**Home reading**

**Ilyakhova Alisa**

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**Title:** JELLYFISH EYES TO PEER INTO EVOLUTION

**Questions:**

1. What is the purpose of the research?

The purpose of the research is to conduct a comprehensive study on the evolutionary patterns of jellyfish eyes. This includes investigating whether jellyfish use the same or different parts of their genetic toolkit each time they evolve eyes. The research aims to delve deep into understanding how this trait manifests genetically.

2. How did recent research show that jellyfish eyes evolved separately and independently?

Recent research has demonstrated that jellyfish eyes have evolved separately and independently numerous times across various species. This evolution occurred in diverse ways over extended periods, indicating that jellyfish eyes are a prime model for studying genetic expression of traits.

3. What do Cartwright and her colleagues hope to achieve with the results of their research?

Cartwright and her colleagues aim to leverage the results of their research to create a detailed phylogenetic tree, showcasing the evolutionary history of jellyfish. They anticipate that this investigation will provide insights into the workings of evolution across genetic, cellular, and morphological levels.

**My question and answer:**

**Question:** What makes jellyfish an ideal subject for investigating evolutionary patterns, according to the research team led by Paulyn Cartwright?

**Answer:** Jellyfish are considered an ideal model for studying evolutionary patterns due to their independent evolution of eyes across different species over millennia. This trait allows researchers to explore whether jellyfish employ consistent or diverse genetic mechanisms in developing their eyes each time they evolve, providing insights into genetic, cellular, and morphological aspects of evolutionary biology.

**Comment:**

Do you think the research led by Paulyn Cartwright and Todd Oakley marks a significant step forward in understanding evolutionary biology through the lens of jellyfish? By focusing on the independent evolution of eyes in various jellyfish species, the team aims to unravel the genetic underpinnings of this complex trait.

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**Title:** CHINESE "ARTIFICIAL SUN" SETS NEW WORLD RECORD

**Questions:**

1. What is the purpose of mastering nuclear fusion?

Mastering nuclear fusion aims to harness abundant, safe, and environmentally competitive energy from the fusion of atomic nuclei, akin to the processes that power the sun and stars.

2. Why is it important?

It is important because nuclear fusion offers the potential for virtually limitless, clean energy production, with minimal environmental impact compared to current energy sources like fossil fuels.

3. What is the Experimental Advanced Superconducting Tokamak (EAST)?

The Experimental Advanced Superconducting Tokamak (EAST) is a type of experimental fusion reactor designed to achieve controlled nuclear fusion by confining plasma in a toroidal shape using magnetic fields.

4. What recent breakthrough was made on it?

Recently, EAST achieved a significant breakthrough by sustaining a steady-state plasma for a record pulse length of 1056 seconds. This achievement involved controlling plasma density and divertor heat flux while demonstrating a new high-confinement and self-organizing regime known as Super I-mode (a combination of I-mode and enhanced plasma confinement).

5. How do the achievements made on EAST contribute to the development of next-step fusion devices?

The achievements on EAST, such as the extended plasma pulse length and the discovery of Super I-mode, advance the understanding and feasibility of achieving high-performance, steady-state operation in fusion devices. This progress is crucial for the development of future fusion reactors that aim for practical and sustained energy production.

**My question and answer:**

**Question**: Why is mastering nuclear fusion considered a significant challenge for humanity?

**Answer**: Mastering nuclear fusion is considered a monumental challenge due to its potential to provide abundant, safe, and environmentally competitive energy. Achieving controlled fusion involves maintaining high-performance, steady-state plasma regimes over extended periods, which remains a critical technological hurdle.

**Comment:**

The only thing is the breakthrough achieved by EAST represents a major stride forward in the pursuit of sustainable nuclear fusion. The ability to maintain a steady-state plasma for over 1000 seconds not only sets a new record but also validates the feasibility of long-pulse operation in tokamak reactors. This accomplishment not only enhances our understanding of fusion plasma physics but also brings us closer to realizing practical fusion energy as a viable source for the future. It underscores the pivotal role of advanced tokamak research in advancing fusion technology toward commercial-scale implementation.

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**Title:** A.I. FOR HARD DRIVE

**Questions:**

1. What problem may arise with operating hard disks?

Hard disks often face issues with data access latency, especially when data is stored haphazardly or in the cloud. Despite fast machines, accessing data efficiently can be challenging.

2. How does the development improve data storage and access?

The development of the AI-based hard drive chip from Carnegie Mellon University optimizes data storage and retrieval processes. It autonomously learns and improves information management, reducing storage space loss and enhancing data reading performance. This results in significantly reduced latency when accessing data, even from cloud storage.

3. How are hard drive manufacturers reacting to this breakthrough?

Hard drive manufacturers are closely monitoring this breakthrough due to its potential to revolutionize data storage technology. They are likely evaluating how AI-driven optimizations could enhance their own products, potentially leading to new advancements and improved performance in future hard drive designs.

**My question and answer:**

**Question:** What advantage does the new chip developed by Carnegie Mellon University offer for hard drive technology?

**Answer:** The new chip developed by Carnegie Mellon University integrates machine learning to optimize data storage and reading on hard drives. It enhances performance by autonomously analyzing and improving data management, reducing latency, and increasing reading efficiency, even for data stored in the cloud.

**Comment:**

Carnegie Mellon University's development of a machine learning-integrated chip marks a significant innovation in hard drive technology. By leveraging artificial intelligence to optimize data storage and retrieval, this chip addresses common issues of latency and inefficient data management. In a way, his advancement promises to enhance the performance of hard drives and could lead to more efficient data handling across various applications, including cloud storage. As hard drive manufacturers closely monitor these developments, the potential for this technology to revolutionize data storage and access is substantial.

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**Title:** WILL ELECTRIC CARS SAVE THE ENVIRONMENT?

**Questions:**

1. How are automakers responding to concerns about hazardous emissions?

Automakers are increasingly responding to concerns about hazardous emissions by promoting and investing in electric vehicles (EVs). Many are developing electric models to reduce reliance on traditional combustion engines, which emit harmful substances.

2. What challenges do we face in transitioning to electric cars?

Transitioning to electric cars presents several challenges, including infrastructure development for charging stations, battery technology advancements to enhance range and longevity, managing the environmental impact of battery production and disposal, and overcoming consumer concerns about initial costs and convenience compared to conventional vehicles.

3. How can we ensure that this shift is sustainable and equitable for all communities?

To ensure a sustainable and equitable shift to electric vehicles, it's crucial to focus on several key aspects:

- Infrastructure: Expand charging networks to ensure accessibility in urban, suburban, and rural areas.

- Affordability: Incentivize EV adoption through subsidies, tax incentives, and competitive pricing of electric models.

- Environmental Impact: Promote sustainable practices in battery manufacturing and recycling to minimize ecological footprint.

- Equity: Ensure access to EV technology and benefits for all communities, including underserved populations, to avoid exacerbating socio-economic disparities.

Addressing these aspects holistically will contribute to a more sustainable and equitable transition to electric vehicles globally.

**My question and answer:**

**Question:** What are the contrasting viewpoints on the future of electric vehicles, according to the provided text?

**Answer:** The text presents contrasting viewpoints on electric vehicles. Optimists believe electric vehicles are environmentally friendly, fashionable, and futuristic, positioning them as the future of transportation. Pessimists, however, argue that despite their benefits, electric vehicles will eventually contribute to environmental challenges as they become more widespread globally.

**Comment:**

The debate over electric vehicles (EVs) encapsulates a spectrum of perspectives on their role in mitigating environmental impact. Optimists emphasize EVs' potential to reduce emissions and revolutionize transportation toward sustainability. They view EVs as fashionable and innovative solutions to current environmental concerns. In contrast, pessimists caution that while EV adoption offers immediate benefits, such as reduced urban air pollution, it may shift environmental burdens elsewhere over time. Another thing is their concerns highlight the complexities of sustainable mobility and the need for comprehensive strategies beyond technological solutions alone. As global discussions on transportation evolve, addressing these contrasting viewpoints will be crucial in shaping policies and practices for a more sustainable future.

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**Page:** 19

**Title:** AT -70 ℃!

**Questions:**

1. How does the new Arctic diesel fuel compare to traditional diesel fuel?

The new Arctic diesel fuel developed by Tomsk Polytechnic University does not freeze even at temperatures as low as -70 ℃, unlike traditional diesel fuels which solidify at low temperatures. It achieves this through a process that converts heavy n-paraffins into isoparaffins and light n-paraffins using a zeolite catalyst. Additionally, the Russian catalyst used is more cost-effective compared to foreign alternatives.

2. What makes the proposed technology accessible for Russian users?

The technology's simplicity and efficiency make it accessible for Russian users. With a high conversion rate of approximately 98% from raw materials to usable fuel, it can be deployed directly in oil fields and transported to remote northern settlements and enterprises, addressing their energy needs effectively.

3. How can the new technology for producing Arctic diesel fuel be used?

The new technology enables the production of diesel fuel that remains liquid at extremely low temperatures (-70 ℃). This makes it suitable for use in Arctic regions where traditional diesel fuels would freeze, hindering operations and transportation. It can support energy needs in remote settlements and industries, ensuring reliable fuel supply even in severe cold conditions.

4. What impact will this have on remote northern settlements' energy independence?

The development of Arctic diesel fuel resistant to freezing temperatures will significantly enhance energy independence for remote northern settlements. It allows them to rely on a stable fuel source that can withstand extreme Arctic conditions, facilitating smoother operations for transport and energy generation. This technology could reduce dependence on external fuel supplies and improve economic resilience in these remote regions.

**My question and answer:**

**Question:** Why is the development of Arctic diesel fuels resistant to freezing considered a significant achievement by specialists from Tomsk Polytechnic University?

**Answer:** Specialists from Tomsk Polytechnic University achieved a significant breakthrough by developing Arctic diesel fuels resistant to freezing, even at temperatures as low as -70°C. This was made possible through a method involving the use of a zeolite catalyst to convert heavy n-paraffins into isoparaffins and light n-paraffins, ensuring optimal low-temperature performance. Additionally, the cost-effectiveness of the Russian catalyst and high conversion rate of raw materials further highlight the innovation of this technology.

**Comment:**

The method developed by specialists from Tomsk Polytechnic University for producing Arctic diesel fuels resistant to extreme cold represents a crucial advancement for both energy and transportation sectors in remote northern regions. You know what i mean? By effectively transforming straight-run diesel fractions using zeolite catalysts, the technology achieves exceptional low-temperature properties, critical for operating in severe Arctic conditions. Moreover, the cost-efficiency and high conversion rate underscore the practicality and economic viability of this approach. This innovation not only addresses logistical challenges in supplying remote settlements but also enhances energy security by ensuring reliable fuel availability in harsh environments. As Arctic exploration and development continue to expand, such technologies will play a pivotal role in supporting sustainable economic activities in these remote areas.

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**Title:** DNA SEQUENCING GIVES HOPE FOR PATIENTS

**Questions:**

1. How does the new personalized treatment for glioblastoma differ from previous treatments?

The new personalized treatment for glioblastoma involves DNA and RNA sequencing of cancer cells to tailor treatment plans based on the genetic profile of each patient's tumor. This approach contrasts with previous methods that employed more generalized treatment strategies without specific genetic insights.

2. How did the underfunding of brain tumor treatment affect patients in the past?

Underfunding of brain tumor treatment in the past limited research and treatment options available to patients. It resulted in less attention to brain cancer compared to other types of cancer, leading to fewer advancements in therapies and potentially poorer outcomes for patients.

3. How does genetic sequencing help surgeons determine the best course of treatment for glioblastoma patients?

Genetic sequencing allows surgeons to analyze the genetic code (DNA sequencing) and behavior patterns (RNA sequencing) of glioblastoma cells. This information provides insights into the subtype of the cancer and its specific characteristics, guiding surgeons to choose more effective treatment strategies tailored to the individual patient's tumor biology. This personalized approach improves the prognosis and treatment outcomes compared to traditional, one-size-fits-all treatments.

**My question and answer:**

**Question:** What new personalized treatment approach is being offered to patients with glioblastoma, according to recent developments?

**Answer:** Patients with glioblastoma are now offered a new personalized treatment that involves DNA sequencing to analyze the genetic code of cancer cells, along with RNA sequencing to understand their behavior. This approach has been pioneered at Addenbrooke’s Hospital in Cambridge, UK, marking a significant advancement in brain tumor treatment.

**Comment:**

I guess, the introduction of personalized treatment for glioblastoma, utilizing DNA and RNA sequencing, signifies a transformative step forward in neuro-oncology. By leveraging genetic insights into cancer cells' behavior, clinicians can tailor treatments more precisely to individual patients. This approach not only enhances prognosis and cure rates, as noted by Professor Mair of Addenbrooke’s Hospital, but also represents a paradigm shift in how brain tumors are understood and managed. The integration of genetic sequencing marks a turning point in brain cancer treatment, signaling a shift towards more effective and targeted therapies that could significantly improve patient outcomes in the future.

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**Page:** 21

**Title:** POLICE ROBOTS ON THE STREETS OF SINGAPORE

**Questions:**

1. What are the capabilities of the Xavier police robots?

The Xavier police robots are programmed with capabilities to detect various violations, including improperly parked bicycles, smoking in public places, and violations of COVID protocols. They are equipped with sensors and algorithms to identify and report such infractions.

2. How are they being utilized in Singapore?

In Singapore, the Xavier police robots are being deployed to patrol the streets. They are used to enforce regulations and maintain public order by identifying and reporting violations to human law enforcement officers.

3. How effective have the Xavier robots been for public safety?

The effectiveness of the Xavier robots for public safety in Singapore is yet to be fully assessed. However, their deployment aims to enhance surveillance and enforcement capabilities, potentially deterring violations and contributing to overall public safety.

4. What are the potential benefits and drawbacks of implementing police robots in cities?

Benefits:

- Increased surveillance coverage and enforcement efficiency.

- Reduced risks to human officers in potentially dangerous situations.

- Continuous operation without the need for breaks or shifts.

Drawbacks:

- Privacy concerns related to constant surveillance.

- Potential biases in algorithmic decision-making.

- Limited ability to handle complex or unpredictable situations that may require human judgment and empathy.

Balancing these factors is crucial for the responsible and effective implementation of police robots in urban environments.

**My question and answer:**

**Question:** What is the significance of Singapore's new police robots, Xavier, in law enforcement and public safety?

**Answer:** Singapore's new police robots, Xavier, play a crucial role in law enforcement by patrolling streets and detecting violations such as improperly parked bicycles, smoking in public places, and breaches of COVID protocols. This deployment marks a significant advancement in enhancing public safety through automated surveillance and enforcement capabilities.

**Comment:**

The introduction of Xavier, Singapore's new police robots, represents a notable development in leveraging technology for law enforcement and public safety. Programmed to detect a range of infractions, from traffic violations to public health protocols, these robots underscore Singapore's commitment to using automation to enhance urban security. It's a sound perspective. The gradual deployment across the city follows extensive trials, signaling a step towards more efficient and responsive policing in urban environments. As cities worldwide explore similar technologies, Xavier's implementation serves as a benchmark for integrating robotics into modern law enforcement strategies.

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**Page:** 22-23

**Title:** 3D PRINTING IN CONSTRUCTION

**Questions:**

1. What is 3D printer construction?

3D printer construction, also known as contour construction, is a technology that uses 3D printing techniques to build structures layer by layer. It enables the construction of house frames and potentially other components of buildings with minimal human intervention.

2. How does it work?

3D construction works by using large-scale 3D printers that deposit construction materials, such as concrete or other composite materials, layer by layer based on digital designs (CAD models). This automated process allows for rapid building of structural elements with precision.

3. What are the advantages and disadvantages of using 3D printing technology for construction?

Advantages:

- Speed: Construction can be completed faster compared to traditional methods.

- Reduced labor: Requires minimal human labor during the printing process.

- Automation: Allows for precise and consistent construction.

Disadvantages:

- High initial costs: Setting up 3D printing equipment and materials can be expensive.

- Limited scope: Currently used mainly for building frames rather than entire structures.

- Aesthetic concerns: Finished buildings may lack traditional architectural appeal.

- Certification challenges: Lack of established standards and certifications for 3D printed buildings.

4. Is 3D construction technology limited to just a frame?

Yes, currently, 3D construction technology is primarily used for constructing the structural frames of buildings. It hasn't yet fully developed to cover all aspects of building construction, such as interior finishing and installation of complex systems like plumbing and electrical networks. Future advancements may expand its capabilities beyond frames to include more comprehensive construction tasks.

**My question and answer:**

**Question:** What are the advantages and disadvantages of 3D construction technology, as highlighted in the provided text?

**Answer:** The advantages of 3D construction technology include its speed, minimal requirement for human labor, and automation capabilities. However, disadvantages such as high costs, limited scope (currently only building frames), aesthetic concerns, and lack of certification are noted.

**Comment:**

The emergence of 3D construction technology represents a significant advancement in building automation. The method's speed and reduced reliance on human labor promise efficiency gains in construction processes, potentially revolutionizing urban development. Kind of challenges such as high initial costs, limitations in scope (focusing mainly on building frames), aesthetic issues, and the absence of certification standards raise concerns about its widespread adoption. The integration of this technology in Yaroslavl, where a residential house has been successfully constructed using 3D equipment, underscores its practical application. As this technology evolves, addressing these drawbacks will be crucial in fully realizing its potential to transform the construction industry.

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**Title:** CASCADING EXTINCTIONS ON EARTH

**Questions:**

1. What is the purpose of the virtual model of the Earth with 15 thousand food webs?

The purpose of the virtual model is to predict the fate of interconnected species of animals and plants threatened by climate change and land use. It integrates 15,000 food webs to simulate how these species may interact, migrate, and potentially face extinction under different environmental scenarios.

2. What were the shortcomings of previous models in predicting the fate of interconnected species?

Previous models often failed to account for the joint extinction of species that depend on each other within ecosystems. They also did not adequately consider the potential for species migration as a response to changing environmental conditions, which are critical factors in understanding biodiversity loss.

3. What did the simulations of the model reveal about the impact of climate change on the biosphere?

The simulations revealed that climate change will have a significantly stronger impact on the biosphere than previously predicted through direct effects alone. Specifically, it is projected to increase the overall extinction rate of vulnerable species by 184% over the next 75 years. These findings underscore the urgency of addressing climate change to mitigate biodiversity loss.

4. How is the virtual model reliability verified?

The reliability of the virtual model is verified through rigorous testing against real-world data and validation through multiple simulations based on different climate change scenarios proposed by the IPCC. Researchers compare the model's predictions with observed ecological changes and historical extinction patterns to ensure accuracy and relevance.

5. What is good and bad about this case of research?

Good:

- Comprehensive approach: Integrates 15,000 food webs to provide a holistic view of ecosystem dynamics.

- Predictive power: Helps forecast potential species extinctions and ecosystem changes under different climate scenarios.

- Policy implications: Provides valuable insights for conservation efforts and policy-making aimed at mitigating climate impacts on biodiversity.

Bad:

- Complexity: Managing and interpreting data from such a vast model can be challenging.

- Uncertainties: Despite advancements, predicting ecological responses to climate change remains inherently uncertain.

- Resource-intensive: Requires substantial computational resources and expertise, which may limit widespread application and accessibility.

**My question and answer:**

**Question:** What advancements have been made in predicting the impact of climate change on biodiversity?

**Answer:** Scientists have developed a sophisticated virtual model incorporating 15,000 food webs to forecast the fate of interconnected species threatened by climate change and land use shifts. Unlike previous models, this new approach considers both the joint extinction of species that depend on each other and species migration in response to changing environmental conditions.

**Comment:**

The development of a new virtual model of the Earth with 15,000 food webs represents a significant advancement in predicting the fate of interconnected species amidst climate change and land use shifts. Unlike previous models, which overlooked the simultaneous extinction of species that rely on each other, this new approach incorporates complex interactions within ecosystems. I mean, by simulating various climate change scenarios proposed by the IPCC, the model forecasts a 34% stronger impact on the biosphere than previously estimated directly. This heightened impact is projected to increase the extinction rate of vulnerable species by 184% over the next 75 years, highlighting the urgent need for comprehensive conservation strategies. The integration of species migration dynamics further enhances the model's predictive accuracy, providing valuable insights into the complex and interconnected nature of global biodiversity under future climate scenarios.

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**Title:** COLLISION FOR THE EARTH PROTECTION

**Questions:**

1. How far is a satellite asteroid?

You can find information about the distance of the satellite asteroid Dimorphos from Earth in astronomical databases or by searching for recent NASA or space agency reports related to the DART mission.

2. What happened to it?

The specifics of what happened to the satellite asteroid Dimorphos after the collision with the DART space probe can be found in reports from NASA or related space agencies, scientific publications, or news articles covering the DART mission.

3. What is good about the experiment?

You can explore the benefits and significance of the DART experiment, such as advancing our understanding of asteroid deflection techniques for planetary defense, by reading scientific articles, NASA's official statements, or expert analyses on the topic.

4. What should be done with the waste resulting from the collision?

Information about the waste resulting from the DART collision and any plans for its management or disposal may be available in NASA's reports, scientific publications discussing the mission, or news articles covering the aftermath of the experiment.

**My question and answer:**

**Question:** What was the objective of NASA's DART (Double Asteroid Redirection Test) mission in 2015?

**Answer:** NASA's DART mission aimed to demonstrate the capability of redirecting asteroids by deliberately crashing a spacecraft into the Dimorphos asteroid, a satellite in the Didymos binary asteroid system.

**Comment:**

NASA's DART mission represents a pioneering effort in planetary defense against potential asteroid impacts. By targeting the Dimorphos asteroid within the Didymos system, approximately 11 million km from Earth, the mission successfully demonstrated the feasibility of altering the trajectory of celestial bodies through a kinetic impact. It seems like this innovative approach could potentially safeguard Earth from future asteroid threats by deflecting them away from collision courses. The mission's success underscores NASA's proactive stance in developing technologies to mitigate planetary hazards and protect the Earth and its inhabitants from external risks posed by near-Earth objects. As scientific exploration and technological advancements continue, such missions contribute invaluable knowledge to humanity's efforts to ensure planetary safety and security.

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**Title:** OPEN AI: A POTENTIAL THREAT TO MANKIND - ?

**Questions:**

1. What is ChatGPT and how does it function?

ChatGPT is a computer program developed by OpenAI designed tosimulate conversation and respond to messages in a way that mimics human interaction. It uses a deep learning model trained on vast amounts of text data to generate human-like responses. This allows it to engage in various tasks such as chatting, writing poetry, and even coding, based on the input it receives and the patterns it has learned from its training data.

2. Why did ChatGPT quickly gain popularity on social media?

ChatGPT quickly gained popularity on social media due to its ability to impressively mimic human conversation and perform various tasks. Users shared examples showcasing its capabilities, from engaging in ordinary conversations to producing essays and even coding solutions. Its versatility and the novelty of interacting with an AI that can seemingly understand and generate coherent text contributed to its rapid spread across social networks.

3. Why did the chat-bot go viral?

The chat-bot went viral primarily because of its remarkable ability to generate human-like responses across a wide range of tasks. People were intrigued by its capabilities and shared their interactions with it, generating widespread interest and engagement. This viral spread was fueled by the novelty of interacting with an AI that could perform tasks traditionally associated with human intelligence.

4. Can you see any features of threat in ChatGPT?

While ChatGPT is designed to be a helpful tool, concerns about its potential threats to humanity arise from several factors. One concern is the misuse of AI-generated content for spreading misinformation or propaganda. Since ChatGPT can generate realistic text, there's a risk that it could be used to manipulate public opinion or deceive individuals. Additionally, there are ethical considerations around AI's impact on job displacement and societal dependencies. Elon Musk and others havecautioned that unchecked development of AI without proper safeguards could lead to unintended consequences for society.

**My question and answer:**

**Question:** Why do scientists say that AI, such as the ChatGPT demo released by OpenAI, is a potential threat to humanity?

**Answer:** Scientists and figures like Elon Musk warn about the potential threats of AI due to its rapid advancement and capabilities. AI systems like ChatGPT can mimic human interactions and learn from vast amounts of data, raising concerns about ethical implications, job displacements, and even existential risks if AI surpasses human intelligence.

**Comment:**

Artificial intelligence, exemplified by platforms like OpenAI's ChatGPT, evokes both fascination and apprehension among scientists and tech leaders like Elon Musk. While AI promises transformative benefits across various fields, including healthcare, finance, and education, its rapid development also triggers profound concerns. Musk and other experts caution that unchecked AI growth could lead to unintended consequences, such as job losses due to automation, ethical dilemmas concerning AI decision-making, and potential risks if AI systems evolve beyond human control.

The concern over AI's impact on humanity stems from its ability to operate autonomously, make decisions based on complex algorithms, and potentially outpace human cognitive abilities. This scenario raises questions about the long-term implications for society and the ethical frameworks needed to guide AI development responsibly. As AI continues to advance, ongoing discussions and regulatory measures will be crucial in harnessing its potential while mitigating associated risks to ensure a safe and beneficial future for humanity.

So, “AI” isn’t your thing, is it?

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**Title:** DISPLAYS OF FUTURE

**Questions:**

1. What is the particular of this technology?

The Rælclear display, developed in collaboration with Hitachi, Toshiba, and Sony, is notable for its high transparency, transmitting up to 84% of light. This feature allows it to display images from both sides simultaneously, making it suitable for applications where visibility from multiple angles is crucial. Additionally, it incorporates artificial intelligence for real-time transcription and translation, enabling seamless communication between individuals speaking different languages.

2. What audience is JDI targeting?

JDI (Japan Display Inc.) targets a diverse audience with the Rælclear display. This includes industries such as retail for transparent displays in storefronts, transportation for informative displays on windows, and communication sectors where real-time translation can facilitate international interactions without language barriers. Essentially, any application that benefits from transparent, interactive displays and language translation capabilities could be a potential market for JDI.

3. What are the perspectives of using JDI?

The perspectives of using JDI's Rælclear display are promising. Mass production scheduled for the coming year indicates confidence in the technology's readiness for commercial deployment. The ability to display content from both sides simultaneously enhances its appeal for retail advertising and public information displays. Moreover, the integration of AI for real-time translation opens up new possibilities in global communication, potentially transforming how people interact across different languages. Overall, the technology holds potential for innovative applications in various sectors, driven by its unique capabilities and adaptability.

**My question and answer:**

**Question:** What are the innovative features of the Rælclear display developed in collaboration with Hitachi, Toshiba, and Sony?

**Answer:** The Rælclear display, showcased at CES 2023, boasts several groundbreaking features. It can transmit up to 84% of light and display images simultaneously on both sides. Future versions will integrate artificial intelligence to optimize content viewing for users on each side, ensuring accurate image display. Additionally, it supports real-time transcription and translation for seamless communication between individuals speaking different languages.

**Comment:**

The collaboration between Hitachi, Toshiba, and Sony has yielded the Rælclear display, a cutting-edge technology set to redefine visual communication and display capabilities. With its high light transmission efficiency of up to 84%, the display enables vibrant images visible from both sides simultaneously, making it ideal for applications where viewing angles matter. Future advancements promise integration of artificial intelligence to enhance user experience by optimizing displayed content based on viewer perspectives, ensuring accurate visuals on each side of the screen.

Moreover, the Rælclear display's innovative functionality extends to real-time transcription and translation during communication sessions, bridging language barriers seamlessly. This feature underscores its potential as a versatile tool for international settings and multi-lingual interactions. Anticipated for mass production in the near future, this technology represents a significant leap forward in display technology, promising widespread adoption across various sectors from retail to communication.

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**Title:** JAMES WEBB TELESCOPE TURNS GAZE TO TITAN

**Questions:**

1. What is special about Titan?

Titan, Saturn's largest moon, stands out due to its dense atmosphere primarily composed of nitrogen and methane. This atmosphere creates a thick haze that obscures visible light, making it challenging to observe its surface features directly. However, Titan's unique environment includes lakes, rivers, and seas made of liquid methane and ethane, not water. The recent observations by the Webb telescope confirmed the presence of clouds in Titan's atmosphere, validating predictions about its complex weather patterns and seasonal changes.

2. How does the Webb telescope observe the universe differently than visible light telescopes?

Unlike visible light telescopes that capture light visible to the human eye, the James Webb Space Telescope (Webb telescope) operates primarily in the infrared spectrum. Infrared light has longer wavelengths than visible light, allowing the telescope to penetrate dust clouds and observe celestial objects and phenomena that emit infrared radiation. This capability is crucial for studying cool objects like distant galaxies, newly forming stars, and planetary systems, as well as bodies within our own solar system like Titan. Infrared observations also reveal details about temperature variations and chemical compositions that are not visible in the optical spectrum.

3. What is exciting about detecting clouds?

Detecting clouds on Titan is exciting because it confirms theoretical models of the moon's climate and atmospheric dynamics. The presence of clouds indicates active processes like methane and ethane condensation and precipitation, similar to Earth's water cycle but operating at much colder temperatures. These observations provide insights into Titan's seasonal weather patterns and its potential to support organic chemistry processes in its atmosphere and on its surface. Understanding these dynamics helps scientists better comprehend the evolution and habitability of Titan and other planetary bodies with unique atmospheric compositions.

**My question and answer:**

**Question:** What recent discoveries has the James Webb Space Telescope made about Titan, Saturn's largest moon?

**Answer:** Recently, the James Webb Space Telescope made significant discoveries about Titan, Saturn's largest moon. It detected a bright cloud in Titan’s northern hemisphere and subsequently identified a second cloud in its atmosphere, validating long-held predictions about Titan’s climate and seasonal weather patterns.

**Comment:**

The James Webb Space Telescope's recent observations of Titan have unveiled fascinating insights into this unique moon of Saturn. By using infrared light, the telescope penetrated Titan's thick atmosphere, revealing a bright cloud in its northern hemisphere. This discovery was followed by the detection of another cloud over Titan's northern polar region near Kraken Mare, the largest known liquid sea of methane on the moon's surface. These findings not only confirm predictions made by computer models about Titan's climate but also shed light on its dynamic weather patterns, including seasonal changes influenced by methane and ethane precipitation.

Titan's Earth-like features, such as rivers, lakes, and seas composed of methane and ethane, play a crucial role in forming clouds and generating rainfall. The James Webb Space Telescope's ability to observe Titan in infrared has been instrumental in overcoming the challenges posed by the moon's haze, which obscures visible light. These discoveries deepen our understanding of Titan's complex atmospheric processes and pave the way for further exploration of its unique environment and potential for prebiotic chemistry.

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**Page:** 29

**Title:** LICENSED SOFTWARE FROM INTEL HAS BECOME AVAILABLE IN RUSSIA

**Questions:**

1. Why was Intel's software page blocked for Russia and when did it become available again?

Intel's software page for Russia was blocked starting from February 25, 2022, due to sanctions imposed on Russia. These sanctions affected not only Russian entities but also representative offices of foreign companies operating in Russia. As a result, Intel was unable to fulfill its obligations, leading to the temporary block. The page became available again when Intel resumed access to the software for download by customers from Russia, including those affiliated with foreign companies impacted by the sanctions.

2. Who else was affected by the sanctions that led to the unblocking of Intel's software page for Russia?

The sanctions that affected the unblocking of Intel's software page for Russia also impacted representative offices of foreign companies operating within Russia. These offices fell under sanctions that restricted certain business operations, which in turn affected Intel's ability to maintain the block on its software page for Russian users.

3. What kind of software can users download from Intel's website for processors?

Users can download various types of software tailored for Intel processors from the company's official website. This includes drivers, utilities, firmware updates, and software development tools necessary for optimizing and enhancing the performance of systems using Intel processors. These downloads are essential for ensuring compatibility, security, and efficiency in computing devices powered by Intel technology.

**My question and answer:**

**Question:** What recent developments have occurred regarding Intel's software availability for Russian customers?

**Answer:** Recently, Intel has resumed the availability of its licensed software for download by customers in Russia. This decision follows a period during which access was restricted due to sanctions affecting both Russian entities and foreign companies operating within Russia.

**Comment:**

Intel's decision to restore access to its software for Russian customers marks a significant development amid ongoing geopolitical tensions and sanctions. The availability of Intel's software, including downloads for processors, had been restricted since February 25, 2022, due to geopolitical circumstances impacting the company's operations in Russia. The lifting of restrictions underscores the complexities faced by multinational corporations navigating international sanctions and their obligations to stakeholders in various regions.

By reopening access to its software platform, Intel addresses the needs of Russian customers, including individuals and businesses reliant on Intel technology for their computing needs. This move reflects Intel's efforts to manage compliance with international sanctions while ensuring continued service provision to global markets. As geopolitical dynamics evolve, such decisions by multinational corporations are pivotal in balancing regulatory requirements and operational continuity across diverse geopolitical landscapes.

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**Page:** 30

**Title:** INTEL REORGANIZES AXG GRAPHICS ACCELERATOR DIVISION

**Questions:**

1. What are the features of reorganization within Intel?

Intel's reorganization involves restructuring its department of graphic accelerators, Accelerated Computing Systems and Graphics (AXG), into two distinct groups. One group will focus on gaming graphics accelerators, while the other will concentrate on technologies for data centers. This move aims to streamline operations and enhance focus within these specific areas. Additionally, AXG Executive Vice President Raja Koduri will resume his role as Intel's Chief Graphics Architect, underscoring Intel's commitment to advancing its capabilities in accelerated computing to compete with industry leaders like Nvidia and AMD.

2. What was the reason for the reorganization?

The primary reason behind Intel's reorganization is to bolster its position in accelerated computing, a critical sector seeing significant growth driven by the increasing demand for AI applications. By splitting AXG into dedicated gaming and data center technology groups, Intel aims to optimize its efforts and better address the distinct needs of these markets. This strategic realignment is part of Intel's broader strategy to strengthen its competitive edge and expand its market presence in the GPU segment.

3. How may the reorganization affect the labor market?

The reorganization could potentially impact Intel's labor market in several ways. Firstly, it may lead to restructuring within the affected departments as roles and responsibilities are realigned under the new gaming and data center groups. This could involve reassignments or adjustments in staffing to match the strategic priorities of each division. Secondly, the focus on accelerated computing could create new job opportunities in areas such as GPU development, AI technologies, and data center solutions, as Intel aims to innovate and expand its product offerings in these high-growth segments. Overall, while there may be some internal adjustments, the reorganization also signals Intel's commitment to investing in talent and capabilities that are pivotal for its future growth and competitiveness in the GPU market.

**My question and answer:**

**Question:** What recent reorganization has Intel announced regarding its graphics accelerator department?

**Answer:** Intel recently announced the reorganization of its graphics accelerator department, Accelerated Computing Systems and Graphics (AXG). The department will now be split into two groups: one focusing on gaming graphics accelerators and the other on technologies for data centers. These groups will integrate into two other divisions within Intel, with AXG's Executive Vice President, Raja Koduri, reassuming the role of Intel's Chief Graphics Architect.

**Comment:**

Intel's decision to restructure its Accelerated Computing Systems and Graphics (AXG) department marks a strategic move aimed at bolstering its position in the competitive GPU market. By dividing AXG into separate units dedicated to gaming graphics and data center technologies, Intel aims to enhance its focus on accelerating computing capabilities, which have become increasingly crucial amid rising demand for AI-driven applications.

The return of Raja Koduri as Intel's Chief Graphics Architect underscores the company's commitment to expanding its footprint in graphics processing, traditionally dominated by Nvidia and AMD. This reorganization is expected to streamline operations and strengthen Intel's competitive edge in both consumer and enterprise markets. As Intel continues to innovate in GPU technology, these structural changes signal its determination to play a pivotal role in shaping the future of accelerated computing.

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**Page:** 31

**Title:** EXPLORING THE NEW NET MULTI-PLATFORM

**Questions:**

1. What is the intended use of the .NET platform?

The .NET platform, including .NET MAUI (Multi-platform App UI), aims to facilitate the development of multi-platform applications. It provides developers with tools and frameworks to write code once and deploy it across different operating systems like Windows, macOS, iOS, and Android. By offering a unified development environment, .NET enables efficient cross-platform app development while leveraging native APIs for each platform.

2. What remains to be the focal point in operating advanced SDK Style project tooling?

In the context of .NET MAUI, the focal point in operating advanced SDK Style project tooling revolves around enhancing developer productivity and efficiency. This includes providing faster algorithms, advanced compilers, and streamlined SDK-style project structures. These tools are designed to simplify the development process, ensuring that developers can focus more on building innovative features and less on managing platform-specific intricacies.

3. Do you think the developers could continue to work on .NET 6, and have Core, iOS, and Android projects while using Xamarin Native directly and ignoring MAUI?

Yes, developers have the flexibility to continue working with .NET 6 and manage Core, iOS, and Android projects using Xamarin Native directly, without adopting .NET MAUI. Xamarin Native allows developers to create native platform-specific applications with full control over the codebase and UI/UX design. This approach might be preferred in scenarios where developers prioritize fine-tuning UI for specific platforms or have existing Xamarin projects that they prefer not to migrate to .NET MAUI immediately. However, .NET MAUI offers advantages in terms of code sharing, unified project structure, and modern UI development, making it a compelling choice for new cross-platform app development projects aiming for code efficiency and easier maintenance across multiple platforms.

**My question and answer:**

**Question:** What role does .NET MAUI play in Microsoft's efforts to unify the .NET platform, and what are its key features?

**Answer: .**NET MAUI (Multi-platform App UI) is pivotal in Microsoft's initiative to consolidate the .NET platform. It enables developers to access native APIs across modern operating systems through a single codebase, facilitating the creation of multi-platform applications. .NET MAUI simplifies project management by supporting diverse source code files and resources tailored to different platforms, ensuring flexibility without sacrificing efficiency. Key features include support for XAML, Model-View-ViewModel (MVVM), and Model-View-Update (MVU) patterns, alongside tools like 'Try-N-Convert' for seamless app migration. Moreover, .NET MAUI prioritizes performance enhancements with faster algorithms, advanced compilers, and an improved SDK-style project tooling experience.

**Comment:**

Microsoft's commitment to unifying the .NET platform with .NET MAUI underscores its strategic focus on empowering developers with versatile tools for multi-platform application development. By integrating native API accessibility across various OS environments, .NET MAUI streamlines development workflows, allowing teams to maintain a single codebase while optimizing deployment efficiency. The framework's support for popular UI design patterns and migration tools reflects Microsoft's efforts to enhance developer productivity and application performance. As .NET MAUI evolves, its comprehensive feature set is poised to shape the future of cross-platform development, catering to diverse application needs and fostering innovation in the developer community.

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**Page:** 32

**Title:** SIMPLE AND RELIABLE

**Questions:**

1. What have Krasnoyarsk scientists produced?

Krasnoyarsk scientists have developed a new method for synthesizing two-dimensional sulfide-hydroxide materials based on the mineral structure of wallerite. This breakthrough allows for the creation of versatile materials with customizable properties suitable for various applications.

2. What are the characteristics of 2D material?

Two-dimensional materials, such as those synthesized from wallerite, typically exhibit properties like high surface area, flexibility, and unique electronic and optical characteristics due to their atomic-scale thickness. These properties make them promising for applications in electronics, catalysis, and energy storage.

3. How did the scientists adjust the physical and chemical properties of the composites they obtained?

The scientists adjusted the physical and chemical properties of the composites by varying the composition during the synthesis process. By carefully controlling the materials' composition, they could tailor characteristics such as conductivity, bandgap, and chemical reactivity to meet specific application requirements. This versatility makes wallerite-based materials a platform for creating multifunctional materials with adjustable properties.

4. Why is it a breakthrough in science?

This discovery is a significant breakthrough for Russian science because it introduces a straightforward and reliable method for synthesizing advanced 2D materials. The ability to control material properties at the atomic scale opens up new possibilities for developing next-generation technologies across various fields. Moreover, the publication of their findings in the Journal of Materials Chemistry underscores the scientific rigor and potential impact of their work on advancing materials science globally.

**My question and answer:**

**Question:** What recent breakthrough has been achieved by Krasnoyarsk scientists, and how does it impact materials science?

**Answer:** Krasnoyarsk scientists have achieved a significant breakthrough by developing a straightforward method for synthesizing new two-dimensional sulfide-hydroxide materials based on the mineral structure of valleriite. By modifying the composition of these composites, they can tailor their physical and chemical properties for specific applications, thus establishing valleriite as a versatile platform for creating customizable multifunctional materials. The study detailing this innovation has been published in the Journal of Materials Chemistry.

**Comment:**

The breakthrough achieved by Krasnoyarsk scientists in synthesizing two-dimensional sulfide-hydroxide materials from valleriite marks a pivotal advancement in materials science. This methodical approach not only simplifies the synthesis process but also allows for precise adjustments in material properties, catering to diverse industrial and scientific applications. By leveraging valleriite's structure, researchers have opened new avenues for developing multifunctional materials with adaptable characteristics, potentially impacting fields ranging from electronics to environmental remediation.

Published in a prestigious scientific journal, this research underscores Russia's growing influence in materials science and its commitment to innovation. The ability to fine-tune material properties according to specific needs enhances the feasibility of integrating these materials into various technologies, promising further advancements and applications in the global scientific community.

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**Page:** 33

**Title:** HABITABLE WORLDS OBSERVATORY FOR ROBOTIC SERVICING

**Questions:**

1. What is the Habitable Worlds Observatory (HWO) and what is its goal?

The Habitable Worlds Observatory (HWO) is a proposed successor to the James Webb Space Telescope (JWST). Its primary goal is to search for signs of life on Earth-like exoplanets. Planned to be a 6.5-meter optical telescope, it will be positioned at the Earth-Sun L2 Lagrange point, approximately 1.5 million kilometers away from Earth. This location offers a stable gravitational environment and minimal interference from Earth's atmosphere, ideal for precise astronomical observations.

2. How does the HWO differ from the JWST?

Unlike the JWST, which primarily operates in the infrared spectrum, the HWO will be an optical telescope. This means it will observe light in the visible spectrum, which is suitable for detailed analysis of exoplanet atmospheres and potentially detecting signs of life through biosignatures such as oxygen, methane, and other chemicals indicative of biological processes. Additionally, the HWO is designed for robotic servicing and upgrades, enhancing its longevity and adaptability over time.

3. What is the current status of the HWO's design and technology development?

As of now, the Habitable Worlds Observatory (HWO) is in its conceptual stage. While NASA's astrophysics division director, Mark Clampin, has discussed preliminary plans and goals for the telescope, specific details about its design and technological specifications are still under development. The project lacks a dedicated budget at this stage, which limits progress on detailed design and technological advancements needed for such a complex space telescope. However, the concept shows promise for advancing our understanding of potentially habitable exoplanets and the search for extraterrestrial life in the coming decades.

**My question and answer:**

**Question:** What exciting new development has NASA unveiled at the recent American Astronomical Society meeting, and what are its implications for future space exploration?

**Answer:** NASA has revealed plans for a successor to the James Webb Space Telescope (JWST) at a recent American Astronomical Society meeting. This new optical telescope, tentatively named the Habitable Worlds Observatory (HWO), aims to match JWST's size and capabilities while focusing on detecting signs of life on Earth-like planets by the early 2040s. Unlike JWST, the HWO will be stationed at L2, a gravitational balance point 1.5 million kilometers from Earth, designed for robotic servicing and upgrades to potentially extend its operational lifespan.

**Comment:**

NASA's announcement of the Habitable Worlds Observatory (HWO) represents a significant leap forward in space exploration capabilities. Building on the success of the JWST, the HWO's focus on detecting signs of life on exoplanets underscores NASA's commitment to expanding our understanding of potentially habitable worlds beyond our solar system. The telescope's advanced design for robotic servicing and upgrades promises longevity and adaptability, essential for sustained exploration and discovery in the coming decades.

By planning the HWO to operate at L2, NASA ensures optimal conditions for observing distant celestial bodies with minimal interference from Earth's atmosphere and other sources of noise. This strategic positioning, combined with its ambitious scientific goals, positions the HWO as a pivotal tool in humanity's quest to explore and potentially understand the prevalence of life in the universe. As NASA continues to refine the telescope's design and secure funding, the scientific community eagerly anticipates the groundbreaking discoveries that the HWO could unveil in the search for habitable exoplanets.

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**Page:** 34-35

**Title:** NEURAL NETWORK ARTWORK

**Questions:**

1. Is the article summarizing or evaluating the issue?

The article is primarily summarizing the advancements and capabilities of neural networks in artwork creation. It highlights the evolution and features of neural networks like Artbreeder, StyleGAN, and Topaz Gigapixel AI, focusing on how these technologies have progressed in generating art and enhancing image quality. While it touches on concerns about their impact on traditional artists, the article leans more towards summarizing the technological advancements rather than evaluating their broader societal implications in depth.

2. What are some of the motives behind updating neural networks to do artwork?

Several motives drive the continuous updates and improvements of neural networks for artwork:

- Enhanced Capabilities: Updates aim to expand the range of artistic styles, details, and features that neural networks can reproduce, making them more versatile tools for creative expression.

- Quality Improvement: Advances focus on improving the fidelity and realism of generated images, making them suitable for professional and commercial applications.

- User-Friendliness: Updates often include improvements in user interfaces and functionalities, making these tools more accessible and easier to use for artists and creators.

- Market Demand: There's a growing demand for automated tools that can quickly generate high-quality artwork or enhance existing images, catering to industries such as advertising, entertainment, and digital art.

3. Will the neural network be able to replace artists?

The potential for neural networks to replace artists entirely is unlikely in the foreseeable future. While these tools are adept at generating art and improving images, they currently lack the creativity, intuition, and emotional depth that human artists bring to their work. Neural networks excel at replicating existing styles and generating variations based on input parameters, but they do not possess the imaginative and conceptual abilities that drive original artistic expression. Instead, these technologies are more likely to complement artists by offering new tools for exploration, experimentation, and efficiency in certain aspects of the creative process. Therefore, while neural networks are transformative in the realm of digital art and image enhancement, they are not poised to replace the unique contributions of human artists.

**My question and answer:**

**Question**: What specific problems were addressed by the recent update of Artbreeder, StyleGAN, and Topaz Gigapixel AI neural networks?

**Answer**: The recent update of these neural networks addressed issues related to enhancing their capabilities, improving the quality and detail of generated art, and introducing new features such as concept art creation and emotion manipulation.

**Comment:**

Absolutely, the recent update to Artbreeder, StyleGAN, and Topaz Gigapixel AI neural networks marks a significant leap forward in digital artistry. It's not just about fixing glitches or enhancing performance; it's about unlocking new realms of creative expression. These updates introduce exciting features like concept art creation and emotion manipulation, pushing the boundaries of what's possible in digital art. In fact, they're revolutionizing the way artists approach their craft.

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**Page:** 36

**Title:** QUANTUM INFORMATION FOR ADVANCED TECHNOLOGIES

**Questions:**

1. What observations did Bell make?

In the 1960s, John Stewart Bell proposed a theoretical framework to test the nature of quantum entanglement. He formulated Bell's inequalities, which are mathematical expressions defining limits on correlations between entangled particles if they were to follow local hidden variable theories. Bell's work aimed to distinguish between classical and quantum mechanics by testing these inequalities experimentally.

2. How were they upgraded?

In 2020, scientists modernized Bell's observations by conducting a series of sophisticated experiments to test Bell's inequalities extensively. These experiments involved entangled quantum states, where pairs of particles exhibit correlated behavior regardless of the distance separating them. The upgraded experiments involved advanced quantum information techniques to precisely measure and verify violations of Bell's inequalities, confirming the unique quantum nature of entanglement.

3. How long did it take to come up with the result?

The process to achieve conclusive results involved significant technological advancements and meticulous experimental design over decades. From Bell's initial theoretical work in the 1960s to the modern experiments in 2020, it took approximately 60 years of theoretical refinement, technological progress in quantum information science, and extensive experimental validation to demonstrate violations of Bell's inequalities with high accuracy. This timeline underscores the complexity and persistence required to unlock the potential of quantum information and phenomena like quantum entanglement for practical applications in technology.

**My question and answer:**

**Question:** What recent breakthrough has been achieved in quantum physics, and what are its implications for technology?

**Answer:** Scientists have achieved a groundbreaking feat in quantum physics by conducting experiments demonstrating entangled quantum states, where particles behave as a single unit despite physical separation. These results pave the way for new technologies based on quantum information, marking a significant advancement since John Stewart Bell's initial work in the 1960s.

**Comment:**

The recent breakthrough in quantum physics, showcasing entangled quantum states, represents a pivotal advancement with profound implications for technology. By validating Bell's theoretical framework through extensive experiments, scientists have not only confirmed the existence of quantum entanglement but also demonstrated phenomena like "quantum teleportation". Exactly in fact, this breakthrough fuels the development of quantum information technologies, promising innovations in secure communication, supercomputing, and precision sensing.

The ability to manipulate entangled particles, maintaining instantaneous correlation regardless of distance, challenges conventional notions of information transfer and opens doors to previously unimaginable applications. This achievement underscores the ongoing evolution of quantum mechanics from theory to practical implementation, marking a transformative era in scientific exploration and technological advancement. As researchers continue to delve deeper into quantum phenomena, the potential for groundbreaking discoveries and revolutionary technologies remains vast, positioning quantum physics at the forefront of 21st-century scientific innovation.

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**Page:** 37

**Title:** ULTRA-COMPACT HIGH-SPEED POWER BANK

**Questions:**

1. Is the article summarizing or evaluating the charger?

The article is primarily evaluating the charger. It highlights its unique features such as being ultra-compact, yet powerful, and how it has been well-received by Amazon shoppers based on positive reviews. The focus is on promoting its small size, high capacity, and compatibility with various devices like smartphones and tablets.

2. What special words are used to express positive points?

The article uses words like "unique", "ultra-compact", "amazingly powerful" and "best-selling" to express positive points about the portable charger. These words emphasize its standout features and popularity among users.

3. What other tiny devices accompany our life from day to day?

Other tiny devices that accompany our daily lives include:

- Bluetooth earbuds or wireless headphones

- Fitness trackers or smartwatches

- Portable Bluetooth speakers

- USB flash drives or external SSDs

- Miniature digital cameras or action cams

These devices are compact yet offer significant utility in various aspects of modern living, from communication and entertainment to health monitoring and data storage.

**My question and answer:**

**Question:** What unique features distinguish the "ultra-compact high-speed T-Core power supply" recently introduced on the market?

**Answer:** The "ultra-compact high-speed T-Core power supply" stands out for its remarkably small size, comparable to a bank card, yet it delivers powerful performance suitable for smartphones, tablets, and other devices. Despite its compact dimensions, it has garnered positive reviews for its efficiency and compatibility.

**Comment:**

The introduction of the "ultra-compact high-speed T-Core power supply" represents a significant advancement in portable charging technology. Its compact size, akin to a bank card, belies its robust power capabilities, making it an ideal companion for mobile devices. The positive reception among Amazon shoppers underscores its appeal and reliability, highlighting a growing demand for portable chargers that balance size with performance. That's a good point, as consumer expectations for convenience and power efficiency evolve, innovations like the T-Core power supply set new benchmarks in the portable charger market, catering to modern lifestyle needs with style and functionality.

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**Page:** 38

**Title:** SPRITES IN THE SKY

**Questions:**

1. What are sprites and how do they differ from ordinary lightning?

Sprites are large-scale electrical discharges that occur high above thunderstorms, typically between 50 to 130 kilometers in altitude. They differ from ordinary lightning, which occurs closer to the ground (typically up to 16 kilometers). Sprites are much larger in size, reaching up to 60 kilometers in length and 100 kilometers in diameter. They also appear shortly after strong lightning strikes and last for less than 100 milliseconds. Unlike regular lightning, sprites propagate both upwards and downwards simultaneously, with the downward motion being more pronounced and faster.

2. How can sprites be mistaken for unidentified flying objects (UFOs)?

Sprites can be mistaken for UFOs due to their unusual appearance and location high above thunderstorms. They exhibit shapes and movements that might appear unfamiliar to observers, such as dancing motions or circular arrangements. Moreover, their brief duration and occurrence in groups can lead to confusion or misinterpretation by witnesses who are unfamiliar with atmospheric phenomena.

3. What causes them to occur?

Sprites are caused by specific types of lightning discharges known as positive cloud-to-ground lightning or intracloud lightning. These lightning events create an intense electrical field above thunderstorms, which ionizes the upper atmosphere and leads to the formation of sprites. The exact mechanisms triggering sprites are still under study, but they are associated with the interaction of lightning-induced electric fields and the conductivity of the upper atmosphere.

**My question and answer:**

**Question**: What distinguishes sprites from ordinary lightning and how do they form?

**Answer**: Sprites differ from ordinary lightning in their altitude, size, and appearance. They form following very strong lightning strikes, typically appearing tenths of a second after the lightning discharge. The electrical field created by lightning in the space above it triggers the formation of sprites, resulting in a uniquely shaped flash of light in the atmosphere. **Comment:**

Absolutely fascinating! Introducing sprites, these enigmatic atmospheric phenomena, sheds light on the intricate dynamics of thunderstorms. You know what I mean? Sprites, unlike ordinary lightning, occur at astonishing altitudes ranging from 50 to 130 kilometers, with lengths reaching up to 60 kilometers and diameters up to 100 kilometers. Actually, their formation, mere tenths of a second after powerful lightning strikes, remains a captivating mystery. It seems like unraveling the mechanisms behind sprites could revolutionize our understanding of atmospheric electricity. In fact, exploring this correlation promises to unveil new frontiers in atmospheric science.

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**Page:** 39

**Title:** NANOBOTS IN SERVICE WITH MEDICINE

**Questions:**

1. Is the text summarising or evaluating the issue?

The text is primarily summarizing the application of nanobots in cancer treatment. It discusses how scientists have tested nanobots to target and inhibit cancerous tumors by delivering specific drugs through the bloodstream. The focus is on describing the process and outcomes of the research.

2. What is the purpose of nanobots application in this case?

The purpose of applying nanobots in cancer treatment is to precisely target cancerous tumors within the body. Nanobots are designed to navigate through the bloodstream, locate tumor sites, and deliver therapeutic agents directly to the affected areas. In the described case, nanobots were used to deliver blood clotting drugs to cut off the blood supply to tumors, thereby shrinking them and inhibiting their growth.

3. Do you think cancer treatment with nanorobots is a good alternative to chemotherapy?

Nanorobots hold potential as a targeted and potentially less invasive alternative to traditional chemotherapy. Unlike chemotherapy, which affects the entire body and can cause severe side effects due to its systemic nature, nanobots can deliver drugs directly to tumor sites, minimizing damage to healthy tissues. However, the technology is still in experimental stages, and more research is needed to determine its long-term effectiveness and safety compared to established cancer treatments like chemotherapy. It may complement existing treatments rather than completely replace them in the foreseeable future.

**My question and answer:**

**Question:** What potential breakthrough has been reported regarding the application of nanobots in cancer treatment, and how does it work?

**Answer:** Scientists have reported promising results in using nanobots for actively seeking and destroying cancer cells. These nanobots are injected into the bloodstream, where they navigate to cancerous tumors by targeting blood vessels. Once in position, they release drugs that induce blood clotting, effectively cutting off the blood supply to tumors. This approach has shown success in shrinking tumors and inhibiting their spread, as detailed in recent research.

**Comment:**

The development of nanobots for targeted cancer therapy represents a significant stride in medical science, offering a potentially transformative approach to treating cancer. By leveraging nanotechnology, researchers have devised a method where these tiny machines can navigate through the bloodstream and deliver precise treatments directly to tumors. This targeted approach minimizes damage to healthy tissue and enhances the efficacy of treatment.

I don't know if you know, but the successful application of nanobots in inhibiting tumor growth and reducing metastasis highlights their promise as a future tool in cancer therapy. As research continues to refine these technologies, the potential for more effective, less invasive cancer treatments grows, promising new hope for patients and clinicians alike. This innovation underscores the ongoing evolution of medical technology toward personalized and targeted therapies, setting the stage for further advancements in combating complex diseases like cancer.

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**Page:** 40

**Title:** HUMONGOUS TECHNOLOGY

**Questions:**

1. What is the net energy gain?

Net energy gain in the context of nuclear fusion refers to the amount of energy produced by a fusion reaction exceeding the energy input required to initiate and sustain the reaction. Achieving net energy gain is a significant milestone because it indicates that the fusion process can potentially generate more usable energy than it consumes, which is crucial for practical energy production.

2. How does fusion power technology differ from traditional power generation methods in terms of carbon emissions and radioactive waste production?

Fusion power technology differs significantly from traditional methods:

- Carbon Emissions: Fusion reactions produce no carbon emissions. Unlike fossil fuels and even nuclear fission (which produces radioactive waste), fusion reactions involve isotopes of hydrogen (deuterium and tritium) that are abundant and non-polluting.

- Radioactive Waste: Fusion reactions do not produce long-lived radioactive waste. While some activation of materials in the reactor occurs due to neutron bombardment, the radioactive waste generated is short-lived compared to the long-lived waste produced by nuclear fission reactors.

3. What is an essential characteristic of net energy gain?

The essential characteristic of achieving net energy gain in fusion reactions is that the energy output from the fusion process exceeds the energy input required to maintain the reaction. This surplus energy is what makes fusion a potentially sustainable and virtually limitless source of clean energy. It marks a critical step towards developing fusion power as a practical and environmentally friendly alternative to current energy sources.

**My question and answer:**

**Question**: How does achieving net energy gain in nuclear fusion contribute to the development of carbon-free energy sources?

**Answer**: Achieving net energy gain in nuclear fusion contributes significantly to the development of carbon-free energy sources by providing a sustainable and abundant source of energy without emitting carbon dioxide, thereby helping to mitigate climate change and reduce dependence on fossil fuels. This breakthrough opens up possibilities for a cleaner and more environmentally friendly energy future.

**Comment:**

It seems like achieving net energy gain in nuclear fusion is a significant stride towards sustainable energy sources. Actually, this breakthrough offers a promising solution for reducing carbon emissions and tackling climate change. In fact, it opens up exciting prospects for a cleaner and more environmentally friendly energy future. Do you see what I mean? This progress not only addresses the pressing need for carbon-free energy but also diminishes our reliance on fossil fuels. Absolutely, it's a prudent decision to invest in further research and development in this field. If you ask me, nuclear fusion holds immense potential to revolutionize our energy sector for the better.

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**Title:** PROCRASTINATORS MAY DELAY ALL THE WAY TO WORSE HEALTH

**Questions:**

1. What health issues were more likely to be reported by college students who scored high on a procrastination scale?

College students who scored high on a procrastination scale were more likely to report the following health issues nine months later:

- Body aches, particularly upper-body pain.

- Poor sleep quality.

- Symptoms of depression and anxiety.

These issues were more prevalent compared to their peers who did not procrastinate as much.

2. Why might college students be more prone to procrastination?

College students may be more prone to procrastination due to several factors:

- Freedom and lack of structure: College life often provides students with greater freedom and fewer immediate consequences for delaying tasks, such as assignments or studying.

- Distance from deadlines: Deadlines in college are typically more spread out compared to the structured environment of high school, allowing for procrastination tendencies to develop.

- High workload and stress: The pressure of academic workload combined with personal freedom can lead to stress and avoidance behaviors, such as procrastination.

3. What other factors besides procrastination may contribute to the mental and physical symptoms reported by students?

Besides procrastination, other factors that may contribute to the symptoms reported by students include:

- Stress and anxiety: Apart from procrastination itself, the stress and anxiety associated with impending deadlines and academic performance can exacerbate mental health issues.

- Unhealthy lifestyle habits: Poor sleep quality, lack of exercise, and loneliness were also reported more frequently among students with high procrastination scores. These factors can contribute to both physical and mental health problems.

- Pre-existing conditions: Students with pre-existing depression or anxiety may be more prone to procrastination as a coping mechanism, exacerbating their symptoms over time.

Overall, the study highlights the complex interplay between procrastination, stress, and various health outcomes among college students.

**My question and answer:**

**Question:** What health implications are associated with high levels of procrastination among college students, based on recent research?

**Answer:** Recent research indicates that college students with high levels of procrastination are more likely to experience a range of health issues. These include increased prevalence of body aches, poor sleep quality, and symptoms of depression and anxiety nine months later.

**Comment:**

Definitely, the findings from the study conducted by Fred Johansson and his team at Sophiahemmet University shed light on the significant health consequences of procrastination among college students. The lack of structure and distant deadlines characteristic of college life can exacerbate procrastination tendencies, leading to adverse health outcomes over time.

The correlation between procrastination and health issues such as depression, anxiety, and physical discomfort underscores the importance of time management and stress management strategies among students. The study's results emphasize the need for targeted interventions to help students mitigate procrastination habits and promote overall well-being throughout their academic careers.

By addressing procrastination early on and fostering healthier habits, universities and health professionals can potentially improve students' mental health and quality of life, contributing to a more positive and productive collegiate experience. As further research explores the complex relationship between procrastination and health, implementing effective support systems and interventions becomes increasingly crucial in supporting student success and well-being.

The words I used:

The best thing is...; another thing is...; actually...; it seems like...; you know what i mean?; absolutely/definirely/exactly in fact...; i guess/probably/in a way/kind of...; so, “AI” isn’t your thing, is it?; i don’t know if you know, but...; do you think...?; i know what you mean, but...; if you ask me...; that’s good point; i mean; it’s a sound perspective; do you mean...?

**REVISE AND CHECK**

**I. Test** (20 points)

**Choose the correct answer. Only one answer is correct.**

1. Which of the following is likely to be a correct completion of the statement?

You are recommended to always fact-check news sources because

a. similar studies often have similar conclusions

b. the information varies greatly and incrementally.

**c. sometimes news reporters overgeneralize and embellish about the subject.**

d. you have to determine the number of people involved in the event

2. Which of the value types does the following news belong to?

Tyra Banks completed a management program at Harvard's School of Business in 2012.

a. Impact

**b. Prominence**

c. Novelty

d. All the answers are correct

3. Which of the value types does the following news belong to?

A weatherman is able to correctly pronounce the extremely long anime of a Welsh village.

a. Impact

b. Prominence

**c. Novelty**

d. All the answers are correct

4. Which of the value types does the following news belong to?

The United Kingdom's vote to exit the European Union in June 2016 had global implications due to the projected effects for economy and citizens

**a. Impact**

b. Prominence

c. Novelty

d. All the answers are correct

5. Complete the following:

A profile of an athlete or a political figure is an example of a

a. an editorial

b. straight news

**c. a feature article**

d. All the answers are correct

6.Is the following statement *true* or *false*?

Soft news is a feature story that does not focus merely on the basic facts. *(true)*

7. What is the purpose of the research conducted by the team who have received a grant from the National Science Foundation.?

**a) To discover whether jellyfish use the same aspects of their genetic toolkit to build eyes every time they evolve**

b) To determine how jellyfish eyes evolved separately and independently in different species

c) To construct a more detailed phylogenetic tree of jellyfish

d) All of the above

8. What is the main focus of the research conducted by a university on the other side of the Atlantic?

a) Developing a chip with artificial intelligence for hard drives

b) Optimizing storage and reading on hard drives using machine learning

c) Reducing latency of data access on hard drives

**d) All of the above**

9. Who funded the work in the laboratory of Carnegie Mellon University?

a) VLSI Symposium stakeholders

b) Data Storage Systems Center and its industrial sponsors

**c) Carnegie Mellon University**

d) The team of researchers themselves

10. What health issues are related to college students who scored high on the procrastination scale in the study?

a) Headaches and stomachaches

**b) Body aches, poor sleep, and depression and anxiety symptoms**

c) Fatigue and lack of motivation

d) None of the above

11. What might contribute to the health issues experienced by college students who procrastinate?

**a) Lack of structure in their lives and distant deadlines**

b) Excessive workload and academic pressure

c) Poor time management skills

d) Lack of social support from peers

12. According to the research, what might be the cause of the health issues experienced by students who procrastinate?

a) Lack of motivation and discipline

**b) Persistent stress and worry associated with procrastination**

c) Poor time management skills

d) Lack of support from friends and family

13. What is the altitude at which sprites appear?

a) 16 kilometers

**b) 50 to 130 kilometers**

c) 100 kilometers

d) 60 kilometers

14. How long do sprites typically last?

a) Several seconds

b) Several minutes

**c) Less than 100 milliseconds**

d) Up to 1 second

15. What can sprites be misjudged for?

**a) Unidentified flying objects (UFOs)**

b) Shooting stars

c) Satellites

d) Cloud formations

16. What is the main benefit of the diesel fuel developed by Tomsk Polytechnic University specialists?

**a) It is resistant to freezing at extremely low temperatures**

b) It is inexpensive

c) It can be produced in remote northern settlements

d) It can be used for both transport and energy purposes

17. What is the catalyst used in the process of obtaining Arctic diesel fuels?

a) Russian catalyst

b) Foreign catalyst

**c) Zeolite catalyst**

d) Straight-run diesel fractions

18. What is the main benefit of the neural network used in the art industry?

**a) It can increase the quality of photos**

b) It can mix the stylistics of two paintings

c) It can create high-quality portraits

d) It can create landscapes with brush strokes

19. Which neural network is primarily used for creating landscapes?

a) Artbreeder

**b) StyleGAN**

c) Topaz Gigapixel AI

d) None of the above

20. What is the purpose of Topaz Gigapixel AI?

**a) To increase the quality of photos**

b) To mix the stylistics of two paintings

c) To create landscapes with brush strokes

d) To create high-quality portraits

**II.**

**Answer the following questions** (20 points):  
1. What is wrong with common hard drives?

Common hard drives often suffer from inefficiencies in data storage and retrieval, leading to issues such as high latency, especially when accessing data stored in the cloud. However, developments like the neural network chip from Carnegie Mellon University aim to optimize storage and reading on hard drives using AI, potentially revolutionizing data management by reducing latency and improving performance.

2. What are the advantages and disadvantages of switching to electric vehicles?

Advantages of switching to electric vehicles include reduced air pollution and greenhouse gas emissions, contributing to environmental preservation. However, electric cars often have a limited driving range compared to conventional vehicles, posing a challenge for long-distance travel.

3. How will switching to electric vehicles impact the environment in the long term?

Switching to electric vehicles (EVs) is expected to have both positive and negative environmental impacts in the long term.

Positive impacts:

1. Reduced emissions: EVs produce zero tailpipe emissions, which significantly decreases air pollution in urban areas and improves air quality.

2. Lower greenhouse gas emissions: EVs generally have lower overall greenhouse gas emissions compared to internal combustion engine vehicles, especially when considering the lifecycle emissions.

3. Promotion of renewable energy: Increased demand for EVs can drive investments in renewable energy sources such as solar and wind power, further reducing environmental impact.

Negative impacts:

1. Resource extraction: Production of EV batteries requires significant amounts of raw materials like lithium, cobalt, and nickel, which can lead to environmental degradation and resource depletion.

2. Battery disposal: Proper disposal and recycling of batteries present environmental challenges due to potentially hazardous materials.

3. Energy consumption: The electricity used to charge EVs may come from non-renewable sources in some regions, impacting overall carbon footprint.

In conclusion, while electric vehicles offer substantial environmental benefits such as reduced emissions and improved air quality, addressing challenges related to battery production, disposal, and energy sources will be crucial in realizing their long-term sustainability goals.

4. What is the process for converting heavy n-paraffins into isoparaffins and light n-paraffins in the production of Arctic diesel fuel?

The process for converting heavy n-paraffins into isoparatting and light n-paraffins involves processing straight-run diesel fractions on a zeolite catalyst. This process is key to achieving the low-temperature properties necessary for Arctic diesel fuel, allowing it to remain usable even at extremely low temeratures (- 70 ℃).

5. What changes have been made to improve the situation on the streets of Singapore?

Singapore authorities have introduced two new police robots named Xavier, which have been patrolling the streets for several weeks. These robots are equipped to detect various violations including improperly parked bicycles, smoking in public places, and breaches of COVID protocols.

6. What were the shortcomings of the previous models in predicting the fate of interconnected species of animals and plants threatened by climate change?

Previous models lacked the ability to account for the joint extinction of species that depend on each other. They also did not adequately consider species migration in response to changing environmental conditions. These limitations hindered accurate predictions of how climate change and land use would impact interconnected ecosystems and biodiversity.

7. Why do scientists and Elon Musk, the co-founder of ChatGPT,.consider AI a potential threat to humanity?

Scientists and Elon Musk consider AI a potential threat to humanity due to concerns about its rapid advancement and potential consequences. AI, such as the ChatGPT program from OpenAI, demonstrates impressive capabilities in understanding and generating human-like text based on vast datasets. While AI can be a powerful tool, its rapid evolution raises fears about its impact on society, ethics, and even the potential for unintended consequences if AI systems surpass human control or understanding. Elon Musk has notably warned about the dangers of AI, highlighting concerns that unchecked AI development could pose risks ranging from economic disruption to existential threats. The apprehension stems from the unpredictability of AI's future capabilities and the need for careful consideration of its ethical implications and regulatory frameworks to ensure safe and beneficial deployment.

8. What allowed the Webb telescope to spot a second cloud?

The Webb telescope was able to spot a second cloud in Titan's atmosphere thanks to its ability to observe the universe in infrared light, which penetrates Titan's thick haze, allowing for clearer observations.

9. What do the recent Titan clouds observations confirm in terms of the moon's climate and weather patterns?

The recent observations of clouds on Titan confirm that the moon has seasonal weather patterns similar to Earth's. These observations validate predictions from computer models about Titan's climate, revealing its dynamic atmosphere where methane and ethane form clouds and potentially cause rain. This discovery underscores Titan's unique environment with Earth-like liquid bodies on its surface, providing insights into its complex meteorological processes and seasonal changes.

10. Why is synthetic 2D material made by Krasnoyarsk researchers, a breakthrough in science?

The synthetic 2D material developed by Krasnoyarsk researchers represents a breakthrough due to their creation of a simple and reliable synthesis method for sulfide-hydroxide materials based on the mineral wallerite's structure. This innovation allows for precise adjustment of physical and chemical properties, enabling the development of versatile and customizable materials with broad applications.