journal of Photogrammetry and Remote Sensing*, 62, 328–346. doi:10.1016/j.isprsjprs.2007.04.003
- [99] Silva, L. P., Xavier, A. P., da Silva, R. M., & Santos, C. A. (2020, March). Modeling land cover change based on an artificial neural network for a semiarid river basin in northeastern Brazil. *Global Ecology and Conservation*, 21, e00811. doi:10.1016/j.gecco.2019.e00811
- [100] Mishra, P. K., Rai, A., & Rai, S. C. (2020, August). Land use and land cover change detection using geospatial techniques in the Sikkim Himalaya, India. *The Egyptian Journal of Remote Sensing and Space Science*, 23, 133–143. doi:10.1016/j.ejrs.2019.02.001
- [101] Arnfield, A. J. (2003, January). Two decades of urban climate research: a review of turbulence, exchanges of energy and water, and the urban heat island. *International Journal of Climatology*, 23, 1–26. doi:10.1002/joc.859
- [102] Zhang, J., Zhang, L.-y., Du, M., Zhang, W., Huang, X., Zhang, Y.-q., . . . Xiao, H. (2016, November). Identifying the major air pollutants base on factor and cluster analysis, a case study in 74 Chinese cities. *Atmospheric Environment*, 144, 37–46. doi:10.1016/j.atmosenv.2016.08.066

- [103] Toure, S. I., Stow, D. A., Shih, H.-c., Weeks, J., & Lopez-Carr, D. (2018, June). Land cover and land use change analysis using multi-spatial resolution data and object-based image analysis. *Remote Sensing of Environment*, 210, 259–268. doi:10.1016/j.rse.2018.03.023
- [104] Weng, Y.-C. (2007, July). Spatiotemporal changes of landscape pattern in response to urbanization. *Landscape and Urban Planning*, 81, 341–353. doi:10.1016/j.landurbplan.2007.01.009
- [105] Słodczyk, J. (2020). *The Formation of Urban Spaces Around the World: A History of Planning and Building of Cities*. University of Opole.
- [106] Larondelle, N., Hamstead, Z. A., Kremer, P., Haase, D., & McPhearson, T. (2014, September). Applying a novel urban structure classification to compare the relationships of urban structure and surface temperature in Berlin and New York City. *Applied Geography*, 53, 427–437. doi:10.1016/j.apgeog.2014.07.004
- [107] Fahad, S., Li, W., Lashari, A. H., Islam, A., Khattak, L. H., & Rasool, U. (2021, September). Evaluation of land use and land cover Spatio-temporal change during rapid Urban sprawl from Lahore, Pakistan. *Urban Climate*, 39, 100931. doi:10.1016/j.uclim.2021.100931
- [108] Saadat, H., Adamowski, J., Bonnell, R., Sharifi, F., Namdar, M., & Ale-Ebrahim, S. (2011, September). Land use and land cover classification over a large area in Iran based on single date analysis of satellite imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, 66, 608–619. doi:10.1016/j.isprsjprs.2011.04.001

- [109] Mollicone, D., ACHARD, F., EVA, H. D., BELWARD, A. S., Federici, S., LUMICISI, A., others. (2003). Land Use Change Monitoring in the Framework of the UNFCCC and Its Kyoto Protocol. Report on Current Capabilities of Satellite Remote Sensing Technology. Tech. rep.
- [110] Hegazy, I. R., & Kaloop, M. R. (2015, June). Monitoring urban growth and land use change detection with GIS and remote sensing techniques in Daqahlia governorate Egypt. *International Journal of Sustainable Built Environment*, 4, 117–124. doi:10.1016/j.ijbsbe.2015.02.005
- [111] Yuan, F., Sawaya, K. E., Loeffelholz, B. C., & Bauer, M. E. (2005, October). Land cover classification and change analysis of the Twin Cities (Minnesota) Metropolitan Area by multitemporal Landsat remote sensing. *Remote Sensing of Environment*, 98, 317–328. doi:10.1016/j.rse.2005.08.006
- [112] Ghosh, P., Mukhopadhyay, A., Chanda, A., Mondal, P., Akhand, A., Mukherjee, S., . . . Hazra, S. (2017, January). Application of Cellular automata and Markov-chain model in geospatial environmental modeling- A review. *Remote Sensing Applications: Society and Environment*, 5, 64–77. doi:10.1016/j.rsase.2017.01.005
- [113] Wang, S. W., Gebru, B. M., Lamchin, M., Kayastha, R. B., & Lee, W.-K. (2020, May). Land Use and Land Cover Change Detection and Prediction in the Kathmandu District of Nepal Using Remote Sensing and GIS. *Sustainability*, 12, 3925. doi:10.3390/su12093925

- [114] Epstein, J., Payne, K., Kramer, E., & others. (2002). Techniques for mapping suburban sprawl. *Photogrammetric engineering and remote sensing*, 68, 913–918.
- [115] Jansen, L. J., & Di Gregorio, A. (2004, May). Obtaining land-use information from a remotely sensed land cover map: results from a case study in Lebanon. *International Journal of Applied Earth Observation and Geoinformation*, 5, 141–157. doi:10.1016/j.jag.2004.02.001
- [116] Rawat, J. S., & Kumar, M. (2015, June). Monitoring land use/cover change using remote sensing and GIS techniques: A case study of Hawalbagh block, district Almora, Uttarakhand, India. *The Egyptian Journal of Remote Sensing and Space Science*, 18, 77–84. doi:10.1016/j.ejrs.2015.02.002
- [117] Abijith, D., Saravanan, S., Singh, L., Jennifer, J. J., Saranya, T., & Parthasarathy, K. S. (2020). GIS-based multi-criteria analysis for identification of potential groundwater recharge zones - a case study from Ponnaniyar watershed, Tamil Nadu, India. *HydroResearch*, 3, 1–14. doi:10.1016/j.hydres.2020.02.002
- [118] Berlanga-Robles, C. A., & Ruiz-Luna, A. (2002). Land use mapping and change detection in the coastal zone of northwest Mexico using remote sensing techniques. *Journal of Coastal Research*, 514–522.
- [119] Wulder, M. A., Coops, N. C., Roy, D. P., White, J. C., & Hermosilla, T. (2018, March). Land cover 2.0. *International Journal of Remote Sensing*, 39, 4254–4284. doi:10.1080/01431161.2018.1452075

- [120] Sandu, A. (2017, June). WHAT PATTERN(S) FOR THE URBAN SPRAWL OF THE POST-SOCIALIST ROMANIAN CITIES? 17th International Multidisciplinary Scientific GeoConference SGEM2017, Informatics, Geoinformatics and Remote Sensing. Stef92 Technology. doi:10.5593/sgem2017/23/s11.109
- [121] DeMers, M. N. (2008). Fundamentals of geographic information systems. John Wiley & Sons.
- [122] Ulbricht, K. A., & Heckendorff, W. D. (1998, August). Satellite images for recognition of landscape and landuse changes. ISPRS Journal of Photogrammetry and Remote Sensing, 53, 235–243. doi:10.1016/s0924-2716(98)00006-9
- [123] Gao, J., & Liu, Y. (2010, February). Determination of land degradation causes in Tongyu County, Northeast China via land cover change detection. International Journal of Applied Earth Observation and Geoinformation, 12, 9–16. doi:10.1016/j.jag.2009.08.003
- [124] Bielecka, E. (2020, October). GIS Spatial Analysis Modeling for Land Use Change. A Bibliometric Analysis of the Intellectual Base and Trends. Geosciences, 10, 421. doi:10.3390/geosciences10110421
- [125] Wiatkowska, B., Słodczyk, J., & Stokowska, A. (2021, July). Spatial-Temporal Land Use and Land Cover Changes in Urban Areas Using Remote Sensing Images and GIS Analysis: The Case Study of Opole, Poland. Geosciences, 11, 312. doi:10.3390/geosciences11080312

- [126] Da Costa, S. M., & Cintra, J. P. (1999, February). Environmental analysis of metropolitan areas in Brazil. *ISPRS Journal of Photogrammetry and Remote Sensing*, 54, 41–49. doi:10.1016/s0924-2716(98)00024-0
- [127] Parthasarathy, K. S., & Deka, P. C. (2019, April). Remote sensing and GIS application in assessment of coastal vulnerability and shoreline changes: a review. *ISH Journal of Hydraulic Engineering*, 27, 588–600. doi:10.1080/09715010.2019.1603086
- [128] Fenta, A. A., Yasuda, H., Haregeweyn, N., Belay, A. S., Hadush, Z., Gebremedhin, M. A., & Mekonnen, G. (2017, April). The dynamics of urban expansion and land use/land cover changes using remote sensing and spatial metrics: the case of Mekelle City of northern Ethiopia. *International Journal of Remote Sensing*, 38, 4107–4129. doi:10.1080/01431161.2017.1317936
- [129] Tahir, M., Imam, E., & Hussain, T. (2013). Evaluation of land use/land cover changes in Mekelle City, Ethiopia using Remote Sensing and GIS. *Computational Ecology and Software*, 3, 9.
- [130] Erasu, D. (2017). Remote Sensing-Based Urban Land Use/Land Cover Change Detection and Monitoring. *Journal of Remote Sensing & GIS*, 06. doi:10.4172/2469-4134.1000196
- [131] Guerschman, J. P., Paruelo, J. M., Bella, C. D., Giallorenzi, M. C., & Pacin, F. (2003, January). Land cover classification in the Argentine Pampas using multi-temporal Landsat TM data. *International Journal of Remote Sensing*, 24, 3381–3402. doi:10.1080/0143116021000021288

- [132] Dezso, Z., Bartholy, J., Pongracz, R., & Barcza, Z. (2005, January). Analysis of land-use/land-cover change in the Carpathian region based on remote sensing techniques. *Physics and Chemistry of the Earth, Parts A/B/C*, 30, 109–115. doi:10.1016/j.pce.2004.08.017
- [133] Yang, L., Jin, S., Danielson, P., Homer, C., Gass, L., Bender, S. M., . . . Xian, G. (2018, December). A new generation of the United States National Land Cover Database: Requirements, research priorities, design, and implementation strategies. *ISPRS Journal of Photogrammetry and Remote Sensing*, 146, 108–123. doi:10.1016/j.isprsjprs.2018.09.006
- [134] Kukulska-Kozieł, A., Szylar, M., Cegielska, K., Noszczyk, T., Hernik, J., Gawroński, K., . . . Filepné Kovács, K. (2019, June). Towards three decades of spatial development transformation in two contrasting post-Soviet cities—Kraków and Budapest. *Land Use Policy*, 85, 328–339. doi:10.1016/j.landusepol.2019.03.033
- [135] Lu, D., & Weng, Q. (2007, March). A survey of image classification methods and techniques for improving classification performance. *International Journal of Remote Sensing*, 28, 823–870. doi:10.1080/01431160600746456
- [136] Ghosh, S., & Siddique, G. (2018). Change detection of built up areas applying built-up index for Chandannagar city. *International. Journal of Technogy Research and Management*, 5, 1–7.
- [137] Bramhe, V. S., Ghosh, S. K., & Garg, P. K. (2018, April). Extraction of built-up areas using convolutional neural networks and transfer learning from sentinel-2 satellite images. *The International Archives of the Photogrammetry*,

Remote Sensing and Spatial Information Sciences, XLII–3, 79–85.
doi:10.5194/isprs-archives-xlii-3-79-2018

- [138] Gallego, F. J. (2004, August). Remote sensing and land cover area estimation. *International Journal of Remote Sensing*, 25, 3019–3047.
doi:10.1080/01431160310001619607
- [139] Allen, T. R., Wang, Y., & Crawford, T. W. (2013). Remote sensing of land cover dynamics. Elsevier.
- [140] Lefsky, M. A., & Cohen, W. B. (2003). Selection of remotely sensed data. Springer.
- [141] Lai, Y. (2019, October). A Comparison of Traditional Machine Learning and Deep Learning in Image Recognition. *Journal of Physics: Conference Series*, 1314, 012148. doi:10.1088/1742-6596/1314/1/012148
- [142] Wang, P., Fan, E., & Wang, P. (2021, January). Comparative analysis of image classification algorithms based on traditional machine learning and deep learning. *Pattern Recognition Letters*, 141, 61–67.
doi:10.1016/j.patrec.2020.07.042
- [143] Chen, N., Kuang, X., Liu, F., Wang, K., Zhang, L., & Chen, Q. (2024, December). Few-shot image classification based on gradual machine learning. *Expert Systems with Applications*, 255, 124676.
doi:10.1016/j.eswa.2024.124676
- [144] Sharma, S., & Guleria, K. (2022, April). Deep Learning Models for Image Classification: Comparison and Applications. 2022 2nd International

Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE). IEEE. doi:10.1109/icacite53722.2022.9823516

- [145] Kamath, C. N., Bukhari, S. S., & Dengel, A. (2018, August). Comparative Study between Traditional Machine Learning and Deep Learning Approaches for Text Classification. Proceedings of the ACM Symposium on Document Engineering 2018. ACM. doi:10.1145/3209280.3209526
- [146] Ahmad, M. N., Shao, Z., Xiao, X., Fu, P., Javed, A., & Ara, I. (2024, August). A novel ensemble learning approach to extract urban impervious surface based on machine learning algorithms using SAR and optical data. International Journal of Applied Earth Observation and Geoinformation, 132, 104013. doi:10.1016/j.jag.2024.104013
- [147] Boori, M. S., Netzband, M., Choudhary, K., & Voženílek, V. (2015, November). Monitoring and modeling of urban sprawl through remote sensing and GIS in Kuala Lumpur, Malaysia. Ecological Processes, 4. doi:10.1186/s13717-015-0040-2
- [148] Faisal Koko, A., Yue, W., Abdullahi Abubakar, G., Hamed, R., & Noman Alabsi, A. A. (2021, January). Analyzing urban growth and land cover change scenario in Lagos, Nigeria using multi-temporal remote sensing data and GIS to mitigate flooding. Geomatics, Natural Hazards and Risk, 12, 631–652. doi:10.1080/19475705.2021.1887940
- [149] Faisal Koko, A., Yue, W., Abdullahi Abubakar, G., Hamed, R., & Noman Alabsi, A. A. (2021, January). Analyzing urban growth and land cover change scenario in Lagos, Nigeria using multi-temporal remote sensing data and GIS to

mitigate flooding. *Geomatics, Natural Hazards and Risk*, 12, 631–652.
doi:10.1080/19475705.2021.1887940

- [150] Shikary, C., & Rudra, S. (2020, November). Measuring Urban Land Use Change and Sprawl Using Geospatial Techniques: A Study on Purulia Municipality, West Bengal, India. *Journal of the Indian Society of Remote Sensing*, 49, 433–448. doi:10.1007/s12524-020-01212-6
- [151] Kryczka, P., & Masztalski, R. (2020). A method for the aggregation of spatial data in the study of urban structure on the example of trends in the localisation of tall buildings in Wrocław. *Technical Transactions*, 1–15. doi:10.37705/techtrans/e2020033
- [152] Congalton, R. G., & Green, K. (2019). *Assessing the accuracy of remotely sensed data: principles and practices*. CRC press.
- [153] Foody, G. M. (2002, April). Status of land cover classification accuracy assessment. *Remote Sensing of Environment*, 80, 185–201. doi:10.1016/s0034-4257(01)00295-4
- [154] Anderson, J. R., Hardy, E. E., Roach, J. T., & Witmer, R. E. (1976). A land use and land cover classification system for use with remote sensor data. doi:10.3133/pp964
- [155] Campbell, J. B., & Wynne, R. H. (2011). *Introduction to remote sensing*. Guilford press.
- [156] Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). *Remote sensing and image interpretation*. John Wiley & Sons.

- [157] Congalton, R. G., & Green, K. (2019, August). Assessing the Accuracy of Remotely Sensed Data: Principles and Practices, Third Edition. CRC Press. doi:10.1201/9780429052729
- [158] Pathan, Shehnaj Ahmed, and Atomi V. "Assessment of land use/land cover change and NDVI analysis in Wokha District, Nagaland, India." *Human Ecology* 52.3 (2024): 549-561
- [159] Mittal, H., Pandey, A. C., Saraswat, M., Kumar, S., Pal, R., Modwel, G. (2022). A comprehensive survey of image segmentation: clustering methods, performance parameters, and benchmark datasets. *Multimedia Tools and Applications* 81:35001–35026.
- [160] Lu D, Mausel P, Brondizio E, Moran E (2004) Change detection techniques. *Int J Remote Sens* 25:2365–2407
- [161] Rundquist DC, Narumalani S, Narayanan RM (2001) A review of wet lands remote sensing and defining new considerations. *Remote Sens Rev* 20:207–226
- [162] Rawat JS, Kumar M (2015) Monitoring land use/cover change using remote sensing and GIS techniques: a case study of Hawalbagh block, district Almora, Uttarakhand, India. *Egypt J Remote Sens Space Sci* 18:77–84.
- [163] Rembold, F., Carnicelli, S., Nori, M., & Ferrari, G. A. (2000). Use of aerial photographs, Landsat TM imagery and multidisciplinary field survey for land-cover change analysis in the lakes region, Ethiopia. *JAG*, 2(3/4).
- [164] Cetin, Mehmet. Using GIS analysis to assess urban green space in terms of Accessibility: case study in Kutahya. *International Journal of Sustainable Development & World Ecology* 22.5 (2015): 420-424.

- [165] Mohammady, Majid, et al. "A comparison of supervised, unsupervised and synthetic land use classification methods in the north of Iran." *International Journal of Environmental Science and Technology* 12 (2015): 1515-1526.
- [166] Yin, H., Aryani, A., Petrie, S., Nambissan, A., Astudillo, A., Cao, S.(2024) A Rapid Review of Clustering Algorithms, (arXiv:2401.07389v1 for this version).
- [167] Chena, Z., Qib, Z., Menga, F., Cuic, L., Shi, Y. (2015). Image Segmentation via Improving Clustering Algorithms with Density and Distance. *Information Technology and Quantitative Management (ITQM 2015) Image, Procedia Computer Science* 55. 1015 – 102.
- [168] Dubey, S. K., Vijay, S., Pratibha, (2018). A Review of Image Segmentation using Clustering Methods, *International Journal of Applied Engineering Research* ISSN 0973-4562 Volume 13, Number 5 pp. 2484-2489.
- [169] Zaitoun N. M., Aqel M. J. (2015). Survey on image segmentation techniques. *Procedia Comput Sci* 65:797–806.
- [170] Saxena, A., Prasad, M., Gupta, A., Bharill, N., Patel, O. P., Tiwari, A., Er M. J., Ding, W., Lin, C. T. (2017) A review of clustering techniques and developments. *Neurocomputing* 267:664–681.
- [171] Bradley, P. S., K. P. Bennett, and Ayhan Demiriz (2000) Constrained k-means clustering. *Microsoft Research, Redmond*: 1-8.
- [172] Ezugwu, A. E., Ikotun, A. M., Oyelade, O. O., Abualigah, L., Agushaka, J. O., Eke, C. I., Akinyelu, A. A. (2022). A comprehensive survey of clustering algorithms: State-of-the-art machine learning applications, taxonomy,

challenges, and future research prospects. *Engineering Applications of Artificial Intelligence* 110, 104743.

- [173] Xu, R., Wunsch, D. (2005). Survey of clustering algorithms. *IEEE Transactions on Neural Networks* 16(3), 645–678.
- [174] Xu, D., Tian, Y. (2015). A comprehensive survey of clustering algorithms. *Annals of Data Science* 2, 165–193.
- [175] Kharat, V., Khatdeo, S., Kothe, H., Kshirsagar, R., Dixit, M., Balan, M. S. (2023). Land cover clustering and classification of satellite images. *ITM Web of Conferences* 56.
- [176] Ikotun, A. M., Ezugwu, A. E., Abualigah, L., Abuhaija, B., Heming J. (2023). K-means clustering algorithms: A comprehensive review, variants analysis, and advances in the era of big data, *Information Sciences*, Volume 622, Pages 178-210.
- [177] Murtagh, F., Contreras, P. (2012). *Methods of Hierarchical Clustering* (arXiv:1105.0121v1 for this version) <https://doi.org/10.48550/arXiv.1105.0121>.
- [178] Patel, S., Sihmar, S., Jatain, A., (2015). A study of hierarchical clustering algorithms. *2nd International Conference on Computing for Sustainable Global Development (INDIACom)*.
- [179] Deng, D. (2020). DBSCAN Clustering Algorithm Based on Density. *7th International Forum on Electrical Engineering and Automation (IFEEA)*.
- [180] Li, S. S., (2020). An Improved DBSCAN Algorithm Based on the Neighbor Similarity and Fast NearDest Neighbor Query. *IEEE Access*, pp. 99, 2020.

- [181] Malik, N. (2020). Supernova Type Ia Diversity: A Study using DBSCAN Algorithm. *International Journal of Advanced Trends in Computer and Engineering*, pp. 3398-3402, 2020.
- [182] Zhang Wang, Z., Liang (2020). Short-Term Wind Power Prediction Using GA-BP Neural Network Based on DBSCAN Algorithm Outlier Identification", *Processes*, vol. 8, no. 2, pp. 157.
- [183] Kartakoullis, A., Caporaso, N., Whitworth, M. B., Fisk, I. D. (2025). Gaussian mixture model clustering allows accurate semantic image segmentation of wheat kernels from near-infrared hyperspectral images, *Chemometrics and Intelligent Laboratory Systems*, Volume 259.
- [184] Ahmed, S. R. A., Al Barazanchi, I., Jaaz, Z. A., Abdulshaheed, H. R. (2019). Clustering algorithms subjected to k-mean and Gaussian mixture model on multidimensional data set. *Period Eng Nat Sci*. 7(2):448–457.
- [185] Anderson, T. K. (2009). Kernel density estimation and k-means clustering to profile road accident hotspots. *Accid Anal Prev*. 41(3):359–364.
- [186] Dempster, A. P., Laird, N. M., Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *J R Stat Soc Series B Stat Methodol*. 39(1):1–22.
- [187] Cheng, Y. (1995). Mean shift, mode seeking, and clustering *IEEE Trans. Pattern Anal. Mach. Intell.*, 17 (8), pp. 790-799.
- [188] Welbaum, A., Qiao, W. (2025). Mean shift-based clustering for misaligned functional data, *Computational Statistics & Data Analysis* Volume 206.

- [189] Sarkar, M., Yegnanarayana, B., Kheman, D. (1997). A clustering algorithm using an evolutionary programming-based approach. Pattern Recognition Letters, Volume 18, Issue 10, October 1997, Pages 975-986.
- [190] Taha. K., (2023). Semi-supervised and un-supervised clustering: A review and experimental evaluation, Information Systems, Volume 114, March 2023, 102178.
- [191] Eick, C.F., Zeidat, N, Zhao, Z. (2004). Supervised clustering - algorithms and benefits. 16th IEEE International Conference on Tools with Artificial Intelligence, 15-17 Nov. 2004
- [192] Corne, D., Handl, J., Knowles, J., (2010). Evolutionary Clustering Encyclopaedia of Machine Learning, Reference work entry, pp 332–337.
- [193] Cohen-Addad, V., Kanade, V., Mallmann-Trenn, F., Mathieu, C., (2018). Hierarchical Clustering: Objective Functions and Algorithms. 29th Annual ACM-SIAM Symposium on Discrete Algorithms, New Orleans, 2018.
- [194] Mavaluru, D., Malar, R. S., Dharmarajlu, S. M., Auguskani, j. P. L. Chellathurai, A., Deep hierarchical cluster analysis for assessing the water quality indicators for sustainable groundwater, Groundwater for Sustainable Development, Volume 25, May 2024.
- [195] Neto, A. C., Levada, A. L. M., Haddad, M. F. C.,(2024) . Supervised t-SNE for Metric Learning With Stochastic and Geodesic Distances, IEEE Canadian Journal of Electrical and Computer Engineering, Volume: 47, Issue: 4, Fall 2024.

- [196] Hajderanj, L., Weheliye, I, Chen, D. (2019). A New Supervised t-SNE with Dissimilarity Measure for Effective Data Visualization and Classification. ICSIE '19: Proceedings of the 8th International Conference on Software and Information Engineering Pages 232-236.
- [197] Eick, C. F., Zeidat, N., Zhao, Z., (2004). Supervised Clustering – Algorithms and Benefits, 16th IEEE International Conference on Tools with Artificial Intelligence, 15-17 Nov. 2004
- [198] Zeidat, N., Eick, C. F., Zhao, Z., (2006). Supervised Clustering: Algorithms and Application, PAMI 2006.
- [199] Bennett, K. P., Bradley, P. S., (2000). Constrained K-Means algorithm. MSR-TR-2000-65, May 2000.
- [200] Okabe, M., Yamada, S., (2018). Clustering Using Boosted Constrained k-Means Algorithm, Sec. Computational Intelligence in Robotics, Volume 5 – 2018.
- [201] Chen, Y., Cheng, N., Cai, M., Cao, C., Yang,J., Zhang, Z., (2021).A spatially constrained asymmetric Gaussian mixture model for image segmentation Information Sciences, Volume 575, October 2021, Pages 41-65.
- [202] Olivier, J.F., T.M. Louw Prof., (2024). Time-constrained Gaussian mixture model for clustering multi-modal chemical process data.IFAC-PapersOnLine, Volume 58, Issue 25, 2024, Pages 108-113.
- [203] Babu, G., Gowen, A., Fop, M, Gormley, I.C. (2025). A consensus-constrained parsimonious Gaussian mixture model for clustering hyperspectral images. Advances in Data Analysis and Classification, 2025.

- [204] Manduchi, L., Chin-Cheong., K., Michel., H., Wellmann, S., Vogt, J. E., (2021). Deep Conditional Gaussian Mixture Model for Constrained Clustering35th Conference on Neural Information Processing Systems (NeurIPS 2021).
- [205] Jiang, W., Lina, Y., Xinjun, J., Yuhui, X.. (2015). A New Classification Method Based on Semi-supervised Support Vector Machine, Lecture Notes in Computer Science. 2015.
- [206] Liang, P., Xueming, Y., (2012). Explore semi-supervised support vector machine algorithm for the application of physical education effect evaluation. International Journal of Advancements in Computing Technology, 2012.
- [207] Tao, X., Cao, P., Song, S., Fu, D., (2013). The SVM classification algorithm based on semi-supervised Gauss mixture model kernel. Information and Control, February 2013.
- [208] Agrawal, L., Saradhi, V. V., Sharma, T., (2025). Fairness in constrained spectral clustering. Neurocomputing, Volume 634, 14 June 2025.
- [209] Wang, X., Qian, B., Davidson, I., (2012). On Constrained Spectral Clustering and Its Applications, arXiv:1201.5338 [bcs.LG]
- [210] Low, J. S., Ghafoori, Z., Bezdek, J. C., Leckie, C. (2019). Seeding on Samples for Accelerating K-Means Clustering. BDIOT '19: Proceedings of the 3rd International Conference on Big Data and Internet of Things, Pages 41 – 45.
- [211] Bajpai, N., Paik, J. H., Sarkar, S., (2025). Balanced seed selection for K-means clustering with determinantal point process. Pattern Recognition. Volume 164, August 2025.

- [212] Census of India 1981, Series - 19, Sikkim, Part II-A And Part II-B General Population Tables and Primary Census Abstract accessed online as on 2 May 2025
- [213] Census of India 1991, Series - 22, Sikkim, Paper-1 of 1991, Supplement Provisional Population accessed online as on 2 May 2025
- [214] Census of India 2001, Series - 12, District Census Handbook, Part - A & 8, Sikkim North, West, South and East Districts, Village & Town Directory, Village and Townwise, Primary Census Abstract accessed online as on 2 May 2025
- [215] Census of India 2011 Sikkim Series-12 Part XII - B District Census Handbook North, West, South and East Districts Village and Town Wise Primary Census Abstract (PCA) accessed online as on 2 May 2025
- [216] Unnayan Survekshan 2022 accessed online as on 2 May 2025
- [217] sikkim.gov.in/ accessed online as on 4 May 2025
- [218] www.education.sikkim.gov.in/GeneralSection/SchoolList.aspx accessed online as on 5 May 2025
- [219] gangtokdistrict.nic.in/public-utility-category/colleges/page/2/ accessed online as on 5 May 2025
- [220] sikkim.gov.in/DepartmentsMenu/health-family-welfare-department/ accessed online as on 5 May 2025
- [221] sikkimtourism.gov.in/DownloadableFiles/Notifications/ accessed online as on 5 May 2025
- [222] power.sikkim.gov.in/visitor/projectsdata/22 accessed online as on 6 May 2025

- [223] www.sikkim.gov.in/department/departmentmenudetails accessed online as on 6 May 2025
- [224] industries.sikkim.gov.in/visitors/industriesandcompanies accessed online as on 6 May 2025
- [225] slbcsikkim.co.in/General/Industries.aspx accessed online as on 6 May 2025
- [226] <https://websites.umich.edu/~steiss/page55.html> accessed online as on 6 May 2025
- [227] Karan, Shivesh Kishore, and Sukha Ranjan Samadder. "A comparison of different land-use classification techniques for accurate monitoring of degraded coal-mining areas." *Environmental Earth Sciences* 77.20 (2018): 713.
- [228] Ahmad, A., & Quegan, S. (2012, November). Analysis of Maximum Likelihood classification technique on Landsat 5 TM satellite data of tropical land covers. 2012 IEEE International Conference on Control System, Computing and Engineering. IEEE. doi:10.1109/iccscce.2012.6487156
- [229] Manandhar R, Odeh IOA, Ancev T (2009) Improving the accuracy of land use and land cover classification of Landsat data using post classification enhancement. *Remote Sens* 1(13):330–344