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Forthcoming Tech Events

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- World Congress on Information Technology
- International Conference on Cancer Research and Drug Development
- International Conference on Science Technology and Management
- 3rd International Conference on Multidisciplinary Research
- 3rd International Conference on Research in Science, Engineering & Technology
- International Conference on Science & Technology Research
- International Congress on History of Science and Technology

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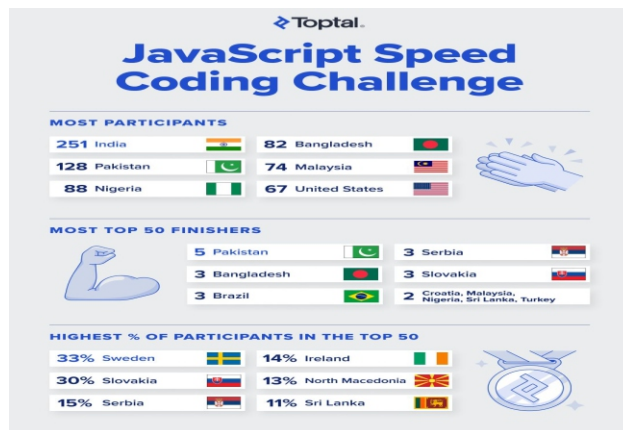
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Pakistani Developers Ranked #1 in Global JavaScript Speed Coding Challenge

Pakistani developers flexed their blazing coding speeds at this year's TopTal JavaScript Speed Coding Challenge by bagging the most top 50 finishes out of any country, despite having lesser participants in the competition than neighbouring India.



Credit: <https://www.toptal.com>

As one of the most popular coding competitions in the world, the TopTal Speed Coding Challenge features a collection of intriguing challenges that need to be solved as quickly as possible by participants in order to earn points. Naturally, points are assigned based on the difficulty of the task and the speed at which one solves it, with extra points assigned for the amount of time left upon early completion of the task. Around 2,000 passionate coders and developers from a total of 137 countries participated in the JavaScript Speed Coding Challenge. India fielded the highest number of participants, with 251 JavaScript coders hailing from the South Asian nation. With 128 developers, Pakistan contributed the second-highest number of participants, followed by Nigeria with 88, Bangladesh with 82, Malaysia with 74, and the United States with 67.

When it came to the actual competition, there was one country clearly standing out. With a total of five participants bagging top 50 finishes in the final leaderboard, Pakistan attained the honor of fielding the most Top 50 Finishers of any country participating in the challenge. With an impressive total of 3494 points, MALLU was the highest-ranking Pakistani developer in the speed coding challenge with a fourth-place finish.

Bangladesh, Brazil, and Serbia ended up tying for the second-highest number of top 50 finishes, as each nation was represented by three participants in Top 50 Finishers. This was followed by Croatia, Malaysia, Nigeria, Sri Lanka, and Turkey, with two Top 50 Finisher positions each.

Source:

www.techjuice.pk/pakistani-developers-ranked-1-in-global-javascript-speed-coding-challenge

Enhanced Biometric-Based User Authentication Scheme for Wireless Sensor Networks Using Fuzzy Extraction and Elliptic Curve Cryptography

Wireless sensor networks are used to monitor physical and environmental conditions. User authentication is required to achieve consistent access control. However, authenticating a user or sensor in a network is a challenging task owing to the limited resources of the sensor nodes. Therefore, to provide secure and efficient communication, numerous authentication schemes have been designed. Traditional schemes have several security vulnerabilities and significant computational overhead. An Enhanced biometric-based user Authentication Scheme has been proposed using Fuzzy extraction and Elliptic curve cryptography (EBAS-FeEcc) for wireless sensor networks to achieve the high-security level and improve the performance as well as the lifetime of the entire network.

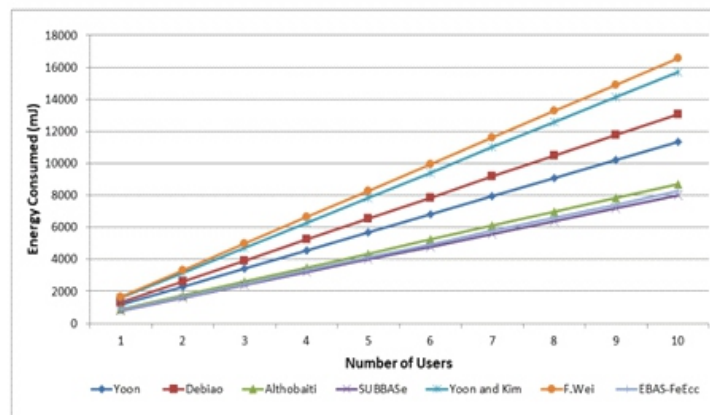


Figure 4 Energy consumption with respect to number of users

Credit: <http://www.jictra.com.pk/index.php/jictra/article/view/190/115>

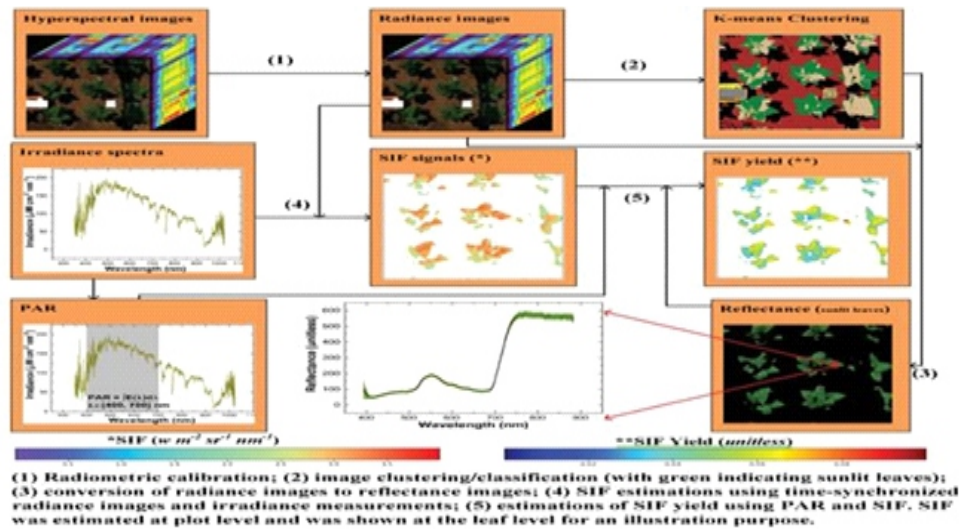
The presented technique consists of easy operations and light computations. The analysis shows that previous schemes have various security weaknesses such as a biometric recognition error, user verification problem, lack of anonymity, session key exposure by the gateway node, and perfect forward secrecy. The current proposed technique overcomes these network security issues. This scheme additionally increases the performance of the network by reducing network traffic, defending sensor networks against DOS attack, and increasing nodes battery life. Therefore, the functionality and performance of the entire network gets improved.

Source:

R. Riaz, S. Shokat, S. Rizvi, and M. Shaheen, “Enhanced Biometric-Based User Authentication Scheme for Wireless Sensor Networks Using Fuzzy Extraction and Elliptic Curve Cryptography”, *jictra*, pp. 1-14, Jun. 2020.

Light Signal Emitted during Photosynthesis used to Quickly Screen Crops

Researchers have revealed a new approach to estimate the photosynthetic capacity of crops to pinpoint their top-performing traits and speed up the plant screening process.



Credit: <https://academic.oup.com/jxb/advance-article/doi/10.1093/jxb/eraa537/6042157>

An international effort called Realizing Increased Photosynthetic Efficiency (RIPE) aims to transform crops' ability to turn sunlight and carbon dioxide into higher yields. To achieve this, scientists are analyzing thousands of plants to find out what tweaks to the plant's structure or its cellular machinery could increase production. University of Illinois researchers have revealed a new approach to estimate the photosynthetic capacity of crops to pinpoint these top-performing traits and speed up the screening process.

Photosynthesis is the entry point for carbon dioxide to become all the things that allow plants to grow, but measuring canopy photosynthesis is really difficult. Most methods are time-consuming and only measure a single leaf when it's the function of all leaves on all plants that really matters in agriculture.

The researchers use two spectral instruments simultaneously -- a hyperspectral camera for scanning crops and a spectrometer used to record very detailed information about sunlight -- to quickly measure a signal called Solar Induced Fluorescence (SIF) that is emitted by plants when they become 'energy-excited' during photosynthesis. With this SIF signal, the team gains critical insights about photosynthesis that could ultimately lead to improving crop yields. They discovered that a key part of the SIF signal better correlates with photosynthetic capacity. This 'SIF yield' accounts for only a fraction of the energy emitted as SIF by plants to the energy captured by plants in total, but it carries important information.

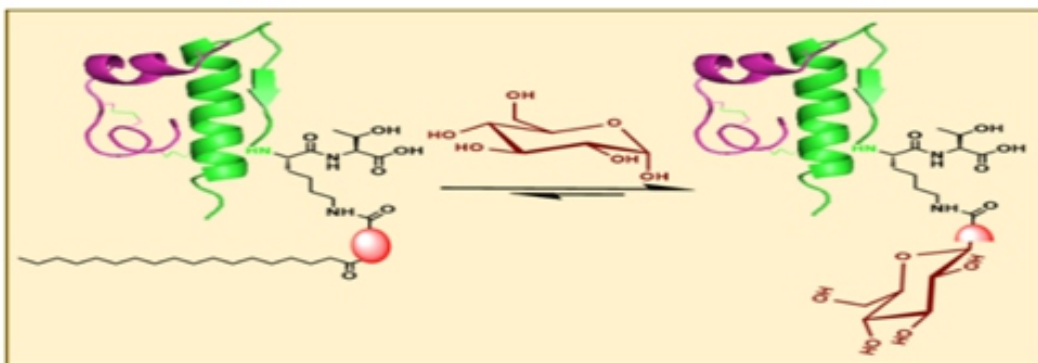
With this insight, we can use a couple of instruments in a synergistic way to make more accurate estimates, and we can make these tools and pipelines more accessible to people who are interested in advancing the translation of photosynthesis.

Source:

www.sciencedaily.com/releases/2020/12/201221173119.htm

Better Diabetes Treatment: New Insulin Molecule can self-regulate Blood Sugar

Researchers have developed a new insulin molecule that will make blood sugar regulation both easier and safer for those with type 1 diabetes.



Credit: <https://chemistry-europe.onlinelibrary.wiley.com/doi/10.1002/chem.202004878>

Everyday life for the more than 46 million people around the world who suffer from type 1 diabetes could become much easier and safer.

Researchers from the University of Copenhagen and biotech firm Gubra have developed a new insulin molecule that, in the future, will ensure that diabetics receive just the right amount of insulin. The insulin on the market today is unable to identify whether a patient with type 1 diabetes needs a small or large effect from the insulin, which lowers blood sugar.

"That is why we have developed the first step towards a kind of insulin that can self-adjust according to a patient's blood sugar level. This has tremendous potential to vastly improve the lives of people with type 1 diabetes," explains Professor Knud J. Jensen, of the University of Copenhagen's Department of Chemistry, one of the researchers behind a new study on this new insulin.

The researchers behind the study developed a type of insulin with a built-in molecular-binding that can sense how much blood sugar is in the body. As blood sugar rises, the molecule becomes more active and releases more insulin. As blood sugar drops, less is released. "The molecule constantly releases a small amount of insulin, but varies according to need," says Knud J. Jensen, who continues:

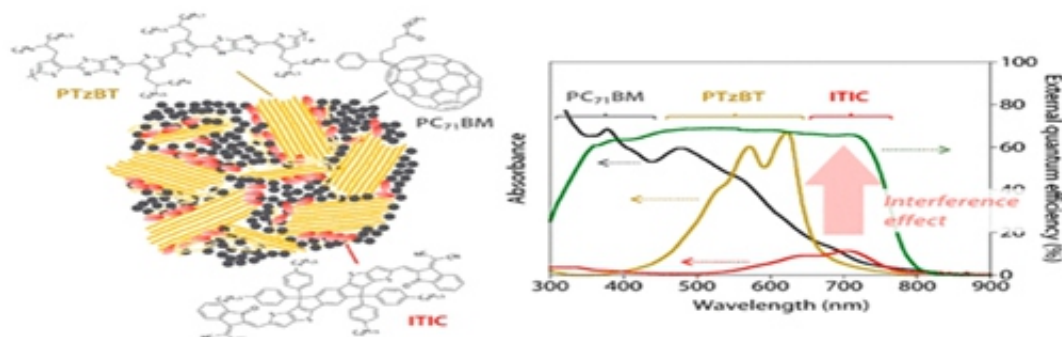
The difficult thing with diabetes is that insulin always works the same way. It lowers blood sugar, even though that might not be what a patient requires. This is what we seek to address with our new molecule."

Source:

www.sciencedaily.com/releases/2020/12/201203122255.html

New Blended Solar Cells Yield High Power Conversion Efficiencies

Researchers have blended together various polymer and molecular semiconductors as photo-absorbers to create a solar cell with increased power efficiencies and electricity generation.



Credit: <https://pubs.acs.org/doi/10.1021/acs.macromol.0c01787>

These types of solar cells, known as organic photovoltaics (OPV), are devices that generate electricity when light is incident upon their photo-absorbers. The efficiency of a solar cell is determined by comparing how much electricity is generated to how much light is incident upon the cell. This is referred to as "photon harvest," or how many particles of light are converted into electrical current. The more efficient the solar cell, the more cost effective and pragmatic the cell is for commercial use.

The team at the Graduate School of Advanced Science and Engineering Hiroshima University, Japan added only a small amount of a compound that absorbs long wavelengths of light resulting in an OPV that was 1.5 times more efficient than the version without the compound. The compound was able to enhance the absorption intensity due to the optical interference effect within the device. The group went on to show that how they are distributed is key to further improved power generation efficiency.

"This leads to a significant increase in the photocurrent and thereby the power conversion efficiency due to the amplified photon absorption that originates in the optical interference effect. A key is to use a very specific polymer, one that allows us to have a very thick semiconductor layer for OPV cells, which significantly enhances optical interference effect compared to a thin layer."

As for future work, Osaka has his eyes set on pushing the boundaries of state of the art solar cells.

"Our next step is to develop better semiconducting polymers as the host material for this type of OPV and better sensitizer materials that can absorb more photons in the longer wavelength regions. This would lead to the realization of the world's highest efficiency in OPV cells."

Source:

www.sciencedaily.com/releases/2020/12/201209115159.html

Tiny Quantum Computer solves real optimization problem

Quantum computers have already managed to surpass ordinary computers in solving certain tasks - unfortunately, totally useless ones. The next milestone is to get them to do useful things. Researchers have now shown that they can solve a small part of a real logistics problem with their small, but well-functioning quantum computer.

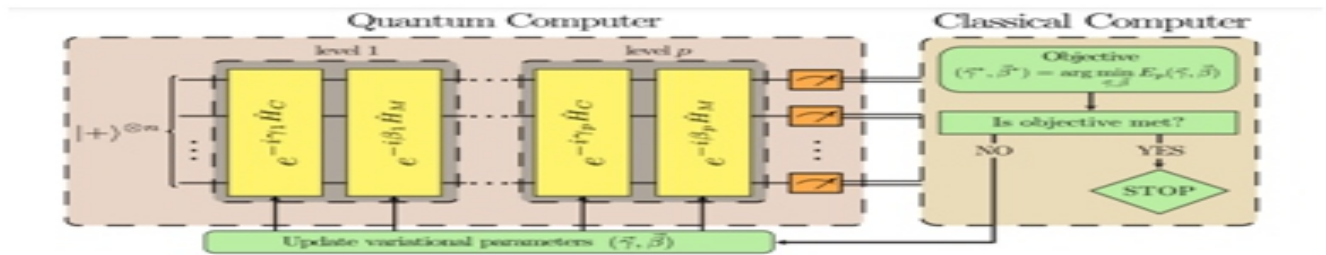


FIG. 1. Schematic representation of the QAOA. The quantum processor prepares the variational state, depending on variational parameters. The variational parameters $(\vec{\gamma}, \vec{\beta})$ are optimized in a closed loop using a classical optimizer.

Credit: journals.aps.org/prapplied/abstract/10.1103/PhysRevApplied.14.034009

Interest in building quantum computers has gained considerable momentum in recent years, and feverish work is underway in many parts of the world. In 2019, Google's research team made a major breakthrough when their quantum computer managed to solve a task far more quickly than the world's best supercomputer. The downside is that the solved task had no practical use whatsoever -- it was chosen because it was judged to be easy to solve for a quantum computer, yet very difficult for a conventional computer.

Therefore, an important task is now to find useful, relevant problems that are beyond the reach of ordinary computers, but which a relatively small quantum computer could solve.

Together with Göran Johansson, Giulia Ferrini led the theoretical work when a team of researchers at Chalmers, including an industrial doctoral student from the aviation logistics company Jeppesen, recently showed that a quantum computer can solve an instance of a real problem in the aviation industry.

The algorithm proven on two qubits All airlines are faced with scheduling problems. For example, assigning individual aircraft to different routes represents an optimisation problem, one that grows very rapidly in size and complexity as the number of routes and aircraft increases.

Researchers hope that quantum computers will eventually be better at handling such problems than today's computers. The basic building block of the quantum computer -- the qubit -- is based on completely different principles than the building blocks of today's computers, allowing them to handle enormous amounts of information with relatively few qubits.

However, due to their different structure and function, quantum computers must be programmed in other ways than conventional computers. One proposed algorithm that is believed to be useful on early quantum computers is the so-called Quantum Approximate Optimization Algorithm (QAOA).

The Chalmers research team has now successfully executed said algorithm on their quantum computer -- a processor with two qubits -- and they showed that it can successfully solve the problem of assigning aircraft to routes. In this first demonstration, the result could be easily verified as the scale was very small -- it involved only two airplanes.

Potential to handle many aircraft With this feat, the researchers were first to show that the QAOA algorithm

can solve the problem of assigning aircraft to routes in practice. They also managed to run the algorithm one level further than anyone before, an achievement that requires very good hardware and accurate control.

The theorists in the research team also simulated solving the same optimisation problem for up to 278 aircraft, which would require a quantum computer with 25 qubits. The plan is to reach at least 20 qubits by 2021 while maintaining the high quality.

Source:

www.sciencedaily.com/releases/2020/12/201217090404.html

Climate change: Threshold for Dangerous Warming will Likely be Crossed between 2027-2042

The threshold for dangerous global warming will likely be crossed between 2027 and 2042 -- a much narrower window than the Intergovernmental Panel on Climate Change's estimate of between now and 2052. Researchers introduce a new and more precise way to project the Earth's temperature. Based on historical data, it considerably reduces uncertainties compared to previous approaches.



Photo concept, hourglass on beach (stock image). Credit: © denyasapozhnik / stock.adobe.com

Scientists have been making projections of future global warming using climate models for decades. These models play an important role in understanding the Earth's climate and how it will likely change. But how accurate are they?

Climate models are mathematical simulations of different factors that interact to affect Earth's climate, such as the atmosphere, ocean, ice, land surface and the sun. While they are based on the best understanding of the Earth's systems available, when it comes to forecasting the future, uncertainties remain. The new approach to projecting the Earth's temperature is based on historical climate data, rather than the theoretical relationships that are imperfectly captured by the GCMs. The approach allows climate sensitivity and its uncertainty to be estimated from direct observations with few.

In a study for *Climate Dynamics*, the researchers introduced the new Scaling Climate Response Function (SCRF) model to project the Earth's temperature to 2100. Grounded on historical data, it reduces prediction uncertainties by about half, compared to the approach currently used by the IPCC. In analyzing the results, the researchers found that the threshold for dangerous warming (+1.5C) will likely be crossed between 2027 and 2042. This is a much narrower window than GCMs estimates of between now and 2052. On average, the researchers also found that expected warming was a little lower, by about 10 to 15 percent. They also found, however, that the "very likely warming ranges" of the SCRF were within those of the GCMs, giving the latter support. With the new climate model and its next generation improvements, there's less wiggle room."

Source:

www.sciencedaily.com/releases/2020/12/201221160425.htm

Forthcoming Tech Events

Pakistan

International Conference on Engineering & Technology

18 February, 2021

Karachi

<https://www.iirst.com/event/index.php?id=1318294>

World Congress on Information Technology

1st-2nd March, 2021

Peshawar

www.worldresearchsociety.com/Conference/20301/WCIT/

International conference on Cancer Research and Drug Development

16-17 April, 2021

Quetta

www.universal-conference.com/Conference/18342/ICCRDD

International Conference on Science Technology and Management

28-29 July, 2021

Rawalpindi

www.astem.org/Conference2021/Pakistan/1/ICSTM/

International

3rd International Conference on Multidisciplinary Research

11-12 March, 2021

Melbourne, Australia

www.icmr.igrnet.org/101/australia

3rd International Conference on Research in Science, Engineering & Technology

11-13 March, 2021

Oxford UK

www.icrset.org/

International Conference on Science & Technology Research

26-27 March, 2021

Singapore

www.straevents.org/conference/singapore

International Congress on History of Science and Technology

25-31 July, 2021

Czech Republic Prague

www.ichst2021.org

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About PASTIC

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