Temple researchers receive grants to develop ALS therapy, EEG software

news.temple.edu/news/2013-12-03/temple-researchers-receive-grants-develop-als-therapy-eeg-software

Posted December 3, 2013

The University City Science Center in Philadelphia has awarded Temple two proof-of-concept grants: one for the development of a novel therapy for the treatment of amyotrophic lateral sclerosis (ALS) and another for the creation of a software program that will hone physicians' ability to read and diagnose electroencephalography, or EEGs.

The grants are part of the Science Center's QED Proof-of-Concept Program, which aims to bridge the funding gap between research grants and commercial seed investment by providing funds for life sciences and digital health technologies with high potential in the healthcare industry.

Benjamin Blass, assistant professor of medicinal chemistry in the Moulder Center for Drug Discovery Research at Temple, will be principal investigator on the grant that will support the development of a treatment for ALS (also known as Lou Gehrig's disease).

Researchers in the Moulder Center have developed a compound that has demonstrated the ability to upregulate the protein glutamate transporter 1 (GLT-1) in the brain.

"Seventy-five percent of ALS patients have a significant downregulation of the GLT-1 protein," Blass said. "When GLT-1 is downregulated, glutamate concentrations increase to toxic levels and kill the motoneurons of the central nervous system. That eventually leads to the symptoms associated with ALS." The second QED grant was awarded to Joseph Picone and Iyad Obeid, both electrical and computer engineering faculty members in Temple's College of Engineering, and Mercedes Jacobson, a neurologist in the School of Medicine. That team is developing software that automatically interprets EEGs—recordings of the brain's spontaneous electrical activity that help diagnose a variety of brain disorders, including epilepsy and stroke.

"EEGs generate an intense amount of data," Obeid explained. "Clinical specialists must review that data manually to make a diagnosis. The increasing use of EEGs to monitor patients for long periods of time is creating an abundance of data that is rapidly outpacing a specialist's ability to analyze it."

The team's approach combines two emerging technologies: deep learning and big data.

"Deep learning algorithms are a lot more powerful at finding trends and patterns than you could get if you attempt to concoct a list of ad-hoc rules for the software to follow," Obeid said.

Large amounts of data are needed to model a specialist's decision-making process successfully. To do so, the team is developing a database of more than 22,000 EEGs from Temple University Hospital, which will provide the data necessary to develop algorithms.

"For the first time, researchers will have access to enough data to train these powerful systems," Obeid said. "We have successfully applied these approaches to other fields, such as speech recognition, but this is our first attempt to apply them to a large-scale bioengineering program."

Obeid stressed that the researchers were not trying to replace physicians, but enhance their ability to isolate relevant events on EEGs and make proper diagnoses.

Blass and his colleagues will receive $100,000 from both the Science Center and Temple, and Picone and Obeid will receive $50,000 from the Science Center and $60,000 from the university.

A total of 65 proposals were submitted for consideration, with 14 making finals. Of the final 14, four submissions were from Temple.

- Preston Moretz
Posted In: Research

Related Topics

Research