

Title of the doctorate theme	APPLICATION OF AI FOR PREDICTING THE SPREAD AND IMPACT OF INVASIVE SPECIES USING INFORMATION SYSTEMS
Brief description of the topic	<p>Invasive species pose an increasing threat to natural ecosystems, biodiversity, agriculture, and the economy. Climate change, international trade, and other anthropogenic factors facilitate the spread of these species, necessitating the development of advanced methods for effectively monitoring, predicting, and managing invasion processes. Existing invasive species information systems (e.g., AquaNIS, GBIF, GISD, EASIN) compile vast amounts of data on species distribution, ecological impact, and management strategies. However, the analysis of these data is often based on traditional statistical methods, which may not provide sufficiently accurate predictions.</p> <p>The scientific problem arises from the limited accuracy of existing predictive models, the lack of automated analytical tools capable of processing large datasets in real time, and the underutilization of artificial intelligence (AI) in this field.</p> <p>This dissertation aims to develop an AI-based system that will integrate data from multiple sources, conduct automated analyses, and generate high-precision forecasts on the spread and impact of invasive species on ecosystems. The proposed tool will contribute to the development of early warning and management strategies. The research will employ state-of-the-art AI methodologies, utilizing data from invasive species information systems, geographic information systems (GIS), remote sensing sources, and citizen science initiatives.</p>
Requirements for a candidate	Understanding of invasive species ecology and ecosystem dynamics. Knowledge of AI, machine learning, and data analysis methods. Programming skills in Python, R, or another data analysis and AI modeling language. Ability to work with databases and APIs (e.g., PostgreSQL, JSON, REST API). Basic knowledge of remote sensing methods. Ability to analyze scientific literature, synthesize information, and apply it in practice. Experience in conducting statistical data analysis.
Existing research infrastructure and support	The candidate will have the opportunity to participate in the KU project GuardIAS (Guarding European Waters from IAS), utilize the computational infrastructure of KU and its partners, and access data from the AquaNIS information system.
How the topic advances the research capacity of the Klaipeda University	The proposed doctoral topic could significantly contribute to the scientific development of KU. The AI-based invasive species forecasting system could become a new tool for invasion management, decision-making, and the foundation for early warning systems. This topic would promote the application of new digital methods in ecology and establish an infrastructure for R&D services for both the public and private sectors, as well as for preparing applications for international projects.
Potential scientific supervisor	Dr. Aleksas Narščius, KU Marine Research Institute. https://www.ku.lt/cris/entities/person/35490f3e-2530-453d-9ca6-f2edf4a4ef85
Potential scientific advisor	prof. dr. Sergej Olenin, KU Marine Research Institute. https://www.ku.lt/cris/entities/person/1acabfed-ecf4-48f1-a674-9aa95a224b3f