# Keynote 1: Knowledge will Propel Machine Understanding of Big Data

## Abstract

Machine Learning has been a big success story during the AI resurgence. One particular stand out success relates to learning from a massive amount of data. In spite of early assertions of the unreasonable effectiveness of data, there is increasing recognition for utilizing knowledge whenever it is available or can be created purposefully. Knowledge seems to play a central role in human learning

and intelligence, including our superior cognitive and perception abilities. This inspires us to seek approaches to incorporate knowledge in applications that can benefit from big data. Our ability to create or deploy just the right knowledge in our computing processes will improve machine intelligence, perhaps in a similar way as knowledge has played a central role in human intelligence.

In this talk, we discuss the indispensable role of knowledge for deeper understanding of content and exploit big data where (i) large amounts of training data are unavailable, (ii) the objects to be recognized are complex, (e.g., implicit entities and highly subjective content), and (iii) applications need to use complementary or related data in multiple modalities/media. What brings us to the cusp of rapid progress is our ability to (a) create relevant and reliable knowledge and (b) carefully exploit knowledge to enhance ML/NLP techniques. Using diverse examples, we seek to foretell unprecedented progress in our ability for deeper understanding and exploitation of multimodal data and continued incorporation of knowledge in learning techniques.

# Background

- Amit Sheth, Pramod Anantharam, and Cory Henson. Semantic, Cognitive, and Perceptual Computing: Paradigms That Shape Human Experience. IEEE Computer 49, 3, 2016.
- Amit Sheth, Sujan Perera, Sanjaya Wijeratne, Krishnaprasad Thirunarayan. Knowledge will Propel Machine Understanding of Content: Extrapolating from Current Examples. In IEEE/WIC/ACM International Conference on Web Intelligence (WI). Leipzig, Germany: ACM; 2017.

# Brief Bio:

Prof. Amit Sheth is an Educator, Researcher and Entrepreneur. He is an Ohio Eminent Scholar, executive director of Ohio Center of Excellence in Knowledge-enabled Computing, and an IEEE Fellow (2006). He is among the 100 most cited computer scientists (h-index = 95), and top few authors in World Wide Web and Semantic Web. He has founded three companies by licensing his university-led research, including the first Semantic Web company in 1999 that pioneered technology similar to what is found today in Google Semantic Search and Knowledge Graph. Several commercial products and deployed systems have resulted from his research. He is particularly proud of his students' exceptional success in academia, industry research labs and as entrepreneurs. A majority of his first 20 PhD advisees have an average citation of over 1,000 citations, including 3 over 5000 citations, each. More: http://knoesis.org/amit/