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TOGGLE

A publication of The Daily Star

WEEKEND LIVING IN THE DIGITAL AGE

DECODING THE ENIGMA OF BLACK HOLES

Amazon offers automakers tools to build their own Alexa

Amazon has rolled out a new product that will allow car companies to build their own Alexa based intelligent assistants with unique voices and features.

The new product, named Alexa Custom Assistant, will allow car makers to program the assistant to interact with drivers on specific products and services tied to the vehicle. Examples provided were asking Alexa to roll down windows, play an audiobook, etc.

According to Amazon, Fiat Chrysler Automobiles will be the first user of this product, who is working to integrate it to elect vehicle models.

The company also claims the product can be used to build intelligent assistants into mobile applications, smart properties, video games, and consumer electronics. This new product aims to give companies an efficient and cost-effective way of delivering an intelligent assistant to its customers, they added.

New bikes this week

Yamaha teases R15 scooter, Hyosung introduces tiny cruiser

Ever looked at a Yamaha R15 and thought it would be an awesome scooter? Well, the designers at Yamaha did, as evident by this bike. The Yamaha F-155 Concept is a prototype the merges the 155cc liquid-cooled engine from the Exciter 155 VVA scooter with styling cues taken from the R15 and R1 sports bike. The result is a scooter with a functional ram air intake, twin underbelly exhaust system, and a MotoGP seating position, but no obvious place to store your groceries or rest your feet. Yamaha didn't make any comment about putting it into production, but the sheer impracticality of the design in its intended use pretty much makes the answer redundant.

The Korean-based Hyosung isn't as popular in Bangladesh compared to other brands, but they do sell bikes here. The company has recently rolled out the Aquila GV125S, the scaled-down cruiser bike powered by a tiny 125cc liquid-cooled, six-valve 60-degree V-twin engine generating 14 Hp and 7 lb-ft of torque. Besides having the correct engine, the bike also adopts the bobber aesthetic well with its blacked-out components, trimmed rear fender, fork gaiters, and low handlebars. Hyosung has yet to offer this tiny cruiser in Bangladesh, but the size of the engine makes it an ideal substitute for those of us who always wanted a Harley. The $4,620 sticker price remains an issue though.

EDITOR'S NOTE

Everything tech and black holes

This is one special issue. Apart from our regular-everything-tech-and-automobile, we got Bangladeshi astrophysicist Tonima Tasnim Ananna to talk to us, who recently topped the 2020 edition of Science News (SN) magazine's SN 10: Scientists to Watch. In this super fun interview, she explained black holes for noobs like us, leaving us in awe with how cool black holes really are.

We're super excited about the country's first space observatory to be set up in Faridpur and decided to share the excitement with our readers. We also talk about the art of job crafting and the movies to be released in this year that hype us up.

-Nahaly Nafisa Khan, *Sub-editor*

Blue Origin conducts successful test of its crew capsule

American aerospace company Blue Origin has successfully tested the crew capsule module of its New Shepard reusable rocket at the company's west Texas flight test facility on Thursday, January 16.

During the test, the rocket's hydrogen-fueled BE-3 engine lifted

the crew capsule to an altitude of just over 350,000 feet, well above the accepted lower "boundary" of space. It reached a maximum velocity of 2,242 mph before releasing the crew capsule around two minutes and 40 seconds mark. As the capsule slowly descended after deploying its three large parachutes, the booster section headed for it's designated landing pad, restarting its engine at the last moment to slow down it's decent. The duration of the entire mission was 10 minutes and 15 seconds.

Although the capsule did not carry any passengers during this test, it did carry there were 50,000 postcards on board from school kids all around the world. It also carried a life-sized test dummy — dubbed "Mannequin Skywalker" by the crew— equipped with a variety of sensors to test various elements of the environment passengers will experience.

This test marks the 14th suborbital flight of a New Shepard spacecraft, bringing the system one step closers to its planned use for commercial space tourism operations.

Reflective Teens launches course on design thinking and problem solving

Reflective Teens, a social platform teenagers to nurture their creative potentials, has launched its flagship program, RT Brainery's Episode 3 on "Design Thinking for Social Innovation." The course has been made well-suited for teenagers and young adults.

The instructor for the course is Mr Mostafezur Rahman, a researcher and solution designer with 6+ years' experience in qualitative and quantitative research, monitoring, solution design, and project cycle management.

The courses will be online and will provide lessons on collaboration, problem-solving skills, ideation, prototyping and applying ideas on a social level. The deadline for registration is on February 1, 2021.

For more details, visit their website at: https://reflectiveteens.com/rt-brainery/

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WhatsApp rolls back its privacy policy update by 3 months

Google completes its Fitbit acquisition

Job crafting: Turn the job you have into the job you want

OROBI BAKHTIAR

During the week, most of us spend half our waking hours at work. And a lot of us see it as a struggle, or at least a bore, looking forward to the weekend when we can do more worthwhile things. But what if your job itself was worthwhile? What if it was meaningful, left you satisfied, and through it, you could be part of something bigger?

Job crafting is about taking proactive steps and actions to redesign what we do at work, essentially changing tasks, relationships, and perceptions of our jobs. The main premise is that we can stay in the same role, getting more meaning out of our jobs simply by changing what we do and the 'whole point' behind it.

Task crafting: Changing up responsibilities

Task crafting may be the most discussed aspect of the approach, perhaps because job crafting is commonly seen as active 'shaping' or 'moulding' of one's role. It can involve adding or dropping the responsibilities set out in your official job description. For instance, a chef may take it upon themselves to not just serve food but to create beautifully designed plates that enhance a customer's dining experience. As another example, a bus driver might decide to give helpful sightseeing advice to tourists along his route. This type of crafting might also (or) involve changing the nature of certain responsibilities or dedicating different amounts of time to what you currently do.

Relationship crafting: Changing up interactions

This is how people reshape the type and nature of the interactions they have with others. In other words, relationship crafting can involve changing up who we work with on different tasks, who we communicate and engage with regularly. A marketing manager might brainstorm with the firm's app designer to talk and learn about the user interface, unlocking creativity benefits while crafting relationships.

Cognitive crafting: Changing up one's mindset

The third type of crafting, cognitive crafting, is how people change their mindsets about the tasks they do. By changing perspectives on what we are doing, we can find or create more meaning about what might otherwise be seen as 'busy work'. Changing hotel bedsheets in this sense might be less about cleaning and more about making travellers' journeys more comfortable and memorable.

Benefits

Job crafting presents lots of potential benefits for organizational and positive psychology practitioners. While still relatively young, the approach has been examined empirically. Among the findings, and in addition to more meaningful work as mentioned above, there is evidence for at least five main benefits.

Enhanced organizational performance

The very act of shaping one's job is beneficial. Proactive crafting is inherently innovative and creative, and at an organizational level, it is conducive to flexibility and adaptability. In increasingly dynamic and global business environments, it can contribute to a firm-level competitive advantage.

Greater engagement

Altering the way we see and engage with our jobs can give us a sense of control over what the tasks do, as well as more fulfilment from the connections we make. We have more resources at our disposal, which is intrinsically motivating—it facilitates personal growth and helps us accomplish our goals.

Adding more challenge promotes mastery

When we stretched ourselves a healthy amount through task crafting, we encourage mastery experiences; these, in turn, are conducive to our well-being. In job crafting, too, we may seek out feedback and support, potentially boosting our job performance.

It may help us achieve our 'ideal' career status

By analyzing our tasks and identifying our goals, we can move toward them more effectively through crafting. When we add or alter tasks in alignment with our strengths and motives, we experience better person-job fit.

The positive impact of making thoughtful changes to the design of a job has been documented and studied in a broad range of occupations. The principles of job crafting remain deeply relevant in a world where job structure is rapidly changing, putting more and more responsibility on the individual for the experience and engagement in their work. While this certainly creates challenges, it also brings opportunities to build the kinds of task, relational, and cognitive landscapes that bring meaning to work.

THE 350CC GOALPOST:
Five high displacement bikes we look forward to riding

RAHBAR AL HAQ

Royal Enfield Bullet 350
While the Duke appeals to those who enjoy edgy style and raw performance, the Royal Enfield (RE) is meant for people with a more, shall we say refined taste. Widely heralded as the Triumph of the APAC region, the RE is the company for a classic bike that is done right. Their iconic Bullet, is one of the oldest bikes still in production, being around since 1948. The 346cc engine did get some updates —such as fuel injection— over the years, and now makes around 19.1 bhp and 28 Nm of torque through a five-speed gearbox. As for other features, single-channel ABS is present for safety reasons, but everything else remains pretty much as it was seven decades ago. RE recently entered an agreement with the local Ifad Group, meaning if the cc limit is raised, this will be one of the bikes that will mark RE's official debut in Bangladesh.

KTM Duke 250
The bigger brother of the Duke 125 and a cut down version of the 370, the KTM Duke 250 was meant to be a middle of the pack option for people looking for a naked sportbike. And while the 370 remains out of our reach by 20cc, the speculative raised cc limited will make the 250 legal for the streets of Bangladesh, a significant upgrade over the 125 that everyone seems to obsessed over a year ago. Powering the bike is a single-cylinder 248.8cc liquid-cooled engine, making 29.6 bhp and 24 Nm of torque through a six-speed gearbox. Features include switchable ABS, all-around LED, and a non-TFT instrument cluster. KTM is set to make their official debut in the country this year —courtesy of Runner Automobiles—, meaning there is a good chance we will be able to officially buy this beast within a year or two.

Kawasaki Ninja ZX-25R
While 125cc Ninja is quite a creature —watch this space for more info— the ZX-25R is another beast. The 249.8cc four-cylinder engine makes a bowel emptying 51 hp and 22.9 Nm of torque and revs up to an almighty 17,000 RPM. The six-speed gearbox is fitted with quickshifter and can reach 0-100 in just under six seconds. To keep the beast in check, Kawasaki has given the bike their propriety traction control and intelligent ABS and well as multiple different ride modes for the user to choose from. All in all, a fabulous machine for those who can control it and one that we hope we can ride on our roads soon.

TVS Apache RR 310
While the Pulsar deserves its reputation as a sporty commuter, the TVS's Apache series is one of the handfuls of Indian bikes that can claim actual racing provenance. The top-end model of the lineup, the Apache RR 310, is a beast both on track on road. The 312.2cc motor produces a refreshing 33 bhp and 27.3 Nm of torque and channels it to the rear wheel with a six-speed gearbox. The bike is also packed in terms of features, such as dual-channel ABS, all LED lighting, a full-color TFT display, mobile app connectivity, and most importantly, a ride-by-wire system. Which gives the RR four different ride modes: Urban, Sport, Rain, and Track. Overall, the RR will be the closest we can get to riding a full-on literbike, until the days the displacement ban is fully lifted for good.

Bajaj Dominar 250
Granted, we when think about Bajaj, the Pulsar immediately comes to mind. The affordable bike provides a nice balance between performance and everyday commuting, and arguably one of the few motorcycle nameplates in the country to have an actual cult following. What a lot of people don't know that the Pulsar has a bigger brother, the Dominar. Initially started as the Pulsar 400, Bajaj spin off the bike under its own nameplate in 2016. Although the original still remains us of our reach, the company has recently rolled out a cut down 248.8cc version that looks exactly like its bigger brother. The liquid-cooled motor is based on that of the Duke 250 and makes 26.63 bhp and 23.5 Nm of torque. Other bings and bongs include dual-channel ABS, digital odometer, all-around LED, etc. Overall, a fine upgrade over the NS160.

2020's top astrophysicist Tasnim Ananna from Bangladesh explains just why black holes are so cool

ISRAR HASAN

Black holes have long piqued the interest of scientists. From what was once regarded as mathematical curiosity, the lingering mystery of black holes permeates many fields of scientific research encompassing mathematics, physics, astronomy and now computer simulations.

Bangladeshi astrophysicist Tonima Tasnim Ananna, who recently topped the 2020 edition of Science News (SN) magazine's SN 10: Scientists to Watch, has been lauded for her outstanding groundbreaking research on black holes, including their origins and subsequent expansion over time. Her research has mapped the grandeur of black holes tracing its origins, location, and its effect on its surroundings.

Toggle caught up with Ananna for a chat, in hopes of understanding the fascinating phenomena of black holes.

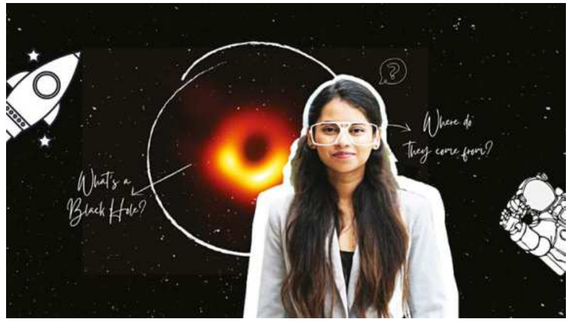
Toggle: How important are black holes in our understanding of the cosmos?
Ananna: Supermassive black holes that reside in the centers of galaxies are known to co-evolve with these galaxies. The energy outbursts from the environment surrounding these black holes can either trigger star formation by disturbing neutral, cold gas clouds which gravitationally collapse to form stars or stop star formation if they inject too much energy into these clouds, making them evaporate. Therefore, to understand how galaxies evolve and what triggers or stops star formation, understanding how black holes evolve is paramount.

However, independent of their roles in galaxy evolution, supermassive black holes are some of the most mysterious objects we find in nature. It is still unclear how they form. Stellar-mass black holes (such as Cygnus X-1) might have been produced by collapsing stars, or from mergers of other dense objects such as neutron stars.

However, supermassive black holes, which are usually a million to a billion times the mass of the sun, had to form very soon after the Big Bang. The Cosmic Microwave Background shows that after the Big Bang, matter was almost uniformly distributed throughout the Universe, with very small perturbations. Over time, the small perturbations developed into superclusters of galaxies (where there was an overdensity of matter) or supervoids (where there were under-densities).

At the center of every massive galaxy, we find supermassive black holes, so the seeds of these black holes must have been formed when matter first started collapsing due to these perturbations - but the exact process that caused them to form is still unclear. To me, understanding how these objects formed and under what conditions they accumulated most of the matter to become so massive is interesting in itself.

Toggle: You and your team have been able to get a clearer look at the spin rate of the black holes, an important characteristic.



Could you elaborate on how this breakthrough is important?
Ananna: The three fundamental characteristics of a black hole are its mass, charge, and spin. While mass can be directly calculated using velocities of stars around these black holes, the spin is more intrinsic and has to be derived from looking at the relationship between mass and light. Because our result accounts for all the light emitted by supermassive black holes in the last twelve billion years, and we have measurements of black hole mass density in the present universe in literature, we are able to understand what the average spin of these black holes have been over time.

Even though previous models which did not account for much of the obscured/hidden AGN predicted that black holes are mostly stationary (i.e., Schwarzschild black holes), we find that rotating Kerr black holes are much more common than previously expected. The solution for general relativity that describes a rotating black hole (found in the 1960s) is very different from that of a stationary black hole (found a year after general relativity was proposed by Einstein in 1915), and the way space curves around a rotating black hole is also different (for example the disk of infalling matter can move closer to the event horizon if the disk and the black hole are both rotating in the same direction).

Therefore the spin measurement does move us closer to understanding the environment around these black holes.

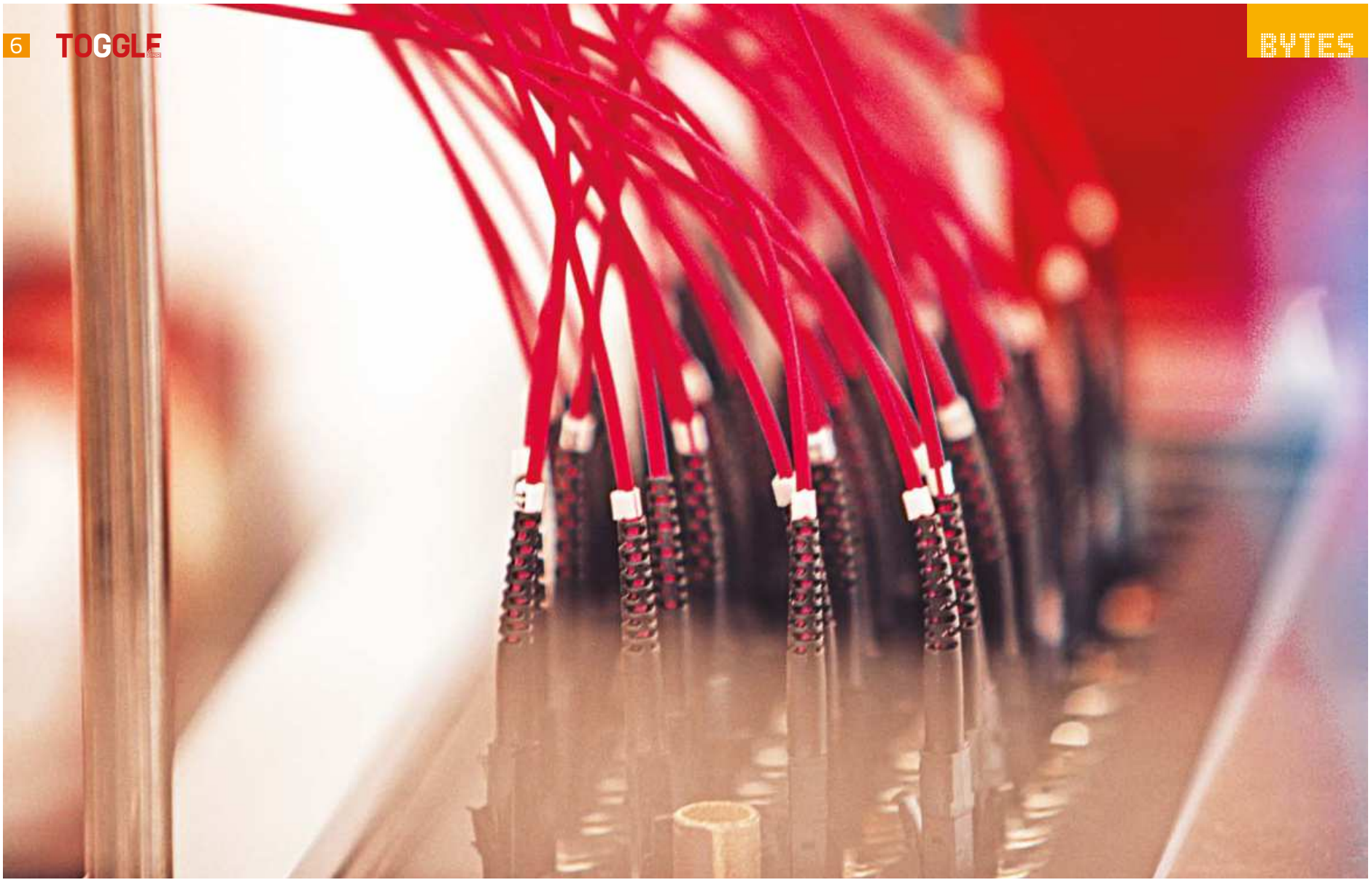
Toggle: What are the major challenges in your research and where do you plan to venture next in the realm of black holes?
Ananna: One major challenge in research is balancing quality vs quantity. There is always pressure to publish as much and as quickly as possible, even though to produce something of value it is best to take a step back and take your time. A few years ago there was an excellent article about this, titled "Scientific knowledge is drowning in a flood of research" - a series of comics in that article perfectly sums up this issue that researchers face today.

About my current projects - right now, I am working with data from an X-ray observatory called Swift-BAT, which observes the universe in high-energy X-rays, but it only observes the local universe. Due to X-rays penetrating power, this will allow us to draw the most complete picture of how mass is distributed in local populations of black holes, update the mass density estimate which is still widely debated, and quantify how much of the infalling mass is radiated away as light.

Toggle: What do you think are the major barriers in Bangladesh in researching such topics, and what are your recommendations in overcoming them?
Ananna: I think the major barrier in research is that our public institutions value connections over merit when it comes to recruitment. It is difficult to hold on to talent if it is not valued. Another important aspect of research is funding.

Researchers in the US regularly propose research projects to NASA and NSF (National Science Foundation), which are reviewed by peers, and the most meritorious projects are funded. All of my research projects have been funded by NASA and NSF grants. In Bangladesh, at least in the sciences, I have not heard of anything similar. It is unlikely that a research environment will thrive if people cannot get funding to collect data, hire graduate students and postdocs.

Illustration: Zarif Faiaz



Edge Computing: Why it Matters

OROBI BAKHTIAR

Edge computing is transforming the way data is being handled, processed, and delivered from millions of devices around the world. The explosive growth of internet-connected devices – the IoT – along with new applications that require real-time computing power, continues to drive edge-computing systems.

Faster networking technologies, such as 5G wireless, are allowing for edge computing systems to accelerate the creation or support of real-time applications, such as video processing and analytics, self-driving cars, artificial intelligence and robotics, to name a few

What is Edge Computing?

At its basic level, edge computing brings computation and data storage closer to the devices where it is being gathered, rather than relying on a central location that can be thousands of miles away. This is done so that data, especially real-time data, does not suffer latency issues that can affect an application's performance. In addition, companies can save money by having the processing done locally, reducing the amount of data that needs to be processed in a centralized or cloud-based location.

Edge Computing was developed due to the exponential growth of IoT devices, which connect to the internet for either receiving information from the cloud or delivering data back to the cloud. And many IoT devices generate enormous amounts of data during the course of their operations.

Benefits of Edge Computing

For many companies, the cost savings alone can be a driver towards deploying an edge-computing architecture. Companies that embraced the cloud for many of their applications may have discovered that the costs in bandwidth were higher than they expected.

Increasingly, though, the biggest benefit of edge computing is the ability to process and store data faster, enabling for more efficient real-time applications that are critical to companies. Before edge computing, a smartphone scanning a person's face for facial recognition would need to run the facial recognition algorithm through a cloud-based service, which would take a lot of time to process. With an edge computing model, the algorithm could run locally on an edge server or gateway, or even on the smartphone itself, given the increasing power of smartphones. Applications such as virtual and augmented reality, self-driving cars, smart cities and even building-automation systems require fast processing and response.

Companies such as NVIDIA have recognized the need for more processing at the edge, which is why people are seeing new system modules that include artificial intelligence functionality built into them. The company's latest module, for example, is smaller than a credit card, and can be built into smaller devices such as drones, robots and medical devices. AI algorithms require large amounts of processing power, which is why most of them run via cloud services. The growth of AI chipsets that can handle processing at the edge will allow for better real-time responses within applications that need instant computing.

Drawbacks

However, as is the case with many new technologies, solving one problem can create others. From a security standpoint, data at the edge can be troublesome, especially when it is being handled by different devices that might not be as secure as a centralized or cloud-based system. As the number of IoT devices grows, it's imperative that IT understand the potential security issues around these devices, and to make sure those systems can be secured. This includes making sure that data is encrypted, and that the correct access-control methods and even VPN tunnelling are utilized.

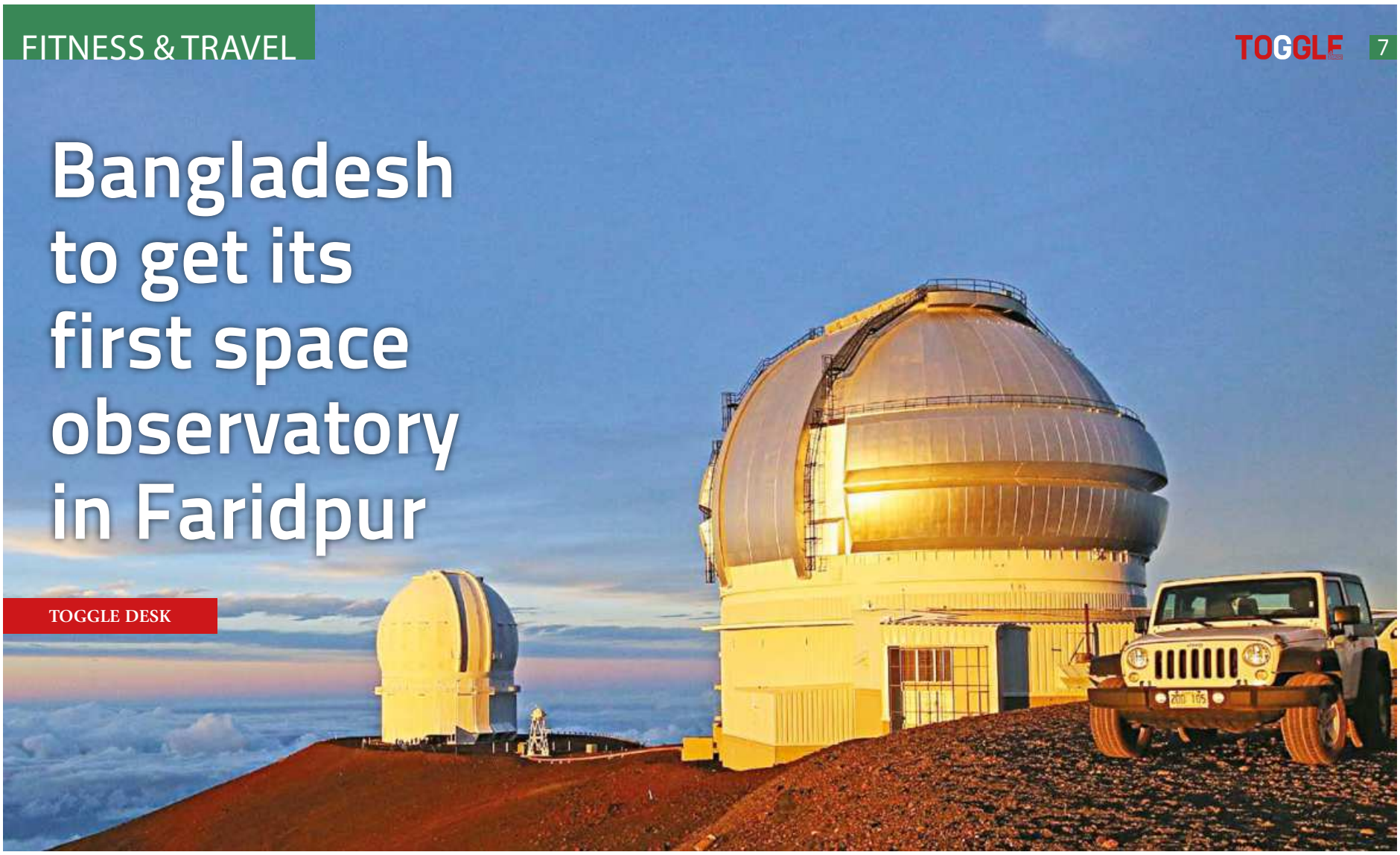
Furthermore, differing device requirements for processing power, electricity and network connectivity can have an impact on the reliability of an edge device. This makes redundancy and failover management crucial for devices that process data at the edge to ensure that the data is delivered and processed correctly when a single node goes down.

5G and the future of Edge Computing

Wireless communication technologies, such as 5G and Wi-Fi 6, will also affect edge deployments and utilization in the coming years, enabling virtualization and automation capabilities that have yet to be explored, such as better vehicle autonomy and workload migrations to the edge, while making wireless networks more flexible and cost-effective.

Edge computing gained notice with the rise of IoT and the sudden glut of data such devices produce. But with IoT technologies still in relative infancy, the evolution of IoT devices will also have an impact on the future development of edge computing. One example of such future alternatives is the development of micro modular data centres (MMDCs). The MMDC is a data centre in a box, putting a complete data centre within a small mobile system that can be deployed closer to data -- such as across a city or a region -- to get computing much closer to data without putting the edge at the data proper.

Bangladesh to get its first space observatory in Faridpur



TOGGLE DESK

The government is all set to build the "Bangabandhu Sheikh Mujibur Rahman Space Observatory Centre", the first of its kind in the country, at Bhanga Upazila of Faridpur. The centre is being set up with all modern facilities for observing the space with telescopes at a cost of Tk 213 crores.

Eminent writer Professor Zafar Iqbal first brought the idea of setting up a space observatory centre at Bhanga of Faridpur to public attention. He explained that the Equator, the Tropic of Cancer and the Tropic of Capricon – three imaginary lines that encircle the Earth from East to West – has an intersection point with the four longitudinal lines that encircle the Earth from North to South at Bhanga of Faridpur, making the spot an ideal location to set up a space observatory.

Following his suggestion, the Prime Minister directed the Ministry of Science and Technology to start preparing the project.

According to the project proposal, the centre will be built on 10 acres of land and will have a 5-storey circular building that will house reflector telescopes. The height of the observatory tower will be kept at 100 metres to commemorate the birth centenary of the father of the nation.

The project proposal also allots Tk 1 crore 10 lacs for the travel and training of 11 officials abroad.

The project is scheduled for completion by June 2023.

4 things to enjoy at Mawa

RAHBAR AL HAQ

The drive

If you are someone who loves driving and/or enjoys long drive the Dhaka Mawa highway will be a treat. After crossing Postogola Bridge, there lies almost 30km of almost empty highway in immaculate condition. The lanes are nicely marked and divided and the corners are wide and free of blindspot. The only thing you have to watch out for is your speed, as you can hit high triple digits without even realize. Bottom line, accelerate to your heart's content but keep an eye on your speedometer.

The Food

Are you a fan of local seafood cuisine? Well, you can have plenty of the in Mawa, and in a ton of variety. Ilish fish fry, Ilish egg curry, lobster roast, and more types of

"vorta" then you can think of. Granted, the hotels selling them may not be score top marks when it comes to hygiene, but the taste is excellent. Besides, stomach pain comes part and parcel of trying something new, just make sure you are loaded with all the digestive pills.

The bazaar

If you lack the adventure spirit —or the recklessness— to savor the local cuisine, head to the local fish market at Mawa Bazar. Ilish there sells for one-third of the price of the local city, and less if you took the time to buff your haggling skill. Besides the marine life, there are also plenty of fresh vegetables from you pick from, all for a price less than what you would pay in a city store. One word of caution, the roads of the Bazar were not made with cars in mind, so you're better of leaving it parked elsewhere. There are plenty of parking spaces in the Shimulia Ferry Ghat, but it is also quite far away from bazar, so plan accordingly.

The view

The beauty and vastness of the Padma river can have been described in many pieces of literature throughout the decade, but words can never do it justice. In both the Shimulia and Mawa Bazar, you will find excellent vantage points to take in its beauty. In addition to the natural beauty, the under-construction Padma Multipurpose Bridge also rises high and tall, a testament to our willingness to see things through. It doesn't matter if you love nature or architecture, for, at Mmawa, there are both.

4 movies to watch out for in 2021

Judas and the Black Messiah
A based-on-true-events drama, co-written and directed by Shaka King. The film tells the story of an FBI informant, William O'Neal who infiltrated the Illinois Black Panther Party in an effort to keep track of Fred Hampton. Set to open on February 12, the film will be simultaneously released on HBO Max.

No Time To Die
The 25th James Bond film, directed by Cary Fukunaga of "True Detective" fame, comes in with a star-studded casting, with Daniel Craig returning for his fifth and (presumably) final turn as 007. He's joined by series regulars Ralph Fiennes, Naomie Harris, Rory Kinnear, and Ben Whishaw, as well as returning characters played by Lea Seydoux and Jeffrey Wright, with Rami Malek reportedly playing the villain. The hype is definitely up for this one, set to be released in April.

The Beatles: Get Back
Peter Jackson of the "They Shall Not Grow Old" fame works with never-before-seen footage behind the scenes to chronicle the Beatles as they record their 1970 album Let It Be, as well as their legendary performance on the rooftop of Apple Records in London. The documentary is set to release in August.

Dune
Denis Villeneuve takes on the massive challenge of re-adapting Frank Herbert's sprawling sci-fi epic more than 30 years after David Lynch's first attempt. The impressive cast including Timothée Chalamet, Josh Brolin, Rebecca Ferguson, Oscar Isaac, Javier Bardem, Jason Momoa, Dave Bautista and Zendaya surely gets the hype up for this, which is set to open on October 1 with a simultaneous release on HBO Max.