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Cloud Based Remote FPGA Lab Platform: An Application of Internet of Things

IoT (Internet of Things) is the next generation of the Internet. The main goal of IoT is to connect each and every physical object to the Internet Cloud. This concept is introduced by bringing IoT technology to the laboratories, making expensive laboratory equipment available on-cloud for real-time experimentation. In this paper, an on CLP (Cloud Laboratory Platform) is presented by employing the concept of IoT to the academic experimentation environment. The CLP allows a rapid deployment of an online laboratory system enabling students and researchers to perform actual experiments on the on-Cloud laboratory equipment using a web interface and a web interface for end users to access front end of the system.

This interface was developed for login purposes so that any user can perform experiments from anywhere. The interface also provides options for comments and feedback. Moreover, this research contribution also facilitate users to test their designs and record observations in real-time on the equipment. For demonstration purposes, a remote lab has been developed for high-tech Xilinx FPGA (Field Programmable Gate Array) development boards, namely Spartan-II and Spartan-III.

This project aims to provide students a new tool to enhance their learning experience and encourage them to test their theoretical knowledge in practical applications.

Source:

Syed Abbas Ali, Raheela Asif, Saman Hina, Zainab Fatima. An Application of Internet of Things. Mehran University Research Journal of Engineering and Technology. 2018 37 (4): 535-544.

PAK-US Tech Exchange 2019 opens Applications for an immersive program in Silicon Valley

Applications are invited under PAK-US Tech Exchange Program starting from February 10th-20th, 2019 in the Silicon Valley.



Powered by Startup Grind and Ejad Labs, the PAK-US Tech Exchange is an opportunity for startups to access Silicon Valley's innovative businesses and gain insights from technology leaders and entrepreneurs. Selected participants will visit technology businesses, startup incubators, and universities to bring back the experience to Pakistan. The visits will include Google, Apple, Facebook, CISCO, Intel and Uber, coveted Silicon Valley incubators and accelerators such as Y-Combinator, TechStars, Start X, Founder Institute, Impact Hub and universities such as Stanford University and Draper University. The delegates will also represent Pakistan at the 7th annual Startup Grind Global Conference that will host over 5000 entrepreneurs and investors from around the globe. Leading technology entrepreneurs such as Reid Hoffman of LinkedIn, Cal Henderson of Slack, Guy Kawasaki of Canva, and Dr. Andrew Ng of Stanford University and Coursera are expected as mentors at the Startup Grind Global Conference.

The program will allow selected delegates to gain hands-on experience through tailored workshops and mentoring sessions with Silicon Valley experts. They will explore new business models inside or outside of an established organization and application of innovation at various stages of organizational growth. At the end of the program, the participants will be awarded certificates by Ejad Labs for successful completion and will be welcomed to the Pak-US Tech Exchange alumni network.

- ✍ The program is looking for the following stakeholders from the Pakistani entrepreneurial ecosystem,
- ✍ Graduate and executive students in business, engineering, technology, innovation, and entrepreneurship
- ✍ Entrepreneurs, startup founders, and leaders of incubators and accelerators
- ✍ Angel investors and venture capitalists
- ✍ Officers from government agencies
- ✍ Technology professionals running an IT company or having relevant work experience
- ✍ Professionals (corporate, government official, development sector)

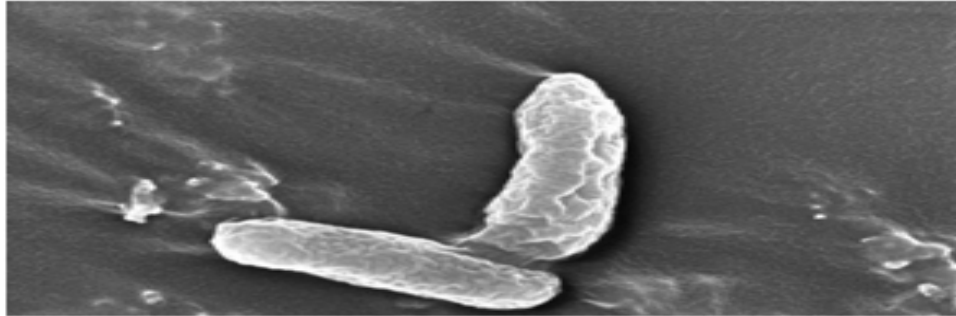
The program is accepting applications till November 15th, 2018. Top 25 participants that qualify the selection phase will have to complete a 4-week online accelerator program from January 1st to January 31st, 2019 to further qualify for the activity in Silicon Valley. The immersion program will run from February 10th to February 20th, 2019.

Apply at: <https://www.pakustech.com/apply>

Source: www.techjuice.pk/pak-us-tech-exchange-2019-opens-applications

Newly Discovered Bacterium Rids Groundwater Contaminants

Researchers have detailed the discovery of the first bacterium known capable of simultaneously degrading the pair of chemical contaminants -- 1,4-Dioxane and



Known as a chemical manufacturing by-product of many cosmetics and home cleaning products, the industrial solvent 1,4-Dioxane is now considered by the Environmental Protection Agency to be an "emerging contaminant" and "likely human carcinogen" that can be found at thousands of groundwater sites nationally -- potentially representing a multi-billion dollar environmental remediation challenge. However, it is the contaminant's frequent co-existence with another toxic chemical -- 1,1-Dichloroethylene (1,1-DCE) -- that has been found to aid in 1,4-dioxane's resistance to certain remediation strategies, including degradation by naturally-occurring microbes.

Now, New Jersey Institute of Technology (NJIT) researchers have detailed the discovery of the first bacterium known capable of simultaneously degrading the pair of chemical contaminants -- 1,4-Dioxane and 1,1-DCE. The study, published in *Environmental Science & Technology Letters*, also showcases the efficiency of the microbe, called *Azoarcus* sp. DD4 (DD4), in reducing 1,4-dioxane and 1,1-DCE levels in co-contaminated groundwater samples.

"Nationwide, researchers have found that more than 80% of the groundwater sites contaminated with 1,4-dioxane also contain 1,1-DCE," said Mengyan Li, Assistant Professor of chemistry and environmental science at NJIT. "This pair of chemicals are toxic and costly to remove from the environment because the pair have very different properties that typically require separate treatment solutions. Biodegradation by DD4 is the first biological method we have found for treating both compounds concurrently, and it is also environmentally-friendly and cost-efficient."

Li's research team initially discovered the DD4 microbe from activated sludge samples collected from a municipal wastewater treatment facility. In the lab, Li's team was able to isolate and analyze DD4's ability to degrade 1,4-dioxane and 1,1-DCE simultaneously in contaminated groundwater samples over a two-week period. Li's lab is now conducting further tests of the bacterium in the lab to better understand how DD4 might perform at contaminated water sites. "Ideally, we may inject the bacteria into the center of a contamination zone, or try growing them on the surface of bio-barriers that help stop spread of contamination," said Li. "First, we'd like to do more tests and possibly develop a gene marker that helps us assess the bacteria's performance. Then, we would like to move into the field."

Source: www.sciencedaily.com/releases/2018/10/181009115019.html

Success is Sweet: Researchers unlock the Mysteries of the Sugarcane Genome

For centuries, sugarcane has supplied human societies with alcohol, biofuel, building and weaving materials, and the world's most relied-upon source of sugar. Now, researchers have extracted a sweet scientific prize from sugarcane: Its massive and complex genome sequence, which may lead to the development of hardier and more productive cultivars.



Harvesting sugarcane or Sugarcane field: Modern sugarcane cultivars are polyploid interspecific hybrids, combining high sugar content from *S. officinarum* with hardiness, disease resistance and ratooning of *S. spontaneum*. The sequenced genome is a haploid accession AP85-441 generated by anther culture from octoploid *S. spontaneum* SES208.

Credit: Ray Ming

"Personally, I waited for 20 years to get this genome sequenced," said Ray Ming, a University of Illinois plant biology professor who instigated and led the sequencing effort. "I dreamed about having a reference genome for sugarcane when I worked on sugarcane genome mapping in the late 1990s." Ming is a member of the Carl R. Woese Institute for Genomic Biology, one of a group of researchers interested in developing sugarcane and related crops to boost food and biofuel production.

"Sugarcane is the fifth most valuable crop, and the lack of a reference genome hindered genomic research and molecular breeding for sugarcane improvement," Ming said.

To conquer this challenge, the sequencing team used a technique called high-throughput chromatin conformation capture or Hi-C. This method allows researchers to discover what parts of the long, tangled strands of chromosomal DNA lie in contact with one another inside the cell. When analyzed using a customized algorithm called ALLHIC developed by the team, the resulting data served the purpose of the picture on the lid of a jigsaw puzzle box, providing a rough map of which sections of sequence most likely belonged to which chromosome.

"The ALLHIC method has already proven to be effective for the construction of the autopolyploid sugarcane genome," Ming said. He anticipates that the techniques used successfully for the sugarcane genome will also assist researchers in sequencing other complex genomes.

Source: www.sciencedaily.com/releases/2018/10/181009114949.html

Artificial Synaptic Device Simulating the function of Human Brain

Researchers have developed a high-reliability artificial electronic synaptic device that simulates neurons and synapses. The finding is expected to be utilized in the development of artificial intelligence (AI) and brain-like semiconductors. A research team led by Director Myoung-Jae Lee from the Intelligent Devices and Systems Research Group at DGIST has succeeded in developing an artificial synaptic device that mimics the function of the nerve cells (neurons) and synapses that are response for memory in human brains.

Synapses are where axons and dendrites meet so that neurons in the human brain can send and receive nerve signals; there are known to be hundreds of trillions of synapses in the human brain. This chemical synapse information transfer system, which transfers information from the brain, can handle high-level parallel arithmetic with very little energy, so research on artificial synaptic devices, which mimic the biological function of a synapse, is under way worldwide.

Dr. Lee's research team, through joint research with teams led by Professor Gyeong-Su Park from Seoul National University; Professor Sung Kyu Park from Chung-ang University; and Professor Hyunsang Hwang from POSTEC, developed a high-reliability artificial synaptic device with multiple values by structuring tantalum oxide -- a trans-metallic material -- into two layers of Ta₂O_{5-x} and TaO_{2-x} and by controlling its surface. The artificial synaptic device developed by the research team is an electrical synaptic device that simulates the function of synapses in the brain as the resistance of the tantalum oxide layer gradually increases or decreases depending on the strength of the electric signals. It has succeeded in overcoming durability limitations of current devices by allowing current control only on one layer of Ta₂O_{5-x}.

In addition, the research team successfully implemented an experiment that realized synapse plasticity, which is the process of creating, storing, and deleting memories, such as long-term strengthening of memory and long-term suppression of memory deleting by adjusting the strength of the synapse connection between neurons.

The non-volatile multiple-value data storage method applied by the research team has the technological advantage of having a small area of an artificial synaptic device system, reducing circuit connection complexity, and reducing power consumption by more than one-thousandth compared to data storage methods based on digital signals using 0 and 1 such as volatile CMOS (Complementary Metal Oxide Semiconductor).

The high-reliability artificial synaptic device developed by the research team can be used in ultra-low-power devices or circuits for processing massive amounts of big data due to its capability of low-power parallel arithmetic. It is expected to be applied to next-generation intelligent semiconductor device technologies such as development of artificial intelligence (AI) including machine learning and deep learning and brain-mimicking semiconductors. Dr. Lee said, "This research secured the reliability of existing artificial synaptic devices and improved the areas pointed out as disadvantages. We expect to contribute to the development of AI based on the neuromorphic system that mimics the human brain by creating a circuit that imitates the function of neurons."

Source: www.sciencedaily.com/releases/2018/09/180907110514.html

New Blood Test detects early Stage Pancreatic Cancer

Pancreatic cancer is currently very difficult to detect while it is still resectable. A new blood test developed by researchers at Lund University in Sweden, Herlev Hospital, Knight Cancer Center and Immunovia AB, can detect pancreatic cancer in the very earliest stages of the disease. The results have been published in the Journal of Clinical Oncology.

Due to diffuse symptoms, pancreatic cancer is usually diagnosed very late in the disease progression. Therefore, despite pancreatic cancer representing less than 3% of all cancer cases, more people currently die from it than breast cancer. By 2030, pancreatic cancer is expected to be the second deadliest type of cancer in the world.

"Our test can detect pancreatic cancer with 96% accuracy at stage I and II, while there is still the possibility of successful surgical intervention. There is currently no cure and few treatment options for advanced pancreatic cancer, which is the late stage when pancreatic cancer is usually diagnosed," explains Carl Borrebaeck, professor at the department of Immunotechnology at Lund University. The study used samples from patients in both Denmark and the US, at different stages of the disease.

The blood test is developed on a so-called antibody microarray that consists of hundreds of recombinant antibody fragments. These antibody fragments are specific for a number of immune-regulatory proteins, cancer-associated antigens, and so on. Since the immune system is the first to respond to threats like complex diseases, such as cancer, autoimmune diseases and infections, the microarray was designed to mirror this early response. This provides information about the development of tumours long before being visible on CT or detected by ctDNA. From those hundreds of markers, 29 markers were selected to detect pancreatic cancer with 96% accuracy at stage I and II.

In the future, the screening method could be used to screen people who are at a higher risk of developing pancreatic cancer, such as those with a hereditary risk, newly onset diabetes patients and patients with chronic inflammation of the pancreas. The next step has already been initiated, which is a large US prospective study for high risk individuals.

Source: www.sciencedaily.com/releases/2018/09/180917101304.html

Virtual Reality Motion Sickness may be Predicted and Counteracted

Researchers at the University of Waterloo have made progress towards predicting who is likely to feel sick from virtual reality technology. In a recent study, the researchers found they could predict whether an individual will experience cybersickness (motion sickness caused by virtual reality) by how much they sway in response to a moving visual field. The researchers think that this knowledge will help them to develop counteractions to cybersickness.



Cybersickness involves nausea and discomfort that can last for hours after participating in virtual reality (VR) applications, which have become prevalent in gaming, skills training and clinical rehabilitation.

"Despite decreased costs and significant benefits offered by VR, a large number of users are unable to use the technology for more than a brief period because it can make them feel sick," Séamas Weech, a postdoctoral research fellow at the Department of Kinesiology and lead author of the paper. "Our results show that this is partly due to differences in how individuals use vision to control their balance. By refining our predictive model, we will be able to rapidly assess an individual's tolerance for virtual reality and tailor their experience accordingly."

In conducting their work, the researchers collected several sensorimotor measures, such as balance control and self-motion sensitivity, from 30 healthy participants aged 18-30. The researchers then exposed the participants to VR with the aim of predicting the severity of motion sickness. Using a regression model, they significantly predicted how much cybersickness participants experienced after being exposed to a zero-gravity space simulator in VR.

"Knowing who might suffer from cybersickness, and why, allows us to develop targeted interventions to help reduce, or even prevent, the onset of symptoms," said Michael Barnett-Cowan, neuroscience professor in the Department of Kinesiology and senior author of the paper. "Considering this technology is in a growth phase with industries such as gaming, design, medicine and automotive starting to use it, understanding who is negatively impacted and how to help them is crucial."

Source: www.sciencedaily.com/releases/2018/09/180927083336.html

Forthcoming Tech Events

National

World Wind Energy Conference

28-30 November, 2018

Karachi, Pakistan

www.wwindea.org

CAC Pakistan Summit

04-05 December, 2018

International Expo Centre, Lahore

www.10times.com/cps-lahore

International Conference on Open Source Systems & Technologies

19-21 December, 2018

Al-Khawarizmi Institute of Computer Science, Lahore

www.10times.com/icosst-q

International Conference on Science, Engineering & Technology

28-29 January, 2019

Rawalpindi

www.researchfora.com/Conference2019/Pakistan/1/ICSET/

International Events

International Conference on Green Computing Technologies, Materials and Devices

28 November, 2018

Asuncion, Paraguay,

www.researchleagues.com

International Conference on Renewable Energy Sources and Sustainability

7th December, 2018

ACCRA, Ghana

www.iser.org.in

International Conference on Engineering & Technology

18th December, 2018

Dubai, UAE

www.allconferencealert.net

International Conference on Vehicular, Mobile and Wearable Technology

16-17 January, 2019

New York, USA

www.iserd.co/Conference2019/USA/1/ICVMWT/

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