

U of M designing open, free program to teach computer science

By Jane Roberts

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University of Memphis professor Andrew M. Olney, pictured in the FedEx Institute of Technology on Tuesday, Feb. 11, 2020, will spearhead a \$3.5 million grant to improve data science learning. (Mark Weber/Daily Memphian)

In his University of Memphis office littered with old robot parts, including heads, machine-learning guru Andrew Olney is planning a brainpower revolution of sorts.

His partner is the National Science Foundation. In January, it gave the university \$3.5 million to come up with deliverables to help a modern but untrained workforce quickly

advance up the data-science ladder, without having to attain the university degree in statistics and machine learning.

This summer, Olney will roll out the first rendition, a sophisticated computer-based course backed with intelligent tutoring support he and his colleagues in the FedEx Institute of Technology have been tinkering with for years.

“In my view ... this is someone who is working for a company would do this on the side. You might say, ‘I am going to learn computer science this year.’ You would spend an hour every day on it,” he said. “After six months, you would have gone through our entire program.

“It will be completely open and free. We are going to put all our materials online.”

With Jupyter, a mashup of coding languages and building blocks from Google’s Blockly — both free elements — one support element will help participants write coding without having to know syntax or take a year off to learn Python.

“It allows them to focus on conceptual stuff and how it works,” said Olney, who earned his Ph.D. at the university and completed his undergraduate and master’s degrees at University College of London and the University of Sussex.

And it will help them speed through to solving problems.

The emerging prototype being created will give workers, retirees, even children, he suspects, a 250-hour training program that will qualify them to manipulate the reams of data now available for solving problems.

“It could be for the citizen scientist, people who might be concerned about pollutants in their community,” he said.

With data from the Environmental Protection Agency, for one, “they could try to figure out if it’s really a problem or not.”

Entrepreneurs might be interested in comparing delivery times for various weights and vendors across shipping companies and platforms, he said. Parcel-tracking

information, now widely available, makes it possible.

“It lets you make data-driven decisions. Letting your decisions be informed by data instead of a hunch or the loudest voice in the room — that’s a classic one — well, there is now that potential,” Olney said. “But the problem is, people are not really trained to use data that way.”

A world where people have experienced Google, Facebook and apps for more than a decade has amassed an appreciation for stupefying amounts of data, he says.

“These companies are collecting tons and tons of data about people all the time. Some goes into advertising, some goes into other things,” Olney said. “That made everyone realize how valuable data is.”

In last three years, the demand for data scientists has increased by a factor of 10 in key markets, says Olney, the principal investigator in this study and professor in the university’s department of psychology and Institute for Intelligent Systems.

“If this trend continues, data scientists will be more sought after than software developers in just a few years.”

This is the second NSF grant the university has received in a matter of months for developing learning systems with artificial intelligence.

Vasile Rus, a computer science professor, received \$2.6 million to build a learner-data institute here, hoping to harness the power of data science to improve education in the region.

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Both their offices are on the fourth floor of the FedEx Institute of Technology, a place where energy abounds for managing giant streams of data and what that could mean for Memphis and the rest of the world.

“I’m a big believer in open-source software,” Olney said. “The software we are working with is free. It’s been free for almost 10 years. The data-science community and the machine-learning community, they are all very open with sharing what they have, so I would like to do the same.”

Jasbir Dhaliwal, executive vice president of research and innovation at the university, is pushing to make Memphis known as a center for excellence in artificial intelligence.

The NSF-funded projects, he says, “will put us on the map as being a leader in data science.”

“A lot of universities are jumping on this. But there are different dimensions,” Dhaliwal said. “We happen to be focusing on education and workforce training.”

Over the five years of the grant, Olney will test pilot iterations with U of M freshmen and graduate students, STEM majors from LeMoyne-Owen College and employees in the biostatistics department at St. Jude Children’s Research Hospital.

Having people at ends of the knowledge spectrum and at key points in between — important in cross-sectional research — will help him and his team judge how effective the supports are and assess what else may be needed.

“The St. Jude department will be our anchor at the extreme end of expertise,” he said. “The freshmen will be on the other end.”

The groups will provide both the test and refining process.

Beginning this summer, LeMoyne-Owen STEM students will have eight-week paid internships at the university as part of the grant. They will work through an early, and likely small, version of the project, and then spend time with U of M professors in their laboratories as an extension of the process.

Olney’s connection to LeMoyne-Owen is a benefit of what he calls “being out there.”

“They had an internship program funded by NSF. They asked me if I would be an external mentor. I did that, and I thought it was a great program,” he said. “I knew I

was going to apply for this grant. I told them I would like to model it on what they had done.”

TOPICS

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