DEMOCRATIZING ECOSYSTEM MODELING

User-friendly AI system makes ecological simulations accessible to all

01   THE CHALLENGE

Modeling ecosystem dynamics can empower people to understand and respond to environmental changes happening in their communities. Although sophisticated ecological simulation models are available, most are expensive and require special training to use. They also require access to ecological data, which is housed in numerous databases and in some cases exists only on paper. While ecological modeling is a valuable tool for researchers, these factors often put it beyond the reach of communities, students and citizen scientists.

02   THE PROJECT

With support from NSF's Big Data Spokes initiative, researchers created an easy-to-use simulation tool called The Virtual Ecological Research Assistant (VERA) that broadens access to ecological modeling by allowing users to investigate questions about the effects of ecological changes. Using VERA, people without scientific training can run simulations with real-world data to answer questions like, "If the weather is sunnier, and the plants in my ecosystem grow faster, how many more deer can I expect in my area?" The user could then explore how an increase in the deer population might affect the area's wolf population, for example.

Through this question-and-answer approach, VERA gives users easy access to information from Encyclopedia of Life, the world's largest biodiversity database, as well as other sources. The research team is working to add more data relevant to ecological modeling by pulling information from databases, scientific papers and even printed monographs. To do this, VERA uses techniques from artificial intelligence, natural language processing and data science, as well as the IBM Bluemix toolkit for question answering. The VERA project demonstrates the use of AI for querying big data in the Encyclopedia of Life and other data sources, and translating the data into knowledge useful for ecological modeling and scientific reasoning.
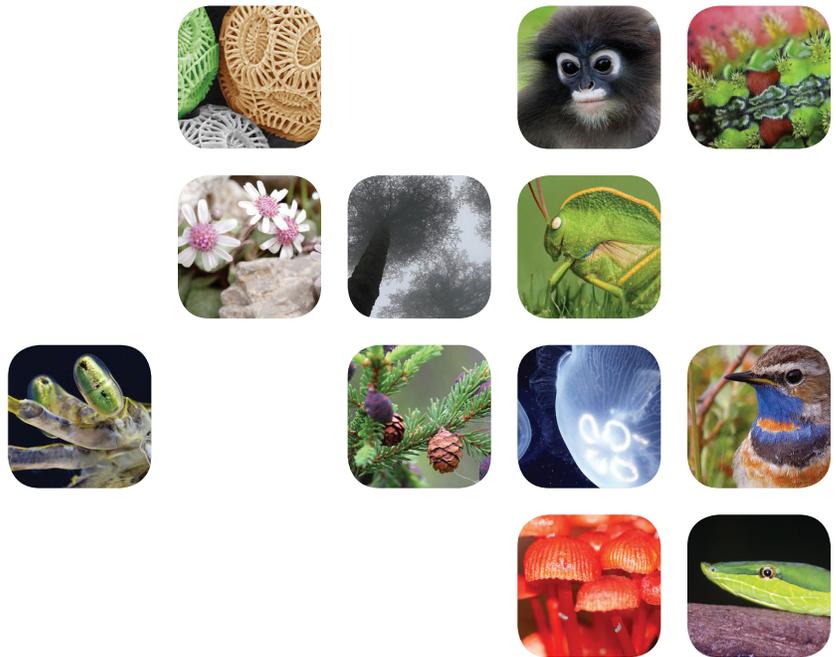
The researchers hope VERA will expand the community of people who can use ecosystem modeling to better understand our world and inform decision making. In addition to bringing ecological simulations within the reach of communities and citizen scientists, VERA can be a useful starting place for ecologists and student scientists because it provides a research workflow that makes it easier to answer complex scientific questions without specialized training.

Initial testing of the VERA prototype with students at the Georgia Institute of Technology found that the system enhanced learning by allowing students to perform modeling exercises. Students were even able to use the tool to create models relevant to questions outside of ecology, such as cancer biology.

BIODIVERSITY

A new simulation model called VERA gives citizen scientists an easy way to use data from the Encyclopedia of Life to answer questions about the effects of an ecological change.

MORE INFORMATION

southbdhub.org | info@southbdhub.org

SOUTH **BIG DATA** INNOVATION HUB