The Hydrology group of the Institute of Water and River Basin Management is seeking to recruit a

Doctoral Researcher (f/m/d)

for the project

"InfraStructure for dAta-BasEd Learning in environmental sciences (ISABEL)"

The amount and diversity of digitally available environmental data is continuously increasing. However, they are often hardly accessible or scientifically usable. The datasets frequently lack sufficient metadata description, are stored in a variety of data formats, and are still saved on local storage devices instead of data portals or repositories.

Based on the existing virtual research environment V-FOR-WaTer, the project ISABEL aims at making this data abundance available in an easy-to-use web portal. Environmental scientists get access to data from different sources, e.g. state offices or university projects, and can share their own data through the portal. Integrated tools help to easily pre-process and scale the data and make them available in a consistent format. Further tools for more complex scientific analyses will be included. The possibility to store workflows together with the tools and respective data ensures reproducible data analysis. Additionally, interfaces with existing data repositories will enable easy publication of the scientists' data directly from the portal. ISABEL addresses the needs of researchers of hydrology and environmental science to not only find and access datasets but also conduct efficient data-based learning with standardised tools and reproducible workflows.

ISABEL rests on a close collaboration between the Institute of Water and River Basin Management (IWG) and the Steinbuch Computing Centre (SCC) at KIT. We are looking complete our existing team of computer scientists and hydrologists by two new colleagues at SCC and two PhD candidates and one software developer at IWG. The two PhD students at IWG will do complementary research and development, while the developer will support the implementation of their models and tools into the V-FOR-WaTer infrastructure.

The successful PhD candidate will explore synergies between data-based and process-based hydrological learning and modelling. Key emphasis is on the potential of machine learning methods to a) analyse the information content in diverse data and their interdependencies, b) to predict hydrological dynamics across different spatial and temporal scales. A major focus will be on improving flash flood predictions using multiple estimates of precipitation data (operational rain gauges, rainfall radar, private weather stations, commercial microwave links) in combination with other meteorological predictors and multiple state measures. The developed machine learning model structures are then implemented as tools in V-FOR-WaTer.

The successful candidate has:
- A Master's degree either in a subject related to environmental systems sciences or to geoinformatics and/or machine learning.
- Experience in various machine learning (ML) methods, especially neural networks.
- Strong interest in applying ML methods to diverse environmental datasets, including rainfall radar data.
- Good programming skills in Python is required, experience with PyTorch is preferred.
- Good writing and oral communication skills in English.
- The ability to work independently and in an interdisciplinary team.

We offer an attractive and modern workplace, exciting opportunities for interdisciplinary collaboration, networking, and training, and a research topic with high future potential. You will join an internationally highly respected group, work in an intellectually stimulating atmosphere and have access to the excellent computing facilities of KIT. The position is initially limited to 3 years. Salary is competitive and with all social benefits (75% TVL-E13). We offer flexible working time models and a job ticket allowance. Based on the project work, the candidate will have the opportunity to pursue a PhD.

Please apply via E-mail to sibylle.hassler@kit.edu until **15/06/2022** including a detailed CV, scans of degree certificates, a letter of motivation, and contact information for two referees. We aim to balance the number of employees from diverse backgrounds (f/m/d) and therefore particularly invite female researchers to apply. If

qualified, disabled persons will be preferred. Planned start date is **15/07/2022**. For further information, please contact Dr. Sibylle Haßler, sibylle.hassler@kit.edu.

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