Challenges in Truly Scaling Services

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Abstract

Many services, such as healthcare and education are highly human-intensive offerings that remain inaccessible (at acceptable quality level) to large numbers of people. With advances in computational power and increasing digitization of the world, there is an opportunity to apply data analytics to transform these services. This talk will describe opportunities and key challenges, both algorithmic and performance-related, to achieve truly transformational impact.

We begin by describing a dire need and an opportunity to improve the healthcare system worldwide by supporting a shift from reactive treatment to more proactive action. As examples of what is possible, we present techniques to predict a class of complications in an ICU, to identify patients in a hospital who are likely to require ICU admission, and measure body vitals through remote sensing at home or workplace for wellness or to screen for diseases and reduce the need for people to visit a hospital. We then describe a system called TutorSpace to help with personalization and improved navigation of videos from massive open online courses to enable more effective learning. We describe some of the performance issues we have faced to make these systems practical, and our approach to those problems. We frame all of the above efforts as examples of using information technology to offer personalized services at massive scale.

Bio

Dr. Manish Gupta is Vice President at Xerox Corporation and Director of Xerox Research Centre in India. Previously, Manish has served as Managing Director, Technology Division at Goldman Sachs India, and has held various leadership positions with IBM, including that of Director, IBM Research - India and Chief Technologist, IBM India/South Asia. From 2001 to 2006, he served as a Senior Manager at the IBM T.J. Watson Research Center in Yorktown Heights, New York, where he led the team developing system software for the Blue Gene/L supercomputer. IBM was awarded a National Medal of Technology and Innovation for Blue Gene by US President Barack Obama in 2009. Manish holds a Ph.D. in Computer Science from the University of Illinois at Urbana Champaign. He has co-authored about 75 papers, with more than 6,000 citations in Google Scholar in the areas of high-performance computing, compilers, and virtual machine optimizations, and has been granted 19 US patents. While at IBM, Manish received an Outstanding Innovation Award, two Outstanding Technical Achievement Awards and the Lou Gerstner Team Award for Client Excellence. Manish is an ACM Fellow, a Fellow of the Indian National Academy of Engineering, and a recipient of a Distinguished Alumnus Award from IIT Delhi.

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