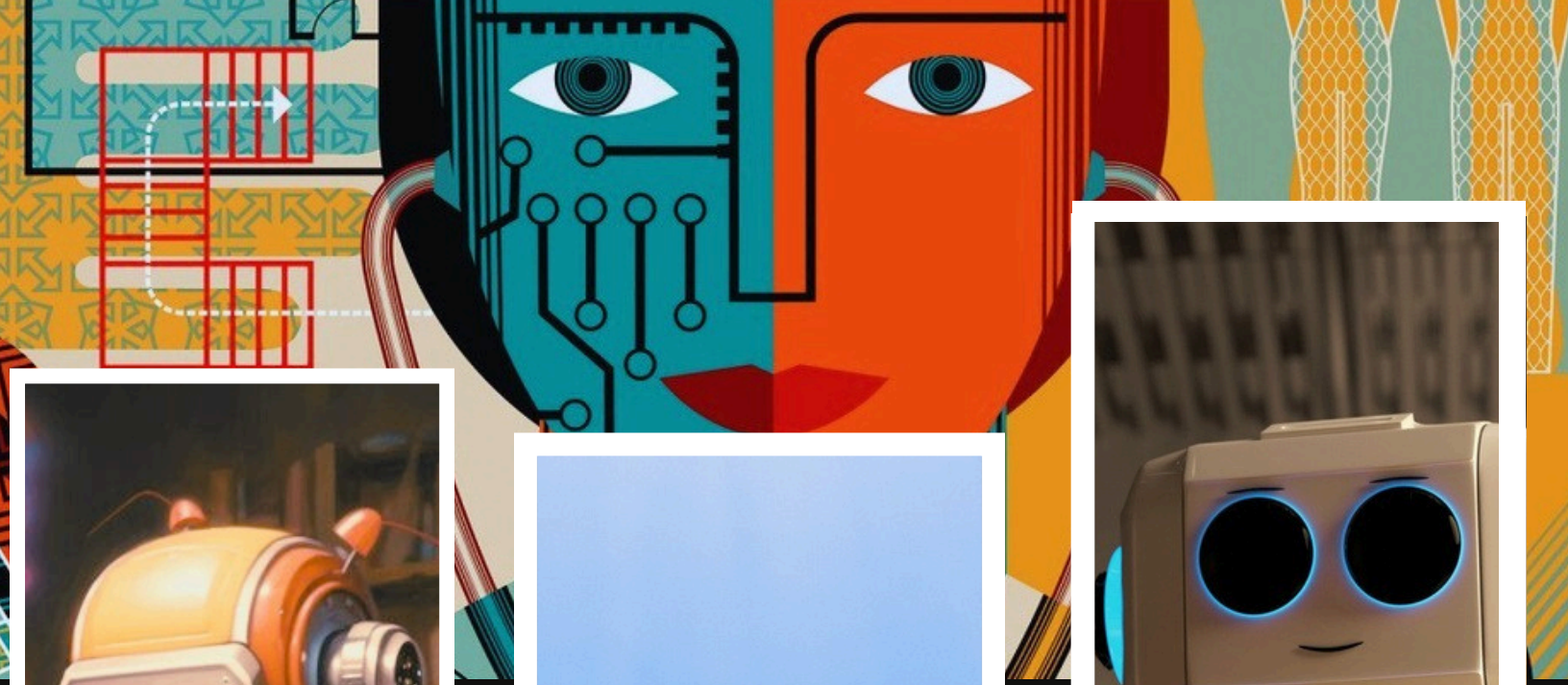

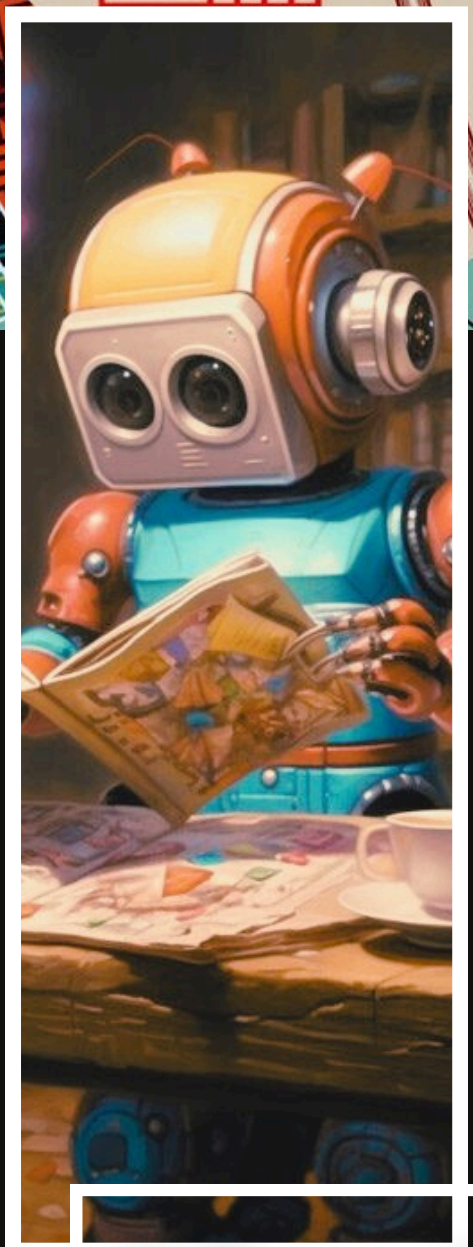

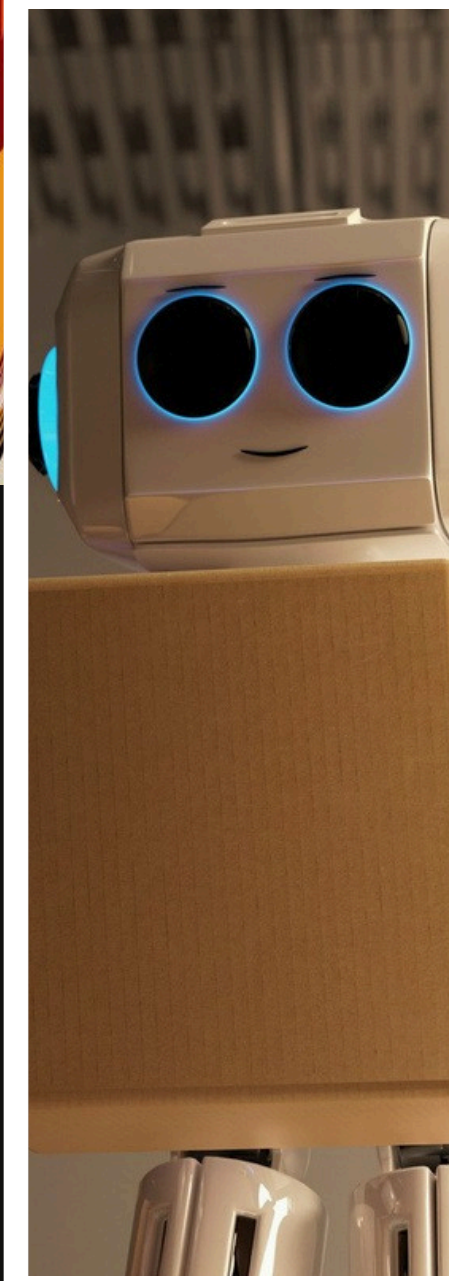

NexTech Nexus

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2024

Disclaimer

Welcome to the inaugural edition of our department's magazine, a platform dedicated to exploring the world of computer science and its profound impact on modern technology. Curated by the students of the Computer Science And Engineering in (Artificial Intelligence and machine Learning) department, this magazine serves as a reflection of our collective passion for innovation, problem-solving, and technological advancement.

In this issue, we delve into a variety of topics centered around artificial intelligence, data science, software development, and emerging trends in the tech world. Each article is thoughtfully crafted to inspire, inform, and ignite curiosity among readers—whether they are seasoned professionals, aspiring technologists, or anyone with a keen interest in the digital revolution.

Our goal with this magazine is to foster a culture of knowledge sharing and to highlight the groundbreaking ideas emerging from our department. We hope that this edition serves as a stepping stone for greater conversations, innovations, and collaborations in the future.

Thank you for being a part of this journey. We are excited to see what lies ahead!

Principal: Dr.Arun Kumar
HOD: Prof. Karishma Raut
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Chief Editor: Anand Rajendra Makasare
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Tel:0250- 7770002544

“INNOVATION THRIVES WHERE CURIOSITY MEETS DEDICATION”.

Dr. Arun Kumar Principal,
VIVA Institute of Technology

DEAR READERS,

It gives me immense pride to witness our students taking the initiative to create this enlightening magazine, focusing on the rapidly advancing fields of computer science and artificial intelligence. These domains are not only revolutionizing industries but also reshaping the future of society. At , VIVA Institute of Technology, we believe that education is not just about acquiring knowledge, but also about fostering curiosity and critical thinking.

Prof. Karishma Raut
HOD, CSE(AI&ML)

It gives me great pride to witness the efforts of our students in creating this magazine, showcasing their knowledge and passion for computer science. This publication reflects the hard work, creativity, and dedication that our department consistently strives to foster. While this edition primarily emphasizes the advancements and applications of computer science, it is important to remember that our field is broad, ever-evolving, and full of opportunities for innovation in numerous areas.

I commend our students for their initiative, and I encourage them to continue exploring the vast possibilities that computer science offers. Their commitment to learning and innovation will undoubtedly shape the future of technology.

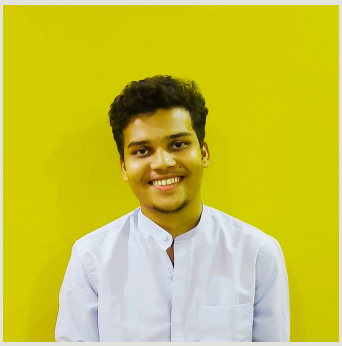
Dr.Kiran Jadhao

Mentor

I am truly honored to mentor such a brilliant group of students who have taken the initiative to create this magazine. Their commitment to exploring the cutting-edge concepts of computer science and sharing that knowledge with the academic community is commendable. This publication serves as a platform for showcasing their ideas, creativity, and problem-solving abilities.

As a mentor, it is always inspiring to witness how each student brings a unique perspective to the ever-growing field of technology. I encourage them to keep pushing boundaries, stay curious, and embrace the challenges that lie ahead. I believe this magazine is just the beginning of many great accomplishments yet to come.

INTRODUCTION OF OUR TEAM



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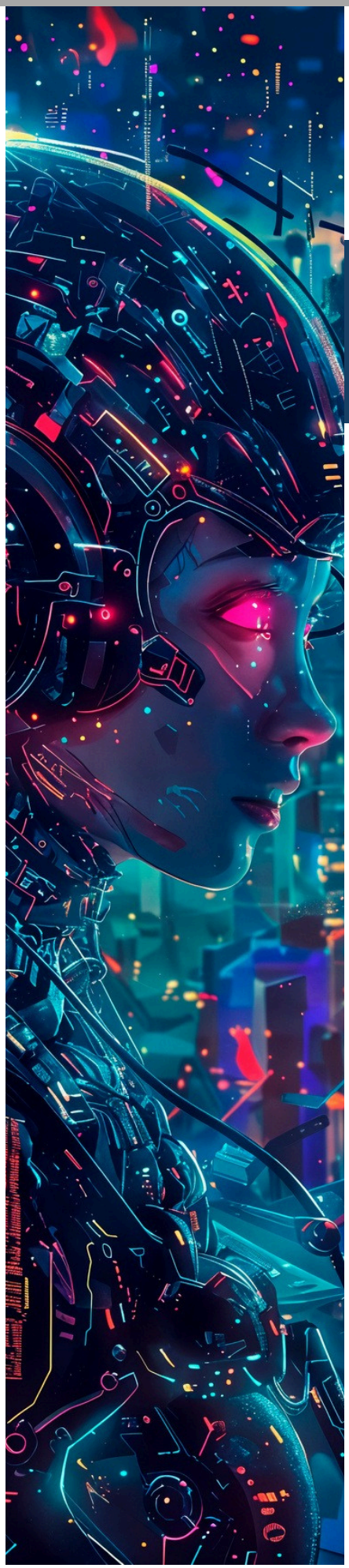


Q* : A NEW ERA DAWNS

Authors - Anand Rajendra Makasare , Mayank Padwal

INTRODUCTION:

Among the many unprecedented developments that are being done in artificial intelligence, there is one: Q*, an open-source project with huge disruption potential in AI-generated video. Q* is part of a greater initiative called Open-Sora. The ultimate goal was to take advanced video generation technology from its current ivory tower status and give it to the world's researchers, developers, and content creators. This article will expound on the possibilities that Q* offers in general, its core technology, and some very interesting implications for the future.

Understanding Q and Open-Sora:*

Q* is the open-source counterpart of OpenAI's Sora, developed by Colossal-AI. Sora represents a very advanced model in text-to-video generation that generates videos of quality from textual descriptions, extends given videos, or creates videos from still images. The access to Sora, however, is restricted, hence, not very mush available to more research and development groups. Open-Sora fills this missing link to provide similar architecture while bringing down training costs and makes it more accessible.

Key Features and Advances: The main points that come out of Q* are related to efficiency. Advanced optimization techniques including sequence parallelism and hybrid parallelism leverage the model to full effect in achieving a cost reduction of up to 46% against Sora in attaining faster training speeds without loss of quality and handling longer video sequences.

It Underpins Dynamic Resolution: Q* does support dynamic resolution—users can generate videos of arbitrary resolution without the need to scale them. This comes with multiple structures of models currently fitted into place: an adaptive layer normalization, cross-attention mechanisms, in-context conditioning, among other capabilities that ensure Q* generates high-quality video efficiently at a very low cost.

TRAINING AND DEVELOPMENT PIPELINE

Q* has a multistage development pipeline for training. This first stage is related to large-scale image pre-training using a pre-trained text-to-image model. This stage makes maximum use of abundant image data available on the internet to set a very strong foundation for successive phases of training.
The second stage involves large-scale video pre-training for enhancing the understanding of the model with regard to the temporal relationships in videos. It is obvious that Q* will capture the subtleties of the content in high-quality output since a temporal sequence attention module será added.

The last stage is fine-tuning using high-quality video data. This stage involves the high-resolution and high-fidelity video data refining on the model to produce videos that are not only pleasing to the eye but with very highly accurate content representations. It is by this staged approach that very impressive results from Q* are accomplished at relatively low computational costs, hence making it more amenable to a broader range of audiences.

APPLICATIONS AND IMPACT

The applications of Q* are potentially huge and diverse. AI-generated video can make a big difference in the entertainment industry when it comes to the making of movies, animations, and games—to name a few—with endless opportunities for new ways of storytelling and visual effects. Q* will help marketers quickly and easily create compelling marketing content in the advertising field.
The applications of Q* extend far beyond these industries to education, healthcare, and scientific research. For instance, high-quality video tutorials and demonstrations can improve educational content for a learner. Respectively, AI-generated videos can be used in medical training or even patient education in a health sector to provide clear and accurate visual depiction of procedures or concepts which otherwise are too complicated to explain.

It will also support creative domains like art and design, allowing artists and designers to experiment in new ways of visual expressions. Empowering users with high video generation technologies at an affordable price fuels Q*'s innovation and collaboration to explore what comes next in both AI and video production.

CONCLUSION

Q* is progressing far ahead in the domain of AI-generated video. Q* and the Open-Sora initiative are going to change a lot of industries —entertainment, advertisement, education, and health—just by democratizing access to really state-of-the-art technology. And now, as we stand in front of this new epoch, opportunities through innovative and artistic expression are endless. Q* doesn't mean progress in technology but is going to be a tool that enables people to reimagine and reshape the future of video content creation. With Q*, the dawn of a new era in AI-generated video is here, promising a future where the lines between human creativity and artificial intelligence blur, leading to unprecedented possibilities and advancements.
This paper unwraps the complexities of Q* and its numerous applications in hope of laying asphalt on which the truly revolutionary technologies bear far-reaching implications. AI evolving initiatives like Open-Sora and Q* are the future of video generation and more.

HALING WITH ALGORITHMS : THE AI HEALTHCARE REVOLUTION

Authors- Mihir Shinde, Alok Singh

INTRODUCTION:

Artificial intelligence in health care is one of the mechanisms changing how we do effects aboutjudgments , treatment, andoperation of conditions. In fact, this metamorphosis would frequently be appertained to as" healing with algorithms," following from the tremendous capabilities of AI realized in the improvement of delivery of health care, enhancement in patient issues, and drop in charges. We'll thus outline how AI is going to change health care, its operations, benefits, challenges, and unborn geography.Rise of AI in HealthcareArtificial intelligence is knitter- made for the complications of health care. It can devour abysses of data and fete patterns that no human could do. numerous factors contributed to this rise of AI in the health sector.

Big Data :- Health- related conditioning come up with huge quantities of data, running into petabytes. It ranges from electronic health records to medical images and genomic data. AI can help process anddissect this vast quantum of data for meaningful perceptivity.

Advancements in Algorithms of Machine Learning:- Sub-domain of Artificial Intelligence, machineliteracy algorithms have evolved over the times and are able of making an accurate vaticination and decision- timber.

Vacuity of important Computing:- High- performance computing possibilities opened for enforcing AIresults in real- time in a clinical setting. operations of AI in Healthcare moment, AI is being applied to all areas of healthcare and changing the way wesuppose about any medical challenge. These include the ensuing areas.

HOW AI SHAPE'S THE MEDICAL SERVICES:

Diagnostics and Imaging – AI algorithms are also proving great for helping diagnose medical images. Forillustration, AI can descry abnormalities inX-rays, MRIs, and CT reviews with a high degree of delicacy, occasionallyfurther than mortal radiologists. Beforehand discovery by AI for cancers or other conditions can prove to be life- saving by way of timely interventions.

Personalized Medicine – This would mean, in the perfect case, treatment targeted towards the individual case with respects to his inheritable makeup, life, andnumerous other colorful factors. AI can dissect inheritable data to prognosticate cases' response to different treatments and subsequently formulate an applicable strategy so that the care plans are more effective andsubstantiated.

Predictive Analytics – AI enhanced prophetic analytics canread patient pitfalls and issues,pressing which case is likely to develop some kind of complaint. For case, using AI, it would be projected that a case has a probability ofgetting diabetic or developing some cardiovascular conditions, hence the chance for preventative measures to be effectuated beforehand enough.

medicine Discovery – piecemeal from that, it enhances this medicine discovery process in the frame ofnatural data analytics andsystems composites most likely to be useful, hence adding the pace of development of new medicines and bringing down costs vastly.

Robotic Surgery – AI driven robotic systems are giving surgeons better delicacy and safety in their surgeries. similar systems arefurnishing real- time feedback, who themselves no waystop covering mortal error, therefore supporting surgeons for better surgical issues.

BENEFITS OF AI IN HEALTHCARE

The relinquishment of AI in healthcare has numerous benefits associated with it, which are as follows:

•**Advanced delicacy** :- AI reduces the liability of mortal error since it contains processing and analysis of data at a advanced and correct speed.

·**Advanced effectiveness**:- Automating routine tasks and processing and analyses of data relieve healthcare professionals to spend further time with cases.

•**Cost Reduction**:- AI can smoothen operations and reduce gratuitous tests and procedures. In that, it optimizes coffers, cutting down on costs to a considerable extent.

•**Early Discovery**:- Informatics identifies conditions at an early stage of illness, therefore offering prospects for successful treatment and perfecting patient issues.Problems in Using Artificial Intelligence in Health Care and Some Ethical enterprises Due to Its Practice

•**Bias and Fairness**:- Since AI algorithms adopt pre- existing impulses in the training data, fairness of issues in healthcare will be affected, and fairness and equitability are areas of topmost concern for AI operations.

CONCLUSION

In this way, the AI result can combine with the heritage DRM healthcare systems only in a veritably complex way, therefore being expensive.Future of AI in Healthcare While continued exploration and development are underway in the working out of current limitations, AI's compass weighs further than its benefits in health. resolvable AI will master some of the ethical enterprises through wrestling AI decision- making into the open process. Continued cooperation on working between experts of AI, health professionals, and statutory agencies assures safe and effective integration of AI into healthcare.Conclusion The AI healthcare revolution, powered by" healing with algorithms," snappily changes the medical geography. opinion, drug, surgery

AI reaches across a broad breadth of operations in healthcare delivery, bettering delicacy, effectiveness, and effectiveness. Of course, challenges would lie on the path, but implicit benefits would be immense in the use of AI in health care where a future could be promised in which technology and mortal moxie combine to watch for cases in the stylish manner. Knowing their power opens the doors to a new drug where algorithms and mortal genius really combine to heal and save lives.

FORTIFYING CYBER DEFENSE WITH ARTIFICIAL INTELLIGENCE

Authors - Mayank Padwal , Riya Khambe

INTRODUCTION

Cybersecurity directly concerns and has quickly grown to be the most paramount concern to individual entities, organizations, and even governments in a primarily digital age. The conventional ways of protection no longer work against cyber threats so sophisticated and fast-changing.

Artificial intelligence is an ultra-modern technology that will bring game-changing and radical roles in a cyber world pre-arranged for defense. The paper investigates how AI strengthens cyber defenses by improving such security features against which modern cybersecurity faces a myriad of threats.

THE MOVING LANDSCAPE OF THREATS

The digital age has brought a lot of connectivity and associated convenience but is also littered with many cyber threats, such as malware, phishing attacks, advanced persistent threats, and ransomware. Their complexity and frequencies are increasing, and traditional mechanisms of cybersecurity are unable to keep pace.

Traditional cybersecurity was much dependent upon signature-based detection, which recognizes known malicious activities based on their digital signature. Obviously, this will not be good enough against zero-day attacks or advanced and previously unknown vulnerabilities and smart APTs which can easily bypass traditional defenses. Hence, there is a need to develop advanced security solutions adaptable to situations.

ARTIFICIAL INTELLIGENCE IN THIS RESPECT

1. Threat Detection and Prevention:

AI can read through enormous amounts of data in search of patterns and anomalies that could indicate a cyber threat. If there have been, machine learning algorithms learn from historical data to make predictions and detect new threats in real-time. That makes for a proactive way to identify previously unknown threats, hence predominantly reducing the window of vulnerability.

2. Behavioral Analysis:

AI continues to monitor and analyze user behavior for any form of detected suspicious activity—an indication of security breach. It allows for the triggering of deviations from a baseline of normal behavior that will raise flags for further investigation. Inspect a method, particularly against insider threats and compromised accounts

3. Automated Response:

At a minimum, AI-powered systems can auto-respond to threats, thus reducing the time of response and hence the window of potential impact of an attack. Examples of automated response include system isolation, blocking malicious traffic, and patching vulnerable systems.

4. Incident Response and Forensics:

It can also serve in incident-response processes by providing the correct analysis of attack vectors, in the case of security incidents, to trace back to the origin of the breach. AI can also defeat forensic investigations by tugging at heaps of data for evidence, tracing, and following cybercriminal activities.

5. Vulnerability Management:

AI can massively help in detecting vulnerabilities of a network and set priorities concerning the vulnerable areas. By estimating the potential risk for every vulnerability, AI ensures that the most critical ones are attended to first so that the best-possible security posture is maintained for any organization.

APPLICATIONS IN THE REAL WORLD

Several industries have already begun harnessing the power of AI in strengthening their cyber defenses:

Financial Services: All financial institutions become the number one target of cybercriminals, even to the level of people's confidential data. AI helps these organizations detect fraudulent activities and maintenance of security of customer information while following all regulatory compliances.

Healthcare sector : It is in the Healthcare sector that AI is getting increasing usage in efforts geared toward protection of the patients' data while at the same time warding off manipulation of the medical records. These systems trace network traffic and can, therefore, detect anomalies, thus protecting critical information from unauthorized access.

Retail: Artificial intelligence in retail protects the information of customers, hence it ensures all transactions online are safe. It detects and restricts many risks involved, including CNP fraud and account takeover.

Government: AI is used by governments to protect themselves against cyber espionage or any other type of attack on their capable infrastructures. An Artificial Intelligence system would analyze the network traffic for any signs of a cyber attack. It would almost react at the speed of light to prevent more damage.

CHALLENGES AND CONSIDERATIONS

While AI has so much to help in improving cybersecurity, it does not come without its challenges. Since the AI systems might treat faultyUmond activities as threatening activities, this might raise a plethora of false positives. This creates an alert fatigue that draws other resources from focusing on real threats, hence requiring constant tuning and refinement of AI models to reduce these false positives.

Adversarial Attacks: Hackers can use adversarial attacks as a method to manipulate the data so that the AI systems do not give any kind of detection. In this case, hardening the AI models against these adversarial attacks has to be of key concern to make them more robust and resilient.

Data Privacy: Since artificial intelligence in cybersecurity is bound to entail large volumes of data, these come with concerns related to data privacy and compliance with regulations – for example, the GDPR and CCPA. These form major aspects of which any institution should ensure conformance of their AI systems to the set standards in securing users' information.

The Future of AI in Cybersecurity

Incomplete work in the integration of artificial intelligence and cybersecurity holds huge potential. If Artificial Intelligence is continuously being developed, maybe more complex and potent security solutions will be developed in the future. Further development may be of:

- Better threat intelligence sharing*: Artificial intelligence can help make threat intelligence sharing across firms easier. It will be a collaborative defense system that improves security for all.
- AI-Driven Security Orchestration:* AI can someday integrate all security tools and processes to work co-ordinately for the development of a unified defense system.
- Human-AI Collaboration:* In the near future, extremely close collaboration can be sought between human experts and AI systems in the domain of cybersecurity. Human intuition and experience, coupled with AI's potential for analysis, can provide a matchless defense against cyber attacks.

CONCLUSION

Artificial intelligence modernizes cybersecurity by choosing from a variety of mechanisms as a way to fight various modern cyber threats. Among these mechanisms, a few have taken roles in improving them all in their effectiveness and efficiency, if not all, from the detection and prevention of threats to automated responses and incident forensics. With technological advancement in AI, its role is thus going to turn very pivotal in enlightening our digital world if people, organizations, and governments are to operate safely in a connected world. AI is therefore directly related to cybersecurity—not some sort of trend, but a requirement before the ever-evolving cyber threats. It is only when we finally open up to AI that there is the possibility of strengthening our defenses towards a digital world more secure for everyone

CAUGHT IN THE NET: THE SOCIAL TRAP

Author - Anand Rajendra Makasare

INTRODUCTION

Social media platforms are an integral part of our daily lives in today's digital era. They provide unrivaled connectivity to connect with friends, share experiences, and get information. Yet, inside these seemingly very useful tools lies the junction of complex, interwoven psychological, social, and ethical issues, locking users in ways perhaps they may not understand. The paper examines the multi-dimensional construct comprising the traps within social media: mental health, privacy, and impact on society at large.

THE APPEAL OF SOCIAL MEDIA

Social media is designed to be addictive. Features like dynamic scrolling, notification, and the most insidious of them all—the dopamine-inducing 'like' button—are designed to keep users glued to their screens. The sum of perpetual engagement is, therefore, considerable time consumption through these platforms at the cost of other activities—real-world interactions and responsibilities. A report by the Royal Society for Public Health has linked usages of social media to raised anxiety, depression, and poor sleep among young people Teuchos.

Mental Health Implications

The most concerning aspect of social media should be its implications on mental health. Excessive use of social media sites is linked to feelings of inadequacy and low self-esteem. Essentially, networking sites like Instagram and Facebook show and depict unrealistic beauty standards and success, which, in effect, make users compare their life unfavorably with those pictures.

The phenomenon is called social comparison, and as a result, it may worsen the feelings of loneliness and depression.Moreover, the constant flux of information might be stressful due to the pressure to always be connected, which is continuous, and thus stressful and tiring. The term 'doomscrolling' has been used to mean the continuous scrolling of bad news from social media, fuelling further anxiety and depression

Privacy Concerns

Worse still, social media erodes personal privacy. The platforms gather vast amounts of information about their users' personal details, browsing history, and social interaction. While seldom used for targeted advertisement purposes, this data at times is vulnerable to breaches and misuse. One such well-known scandals is that of Cambridge Analytica, in which millions of Facebook users' data for clear was harvested without consent political advertising a very example of how baad could proceed Their use and sharing are absolutely non-transparent. Due to the very complicated and vague terms of service agreements, people often agree to expansive data collection. Such loss of control over personal information can result in identity theft, cyberbullying, or other pernicious consequences.

Social and Ethical Implications

Social media has also had profound effects on the behavior of society and its norms. Misinformation and fake news spread like wildfire on these long-reach platforms, bending people's minds drastically toward extreme opinions, thus affecting political decisions. Algorithms that shift more sensational and controversial content to the top can lock users in echo chambers, exposing them only to information that confirms predefined beliefs.

This anonymity can also foster cyberbullying and harassment; that is, a person could be victimized or bullied in the online environment with strict impunity. Because of this fact, online community may turn to be very hostile. It can produce serious psychological impacts, especially in younger users who become more vulnerable toward such attacks outfield source

Finding Balance

Although the challenges from social media are huge, there are ways through which one can make them more forgiving by being a mindful user and creating more digital literacy. Setting boundaries, like limiting how much time one spends on screens or taking a small break off from social media, will keep things in balance. Being critical when information is passed around, cross-checking sources before one shares or accepts it, will reduce the information spread.

This means that there is a need to advocate for better privacy protection measures within social media companies and increased transparency. A user ought to have control over their data and be open to how information is being used. In this line, legislation like the General Data Protection Regulation (GDPR) put in place by Europe is a very positive step, but there is more to be done globally.

Conclusion

One of the most powerful tools that changed the way of connecting and communicating today is social media. Additionally, being aware of pitfalls is crucial and how not to get trapped in them is required. By adopting a far more mindful and informed approach toward the way we use social media today, we will be able to make use of its benefits on social media and reduce the harm it causes to our mental health, privacy, and society at large. This will be very important during this period: wading through the digital ocean, having a good balance between connectivity and well- being in order for social media to be a force for good in our lives.

Impact of ChatGPT on Translation Services

Author - Sahil Phondekar

Impact of ChatGPT on Translation Services

In recent years, the landscape of translation services has been significantly reshaped by advancements in artificial intelligence (AI). One of the most notable developments in this field is the emergence of ChatGPT, a large language model developed by OpenAI. This article delves into how ChatGPT is transforming translation services, exploring its capabilities, benefits, challenges, and potential future impact.

Capabilities of ChatGPT in Translation ChatGPT part of the GPT (Generative Pre-trained Transformer) family, is designed to understand and generate human-like text. Its translation capabilities stem from its vast training data, which includes multiple languages. This enables ChatGPT to perform translations that are contextually aware and often more nuanced than traditional rule-based translation systems.

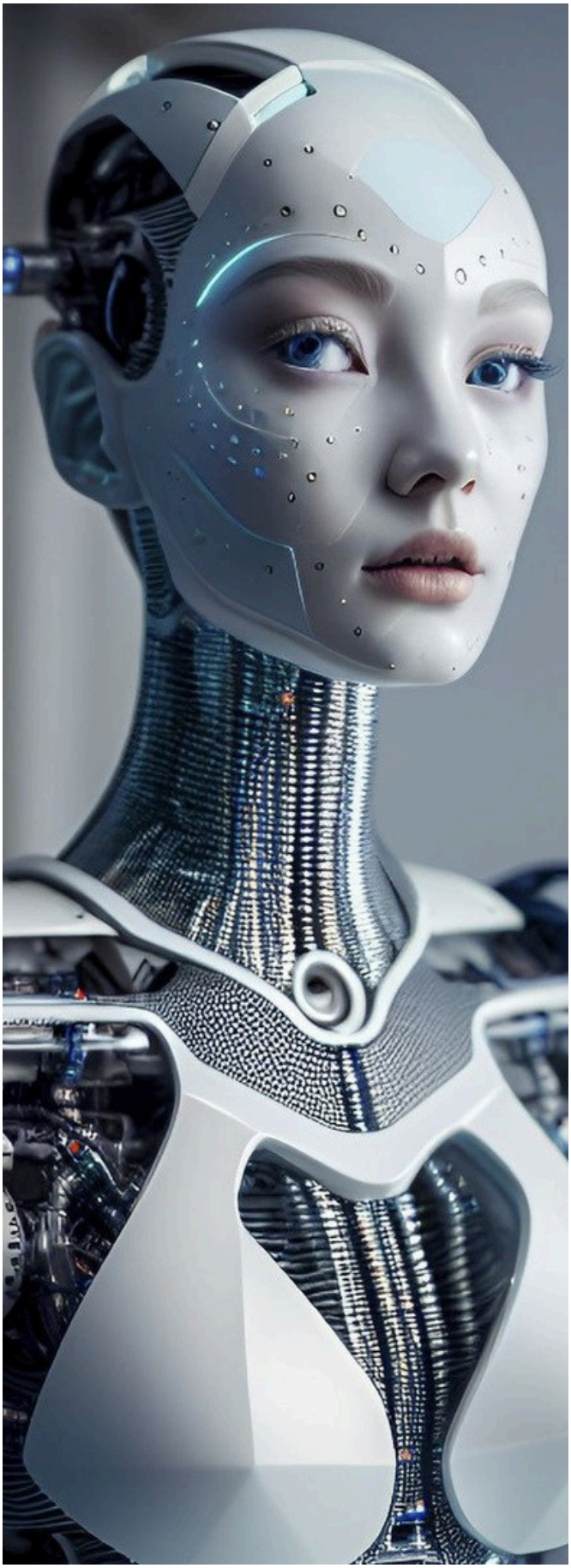
Benefits of Using ChatGPT for Translation Services

Efficiency and Speed: One of the most significant advantages of using ChatGPT for translation is its ability to process large volumes of text quickly. This is particularly beneficial for businesses that require the translation of extensive documents in a short timeframe.

Cost-Effectiveness: By automating translations, ChatGPT reduces the need for human translators, leading to cost savings. While professional translators are still essential for nuanced and highly accurate translations, ChatGPT can handle routine tasks, freeing up human resources for more complex work.

Consistency: Human translators, despite their expertise, can introduce inconsistencies, especially in large projects involving multiple translators. ChatGPT ensures a uniform style and tone throughout the document, enhancing coherence and readability.

Multilingual Support: ChatGPT supports a wide range of languages, making it a versatile tool for global businesses. It can bridge language and
barriers, facilitating better communication understanding across different linguistic groups.



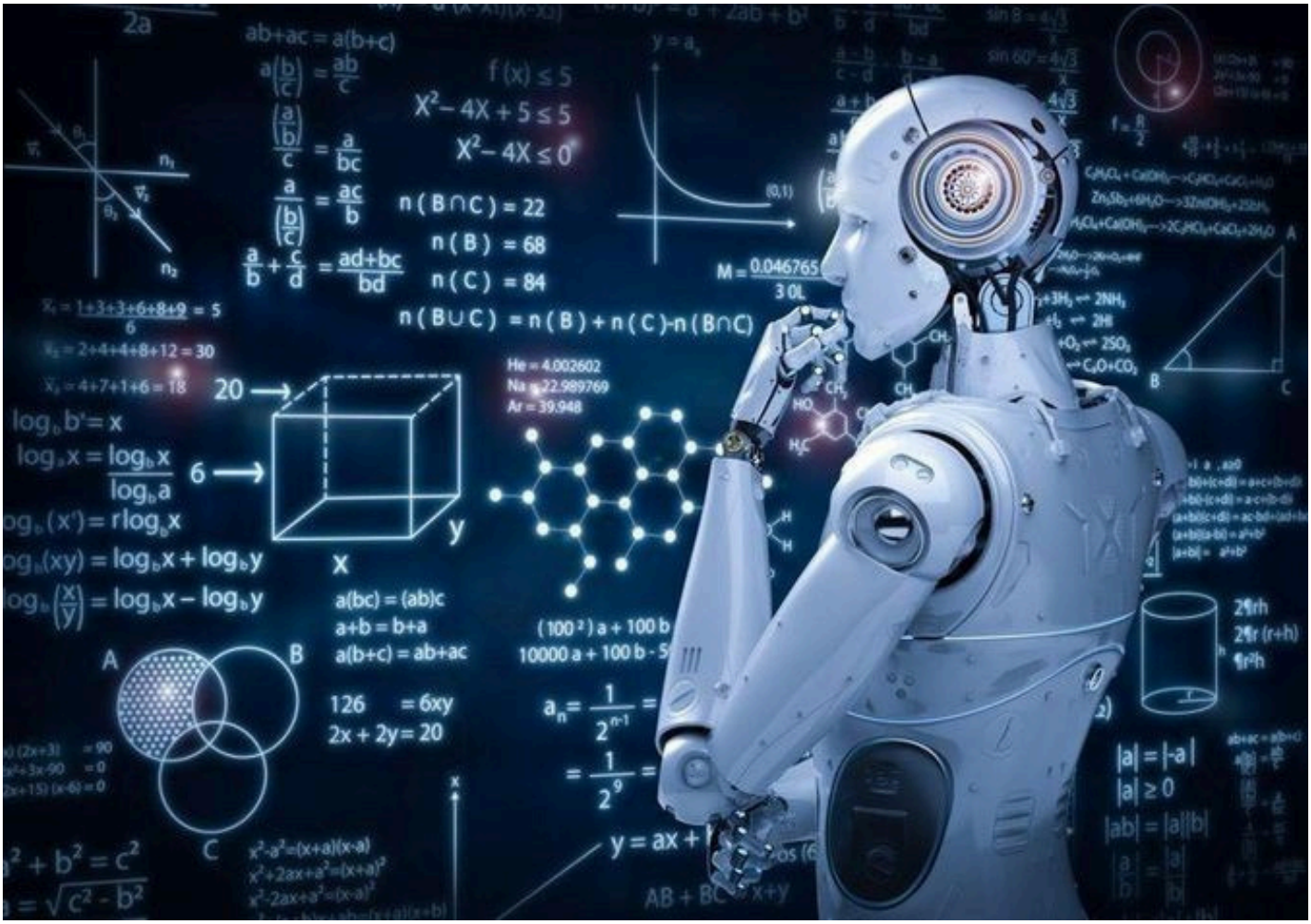
CHALLENGES AND LIMITATIONS

Despite its advantages, ChatGPT is not without challenges. Understanding these limitations is crucial for effectively integrating AI into translation services Contextual and Cultural Nuances: While ChatGPT excels in translating text, it may struggle with capturing cultural nuances and context- specific meanings. Human translators bring cultural awareness and context-specific knowledge that AI currently lacks.

Accuracy: For highly technical or specialized texts, ChatGPT may not always provide the level of accuracy required. Industries such as legal, medical, and technical fields demand precise translations, where even minor errors can have significant consequences.
Ethical Concerns: The reliance on AI for translation raises ethical questions, including the potential loss of jobs for human translators. Additionally, there are concerns about the misuse of AI-generated translations in spreading misinformation.

Future Prospects: The future of ChatGPT in translation services looks promising, with ongoing advancements aimed at addressing its current limitations. Researchers are continually improving the model's ability to understand context and cultural nuances, enhancing its accuracy and reliability. 1. Hybrid Models: A combination of AI and human translators is emerging as a viable solution. AI can handle initial translations and routine tasks, while human experts refine and verify the translations, ensuring cultural and contextual accuracy. 2. **Personalization: Future iterations of ChatGPT could offer personalized translation services, adapting to the specific needs and preferences of users. This would involve learning from user feedback and improving over time.

Accessibility: As AI becomes more accessible, smaller businesses and individuals will also benefit from high-quality translation services. This democratization of translation services can foster greater global communication and collaboration.



CONCLUSION

ChatGPT is undoubtedly revolutionizing the translation industry by offering efficient, cost-effective, and consistent translation services. However, it is essential to acknowledge its limitations and ethical implications. The future lies in a balanced approach that leverages the strengths of both AI and human translators, ensuring high-quality translations that are contextually and culturally accurate. As we move forward, continuous improvements in AI technology will likely enhance the capabilities of ChatGPT, making it an even more valuable tool in the realm of translation services. --- This article provides a comprehensive overview of the impact of ChatGPT on translation services, highlighting both its benefits and challenges. It emphasizes the importance of a hybrid approach that combines the efficiency of AI with the expertise of human translators to achieve the best results.

"EVERY CHALLENGE MET WITH INGENUITY IS A STEP CLOSER TO CRAFTING A WORLD WE CAN ONLY DREAM OF TODAY."

-SATYA NADELLA