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Revolutionizing Enterprise AI:

The Power and Promise of Foundation Models

Modern AI models excel at processing vast amounts of data and addressing complex problems through innovative solutions. As we progress, AI is undergoing a transformative shift towards the use of versatile foundation models. Unlike task-specific models, foundation models are trained on extensive unlabeled datasets and can be fine-tuned with minimal effort to suit various applications. This makes them a cornerstone for a broad spectrum of AI use cases, utilizing self-supervised learning and fine-tuning techniques to effectively apply their generalized knowledge to specific tasks.

In the enterprise, foundation models are setting the stage for a revolution in AI adoption. They significantly reduce the need for labor-intensive data labeling and model programming, making it easier for enterprises to deploy AI across mission-critical operations. This lecture will explore strategies for broadening the implementation of foundation models across enterprises within a seamlessly integrated hybrid-cloud environment. The discussion will extend to developing software, middleware, and hardware that support cloud-native development and maximize the utility of foundation models in enterprise AI applications, focusing on real-world industry scenarios.

Additionally, this lecture covers current research trends and provides insights into the future trajectories of foundation models, illustrating how they continue to evolve and reshape the landscape of artificial intelligence in the business sector.

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Dr. Kaoutar El Maghraoui is a Principal Research Scientist at the prestigious IBM T.J. Watson Research Center and an Adjunct Professor of Computer Science at Columbia University in the City of New York. Kaoutar's work resides at the intersection of systems and artificial intelligence (AI). Within IBM, she spearheads the AI testbed at the IBM Research AI Hardware Center, a prominent global research hub dedicated to advancing efficient next-generation accelerators and systems tailored for AI workloads. Her leadership extends to open-source development and enhancing the cloud end-user experience for IBM's emerging Digital and Analog AI accelerators. Her research areas span systems research, distributed systems, high-performance computing, and AI hardware-software co-design. She co-led IBM's Global Technology Outlook in 2017 and contributed to creating IBM's vision for the future of IT across global labs and business units, focusing on IBM's AI leadership. Kaoutar has co-authored several patents, conferences, and journal publications in systems research, AI, distributed systems, and high-performance computing.

An alumnus of Rensselaer Polytechnic Institute (RPI), New York, Dr. El Maghraoui earned her Ph.D. in Computer Science in 2007. She also holds a master's degree in computer networks (2001) and a bachelor's degree in general engineering from Al Akhawayn University, Morocco. Throughout her career, Dr. El Maghraoui has received numerous prestigious awards, including the Robert McNaughton Award for best thesis in computer science, the Best of IBM award in 2021, and the IBM Eminence and Excellence award for her efforts in increasing women's presence in science and technology. Her other honors include several IBM outstanding technical achievements, the 2021 IEEE TCSVC Women in Service Computing award, and the 2022 IBM Technical Corporate award.

She is an ACM Distinguished Member, ACM Distinguished Speaker, Senior IEEE Member, Society of Women Engineers, TinyML Foundation, and AnitaB.org member. She has served as co-chair, member of the program committee, and reviewer in many technical conferences. Kaoutar was elected secretary-treasurer for ACM SIGOPS for the 2015-2019 term and co-chaired IBM's Operating Systems Professional Community. She is the vice chair of the IEEE Technical Community on Services Computing (TCSVC).

Dedicated to supporting and promoting women in science and technology, Dr. El Maghraoui's leadership extends beyond her professional achievements. She actively participates in and leads initiatives that foster global growth, visibility, and collaboration of women in the computing field. Her work as the global vice-chair of the Arab Women in Computing organization and co-chair of the IBM Research Watson Women Network (WWN) in 2019-2021 exemplifies her commitment to creating opportunities and paving the way for the next generation of women in technology. She also serves on the AFCHIX International Advisory Panel, a non-profit organization dedicated to motivating African women and girls to engage with technology, embark on STEM careers, and realize their significant potential.

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