



Istanbul Technical University, Faculty of Civil Engineering, Department of Geomatics Engineering
Maslak, Istanbul, 34469, Türkiye

Summary

Koray Aksu received a Bachelor's degree in Geomatics Engineering and Civil Engineering (double major) from Istanbul Technical University (ITU), Türkiye, and an M.Sc. degree in Geomatics Engineering from the same institution. He is pursuing a PhD in Geomatics Engineering. He is focused on PhD study, Building Information Modeling (BIM) and Building Energy Modeling (BEM), energy-efficient design optimization to support intelligent decision-making in building design. His primary research interests lie in Geographic Information Systems (GIS), machine learning, reinforcement learning, spatial data analysis, photogrammetry, point cloud segmentation, 3D reconstruction, Scan-to-BIM, BEM, and BIM and game engine integration.

Experience

- **Research Assistant** 2021–Present
Istanbul Technical University, Faculty of Civil Engineering, Department of Geomatics Engineering

Education

- **Geomatics Engineering (Ph.D.)** 2023–Present
Istanbul Technical University, Graduate School
- **Geomatics Engineering (M.Sc.)** 2020–2023
Istanbul Technical University, Graduate School
- **Civil Engineering (B.Sc.)** 2017–2021
Istanbul Technical University, Faculty of Civil Engineering
- **Geomatics Engineering (B.Sc.)** 2016–2020
Istanbul Technical University, Faculty of Civil Engineering

Projects

- **Positive ROBust PEd Localities - PROPEL** 2024–2025
European Commission JPI – PED program and TUBITAK, Multiple Collaboration Programs (ENPED Call), R&D Project - Scholarship holder
- **Development of an Urban Logistics Planning System Based on Multi-Criteria Decision Making** 2024–2025
ITU-1773TTO, R&D Project - Researcher
- **Building Information Model (BIM) Based Fire Evacuation Simulation** 2022–2024
TUBITAK, 121Y099, R&D Project - Scholarship holder
- **Production of High-Definition Maps for ITU Ayazağa Campus Digital Road Infrastructure** 2021–2023
ITU Scientific Research Projects Coordination Unit, 43340, General Research Project - Researcher
- **Effects of Cooperative Vehicle Dynamics in Traffic Flow Modeling: Simulation and Control** 2021–2022
TUBITAK, 120M576, R&D Project - Scholarship holder

Journal Articles

- [1] K. Aksu, H. Demirel, R. M. Alkan, and M. Yanalak. "ITU-Campus3D: A Campus-Scale Urban Mobile Mapping Benchmark for Semantic Segmentation". In: *IEEE Access* 14 (2026), pp. 55621–55640. DOI: [10.1109/ACCESS.2026.3682205](https://doi.org/10.1109/ACCESS.2026.3682205).
- [2] A. F. Terzi, K. Aksu, and H. Demirel. "A generalizable ensemble meta-learning framework for assessing 15-minute cities". In: *Scientific Reports* (July 2026). DOI: [10.1038/s41598-026-61214-1](https://doi.org/10.1038/s41598-026-61214-1).
- [3] A. Koçyiğit, K. Aksu, A. F. Terzi, İ. Karadağ, and H. Demirel. "Indoor Fire Evacuation Simulations using Rule-Based Spatial Analysis and Fire Dynamics Simulation". In: *WSEAS Transactions on Environment and Development* 21 (2025), pp. 1280–1291. DOI: [10.37394/232015.2025.21.107](https://doi.org/10.37394/232015.2025.21.107).
- [4] A. F. Terzi, K. Aksu, A. Koçyiğit, and H. Demirel. "A BIM-Based Multi-Criteria Spatial Framework for Assessing Fire Risks in Indoor Environments". In: *Fire* 8.9 (2025). ISSN: 2571-6255. DOI: [10.3390/fire8090361](https://doi.org/10.3390/fire8090361).
- [5] K. Aksu and H. Demirel. "Extracting Structural Elements From 3D Point Clouds in Indoor Environments via Machine Learning Techniques". In: *IEEE Access* 12 (2024), pp. 94461–94476. DOI: [10.1109/ACCESS.2024.3423425](https://doi.org/10.1109/ACCESS.2024.3423425).
- [6] K. Aksu and H. Demirel. "Integration of Building Information Model into a Game Engine Platform for Indoor Accessibility Analyses". In: *WSEAS Transactions on Environment and Development* 20 (2024), pp. 391–396. DOI: [10.37394/232015.2024.20.36](https://doi.org/10.37394/232015.2024.20.36).
- [7] C. F. Aldoğan, K. Aksu, and H. Demirel. "Enhancement of Sentinel-2A Images for Ship Detection via Real-ESRGAN Model". In: *Applied Sciences* 14.24 (2024). ISSN: 2076-3417. DOI: [10.3390/app142411988](https://doi.org/10.3390/app142411988).

Conference Papers

- [1] A. Koçyiğit, K. Aksu, A. F. Terzi, and H. Demirel. "Investigating the Role of Geographic Information Systems in Advancing Positive Energy Districts". In: *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. Vol. XLVIII-4/W18-2025. 2026, pp. 221–226. DOI: [10.5194/isprs-archives-XLVIII-4-W18-2025-221-2026](https://doi.org/10.5194/isprs-archives-XLVIII-4-W18-2025-221-2026).
- [2] A. F. Terzi, K. Aksu, A. Koçyiğit, and H. Demirel. "Mapping Social Vulnerability Through Accessibility Patterns: The Istanbul Case". In: *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. Vol. XLVIII-4/W18-2025. 2026, pp. 323–329. DOI: [10.5194/isprs-archives-XLVIII-4-W18-2025-323-2026](https://doi.org/10.5194/isprs-archives-XLVIII-4-W18-2025-323-2026).
- [3] A. Koçyiğit, A. F. Terzi, K. Aksu, and H. Demirel. "Mapping Positive Energy: A Geographic Information System Approach to Defining Positive Energy Districts". In: *AESOP Congress 2025*. Istanbul, Türkiye, 2025. URL: https://www.researchgate.net/publication/410745088_Mapping_Positive_Energy_A_Geographic_Information_System_Approach_to_Defining_Positive_Energy_Districts.
- [4] A. F. Terzi, G. Kılıç, A. Koçyiğit, K. Aksu, and H. Demirel. "Makine Öğrenmesi Yöntemleri Kullanılarak Zonguldak İli için Taşkın Riski Değerlendirmesi". In: *TUFUAB XIII. Teknik Sempozyumu*. Zonguldak, Türkiye, 2025. URL: <https://tufuab2025.beun.edu.tr/>.
- [5] A. F. Terzi, A. Koçyiğit, K. Aksu, and H. Demirel. "Performance Analysis of 15-Minute City Zones Through Spatial and Machine Learning Techniques". In: *AESOP Congress 2025*. Istanbul, Türkiye, 2025. URL: https://www.researchgate.net/publication/395012785_Performance_Analysis_of_15-Minute_City_Zones_Through_Spatial_and_Machine_Learning_Techniques.
- [6] K. Aksu, A. A. Aşıroğlu, A. F. Terzi, A. Koçyiğit, and H. Demirel. "Yapı Bilgi Modelinin Görselleştirilmesi: Mekânsal Gösterge Paneli". In: *TMMOB 8. Coğrafi Bilgi Sistemleri Kongresi*. Ankara, Türkiye, 2024. URL: <https://cbskongresi.org/>.
- [7] K. Aksu, E. Günaydın, and Z. Duran. "Comparative Analysis of 3D Models Generated by Close Range Photogrammetry and Smartphone-Based LiDAR Sensor". In: *Advanced Engineering Days*. Online, 2024.
- [8] K. Aksu, A. Koçyiğit, A. F. Terzi, and H. Demirel. "Yapı Bilgi Modellemede Semantik Zenginleştirme ve Güncelleştirme için Farklı Ölçme Tekniklerinin Uygulanması". In: *IX. Uzaktan Algılama-CBS Sempozyumu (UZAL-CBS 2024)*. Aksaray, Türkiye, 2024. URL: <https://uzalcbs2024.aksaray.edu.tr/>.

- [9] A. Koçyiğit, A. F. Terzi, K. Aksu, and H. Demirel. “Pandemi Öncesi ve Sonrası Trafik Yoğunluğunun Çevresel ve Toplumsal Etkilerinin Coğrafi Bilgi Sistemleri Tabanlı Analiz”. In: *IX. Uzaktan Algılama-CBS Sempozyumu (UZAL-CBS 2024)*. Aksaray, Türkiye, 2024. URL: <https://uzalcbs2024.aksaray.edu.tr/>.
- [10] K. Aksu, A. E. Arslan, and H. Demirel. “Makine Öğrenme Yöntemleri ile İç Mekan Nokta Bulutlarının Semantik Segmentasyonu”. In: *TUFUAB XII. Teknik Sempozyumu*. Sivas, Türkiye, 2023. URL: <https://tufuab2023.cumhuriyet.edu.tr/>.
- [11] K. Aksu and H. Demirel. “Kapalı Alan Yangın Tahliye Senaryolarının Dijital Ortamda Oluşturulması”. In: *Mimarlık ve Yangın Sempozyumu*. İstanbul, Türkiye, 2023. URL: <https://polen.itu.edu.tr/items/4662d24c-46e5-4b65-b69c-772e6c4703cd>.
- [12] K. Aksu, H. Demirel, R. M. Alkan, and M. Yanalak. “Digital Transformation of Campuses: The Role of HD Maps”. In: *European Transport Conference*. Milan, Italy, 2023. URL: https://www.researchgate.net/publication/376859655_Digital_Transformation_of_Campuses_The_Role_of_HD_Maps.
- [13] K. Aksu, T. Özcan, İ. Karadağ, and H. Demirel. “Üç Boyutlu Yapı Bilgi Modeli Kullanılarak Yangın Dinamiği ve Yangın Tahliyesinin Simülasyonu”. In: *Uluslararası Yangın Güvenliği Sempozyumu ve Sergisi - TÜYAK 2023*. İstanbul, Türkiye, 2023. URL: <https://tuyak.org.tr/sempozyum-bildiri-kitaplari/>.

Thesis

- [1] K. Aksu. “Makine Öğrenmesi Yöntemleri Kullanılarak Üç Boyutlu Nokta Bulutlarının Sınıflandırılması”. Advisor: Prof. Dr. Hande Demirel. M.Sc. Thesis. İstanbul, Türkiye: İstanbul Technical University, 2023. URL: <https://tez.yok.gov.tr/UlusalTezMerkezi/>.

Academic Activities Attended

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|---|---------------|
| • Transport Research Arena (TRA) 2026
Budapest, Hungary, 2026 | Conference |
| • IEEE GRSS Turkey Young Professionals Day
Invited Speaker – “3D Point Cloud and Artificial Intelligence-Based Approaches in Building Information Modeling”
Yıldız Technical University, İstanbul, Türkiye, 2025 | Seminar |
| • 11th Big Data Conference 2025
Linnéuniversitetet, Kalmar, Sweden, 2025 | Conference |
| • Enhancing Green Mobility Through Proximity in Urban Peripheries (ENTROPIES)
Universidad Politécnica de Madrid, Madrid, Spain, 2025 | Workshop |
| • TUFUAB XIII. Teknik Sempozyumu
Zonguldak Bülent Ecevit University, Zonguldak, Türkiye, 2025 | Symposium |
| • TMMOB 8. Coğrafi Bilgi Sistemleri Kongresi
Ankara, Türkiye, 2024 | Congress |
| • IX. Uzaktan Algılama-CBS Sempozyumu (UZAL-CBS 2024)
Aksaray University, Aksaray, Türkiye, 2024 | Symposium |
| • Virtual Twins for Improving Intermodality
Universidad Politécnica de Madrid, Madrid, Spain, 2024 | Summer School |
| • Urban Mobility Solutions for Liveable Cities
Budapest University of Technology and Economics, Budapest, Hungary, 2023 | Seminar |
| • Low Emission Zones: Challenges and Opportunities
İstanbul Technical University, İstanbul, Türkiye, 2023 | Workshop |
| • TUFUAB XII. Teknik Sempozyumu
Sivas Cumhuriyet University, Sivas, Türkiye, 2023 | Symposium |
| • International Fire Safety Symposium and Exhibition
İstanbul, Türkiye, 2023 | Symposium |

Skills

- **Programming Languages:** Python, C#
- **Database Systems:** PostgreSQL/PostGIS
- **Data Science & AI:** Pytorch, Keras/Tensorflow, Docker
- **Cloud Computing:** High Computing Grid Systems, Kaggle, Google Colab, Google Earth Engine
- **Mathematical & Statistical Tools:** MATLAB
- **Other Tools:** QGIS, ArcGIS, CloudCompare, Feature Manipulation Engine (FME), Revit, DynamoBIM, AutoCAD, Blender, Unity3D, Agisoft Metashape

Honors and Awards

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| • Performance-Based Scholarships Programme for PhD - 2250 (1st Call)
TUBITAK | 2026 |
| • Performance-Based Scholarships Programme for PhD - 2250 (1st Call)
TUBITAK | 2025 |
| • Performance-Based Scholarships Programme for PhD - 2250 (2nd Call)
TUBITAK | 2025 |
| • Best M.Sc. Thesis Award - First Place, Graduate Thesis Competition [🌐]
IEEE GRSS | 2024 |
| • Performance-Based Scholarships Programme for PhD - 2250
TUBITAK | 2024 |

Professional Memberships

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| • IEEE Geoscience and Remote Sensing Society | 2024 - Present |
| • Turkish Chamber of Survey and Cadastre Engineers | 2023 - Present |

Languages

- **Turkish:** Native
- **English:** Fluent