Interview with:

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Artificial intelligence has seen remarkable development in recent years, being utilized across various fields and offering innovative ideas that emulate human intelligence in performing tasks. To understand the buzz surrounding AI, we meet with Dr. Mohammed Abdulaziz Al-Sada, Director of the Kindi Center for Computing Research and the Qatar Mobility Innovations Center (QMIC).

Dr. Mohammed, how would you introduce yourself to the readers of Qatar University's Research Magazine before discussing artificial intelligence?

I am Mohamed Al-Sada, Director of the Kindi Center for Computing Research and the Qatar Mobility Innovations Center (QMIC) at Qatar University. I earned my Bachelor's degree in Computer Science from Qatar University, followed by a Master's and PhD in Computer and Communication Engineering from the Leading Graduate Program in Embodied Informatics at Waseda University in Tokyo, Japan.

Over the past 15 years, I have worked in research and development within prominent institutions, including Qatar Energy and Sony Science Labs. My research focuses on several fields related to human-centered design for augmented and virtual reality systems, wearable robotics, and humanoid robots for daily and industrial applications. My research has been featured in both international and regional media, such as Yahoo! News and MoguraVR in Japan, as well as JeemTV in Qatar.

What is Artificial Intelligence?

Artificial Intelligence (AI) is an advanced technology that enables machines to think, learn, and make decisions in ways that mimic human capabilities. This allows systems to understand problems, learn from past experiences, and effectively respond to unexpected and new contexts. For example, virtual assistants like Siri and Google Assistant help users by recognizing patterns in their questions and voices and improving the quality of responses over time. Additionally, AI algorithms are used in media platforms, like Netflix and YouTube, to suggest content tailored to users' interests based on their viewing history. These examples highlight AI's vital role in enhancing our daily lives and making processes smarter and more precise across various sectors. In transportation, self-driving cars like Tesla demonstrate AI's ability to interact with diverse road environments, including avoiding accidents caused by unexpected obstacles. In industry, AI-powered robots can conduct various tasks, such as inspection or assembly, in full or partial autonomy, thereby minimizing manufacturing errors, reducing waste and improving efficiency.

Are there specific entities within the University specializing in artificial intelligence?

Yes, the University has specific entities dedicated to research and development of artificial intelligence and its applications:

The Kindi Center for Computing Research: The center focuses on AI and cybersecurity research, working to develop AI applications across various fields. It promotes innovation through specialized research projects and training programs, while also collaborating with governmental and industrial entities to develop cutting-edge solutions.

The Qatar Mobility Innovations Center (QMIC): The center specializes in applied AI solutions to support various sectors, such as transportation and intelligent mobility. It emphasizes the development of practical smart technologies to meet the needs of industries and communities, making it a leader in promoting AI usage for addressing real-world challenges.

These centers collaborate with each other and the community to foster a research and application-driven environment that supports innovation in AI, both within and beyond the University.

In what fields is AI most widely applied, and how reliable is it?

AI is evolving rapidly, expanding its applications across diverse fields, making it a driving force of the Fifth Industrial Revolution which mainly relies on embodied systems, especially autonomous robotic systems. Such systems have already been used in the last 40 years, and their role is becoming more crucial in the industry world-wide due to the rapid advancements in AI. Furthermore, autonomous robotic systems have already become an integral part of our daily lives, like delivery-robots, self-driving vehicles and humanoid robots.

AI also powers numerous tools and applications, such as social media platforms, search engines, maps, and voice assistants. Additionally, AI plays a critical role in the financial sector, enabling automated trading and fraud detection.

However, the reliability of AI depends significantly on the quality of the data it is trained on, the complexity of the problems it aims to solve, and the transparency of the models used.

What is the role of AI in research and education?

AI plays a pivotal role in scientific research by enabling the analysis of vast amounts of data with unprecedented speed and precision. This capability helps researchers uncover patterns and insights that may remain hidden using traditional methods. AI also supports the development of predictive

models to solve complex problems across various scientific domains, including medicine, engineering, and environmental sciences. Moreover, it automates data analysis and reporting processes, allowing researchers to focus more on innovation and development. With its advanced capabilities, AI has become an essential tool for enhancing efficiency and driving sustainable progress in research.

In education, AI reveals new opportunities to enhance learning and training experiences. It can personalize educational content to meet individual student needs, provide accurate automated assessments, and offer 24/7 virtual assistance. AI can also be utilized in virtual and augmented reality simulations to create immersive educational experiences. Additionally, AI analyzes educational data to identify students' strengths and weaknesses, enabling the development of effective teaching strategies. By integrating AI, the education sector is better equipped to adapt to diverse learning styles and foster more effective and engaging learning environments.

What is your opinion on the integration or conflict between humans and machines?

The interaction between humans and machines is one of the central challenges in contemporary technological evolution. However, this relationship should be understood as a synergy and partnership rather than a conflict. Human creativity and problem-solving abilities can synergize with the advanced computational and mechanical capabilities of machines. While AI has automated certain tasks by mimicking human thinking, learning, and problem-solving, it has also created new job opportunities and innovative fields that did not exist before. Similar to previous technological revolutions, there will be a period of adaptation by the workforce and society.

Thus, the relationship between humans and machines should not be defined as a competition, but as a partnership where the strengths of both can be combined to enhance human life, which is the essential objective of all created technologies. However, it is essential to approach the applications of AI with an impartial perspective that considers both the potential benefits and risks.

Are there any research projects at Qatar University that have delivered innovative and reliable results using artificial intelligence?

Yes, Qatar University has made remarkable progress in AI applications through its research endeavors in the KINDI Computing Research Center and Qatar Mobility Innovation Center (QMIC). For example, QMIC has numerous substantial systems utilizing AI, such as Falcon-I, which was used for intelligent traffic control during the World Cup 2022 in Doha, Qatar, Falcon-I was fully developed in Qatar University, and proved to be a substantial and reliable asset that is continuously being utilized for various national and international events in Qatar.

Furthermore, our research team at the Kindi Center, in collaboration with Waseda University in Japan, has developed a system that fuses human and artificial intelligence for teleoperating a robot, which was tested with different robot types, including wearable and humanoid robots. By leveraging both human intelligence and artificial intelligence, the system enables new potentials to reap the benefits of human cognitive and intuition capabilities with the precision and efficiency of robots.

How do you view the future of artificial intelligence? Does it represent a greater opportunity or a threat to societies?

AI is a driving force behind the profound transformations reshaping the global landscape across economic, social, and technological fields. While AI presents substantial challenges, it also unlocks promising horizons for contemporary societies. Specialized studies and research underscore its vast potential to revolutionize critical sectors such as robotics and automation, healthcare, education, and scientific research. However, this rapid development raises legitimate concerns about its potential impacts on human autonomy, privacy, and economic equity.

Given these facts, the promising capabilities of AI to enhance human quality of life must be carefully balanced with the accompanying ethical and societal challenges. Such challenges include issues such as safeguarding personal data, addressing potential deepening of social and economic divides, and ensuring fairness in its applications. Addressing these complex issues necessitates an integrated governance framework, comprehensive legislative policies, and a firm commitment to aligning AI applications with the ethical and cultural values of human societies.

Ultimately, the future of this AI hinges on the international community's ability to craft an impartial strategic vision that ensures AI serves humanity effectively and responsibly.