



BYTE QUEST

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Byte Quest is the article published by the CSE dept of Vasavi College of Engineering regarding the latest innovative Technologies and Software that have been emerged in the competitive world. The motto of this article is to update the people regarding the improvement in technology. The article is designed by the active participation of students under the guidance of faculty coordinators.

□ Good, bad or indifferent if you are not investing in new technology, you are going to be left behind.

-Philip Green

□ Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road.

-Stewart Brand

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ML IN MICROSCOPY

Microscopic images are tough to analyze but research helped to devise solution using ml. Fusing dyes to antibodies or inserting genes coding for fluorescent proteins into the DNA of living cells can help scientists pick out the location of organelles, cytoskeletal elements, and other subcellular structures from otherwise impenetrable microscopy images. But this technique has its drawbacks. There are limits to the number of fluorescent tags that can be introduced into a cell, and side effects such as phototoxicity—damage caused by repeated exposure to light—can hinder researchers' ability to conduct live cell imaging. These issues were on Allen Institute for Cell Science in Seattle in 2016.

was hired as part of a group of researchers working to build a 3-D model of a cell. "Allen Integrated Cell," was to develop a tool to help visualize changes in the spatial organization of cells as they move from one state to another—for example, from a pluripotent stem cell to a differentiated heart cell.



K PAVAN KUMAR(CSE-A 2/4)

DEEP LEARNING FOR MEDICINES

Should you be so unlucky as to wind up in the hospital with a drug-resistant bacterial infection, doctors will need to figure out which antimicrobial drug has the best chance of killing your particular pathogen. With antibiotic resistance on the rise—and predicted to kill 10 million people per year by 2050—it's not always an easy choice. It would help clinicians to be able to mine your superbug's genome for DNA sequences that indicate susceptibility or resistance to antibiotics. As a step toward that goal, bioinformaticians are tapping artificial intelligence to identify the most relevant

sequences. They're making progress, thanks to databases stuffed with thousands of genomes from the clinical. This is going to shape the future of antibiotics.



G. VIVEK REDDY(CSE-A 2/4)

AI BEATS ANIMAL EXPERIMENT

For the vast majority, there is very little information about their toxicity. Traditionally, researchers will test chemicals of interest in animals. As an extreme example, a pesticide undergoes about 30 animal tests, costing about \$20 million and consuming more than 10,000 mice, rats, rabbits, and dogs over five years. About 20 kilograms of the chemical are needed for this testing; obtaining such a volume can be quite a challenge for a substance not yet on the market. Other substances receive less scrutiny, but even products with lower regulatory standards, such as industrial chemicals, can require \$5 million worth of animal testing before entering the marketplace.



In 2016, we compiled a database of 800,000 toxicological studies on more than 10,000 chemicals registered under the European REACH legislation for industrial chemicals, and used it to feed an advanced predictive algorithm that enabled us to predict the toxicity of any chemical without setting foot in the animal lab.

The software takes advantage of the power of big data and transfer learning, a machine learning method that applies information from one task or set of items to another. Similar chemicals have similar properties. Based on that principle, the software builds a map of the chemical universe. Similar chemicals are put close to each other, dissimilar ones more distant. Then, the model can place new chemicals on the map, assess what is known about their neighbors, and from that information surmise their potentially harmful health and environmental effects

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