



INFORMS Journal on Applied Analytics

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Special Issue of INFORMS Journal on Applied Analytics—Analytics, Artificial Intelligence, and Data Science for Technical Infrastructure

Martin Valdez-Vivas, Julie Drew, Alexander Gilgur

To cite this article:

Martin Valdez-Vivas, Julie Drew, Alexander Gilgur (2020) Special Issue of INFORMS Journal on Applied Analytics—Analytics, Artificial Intelligence, and Data Science for Technical Infrastructure. INFORMS Journal on Applied Analytics 50(1):97-98. <https://doi.org/10.1287/inte.2019.1025>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2020, INFORMS

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes. For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Call for Papers

Special Issue of *INFORMS Journal on Applied Analytics*—Analytics, Artificial Intelligence, and Data Science for Technical Infrastructure

Guest Editors: Martin Valdez-Vivas,^a Julie Drew,^a Alexander Gilgur^a

^a Facebook, Menlo Park, California 94025

Contact: mvv@fb.com (MV-V); juliedrew@fb.com (JD); agilgur@fb.com (AG)

Published Online in Articles in Advance: January 15, 2020

<https://doi.org/10.1287/inte.2019.1025>

Copyright: © 2020 INFORMS

The technical infrastructure underpinning today's global internet services is increasing both in scale and in complexity, evidenced by the expanding footprint of data centers across the world. Online services with a growing reliance on machine learning, massive-scale batch analytics, and artificial intelligence (AI)-powered products have raised a number of interesting scaling challenges. Besides an expanding number of applications, the continual shift of machine learning toward larger models trained on increasing amounts of data—sometimes distributed across multiple machines—creates a growing demand for cluster capacity, which raises questions from an operations perspective, including traditional operations research domains like scheduling, capacity allocation, and inventory management. With this trend expected to continue well into the future, there are many exciting opportunities for novel applications of tools and methodologies to improve technical infrastructure lying at the intersection of optimization, data, and predictive analytics.

From capacity planning and supply chains for specialized hardware components (application-specific integrated circuits (ASICs), graphics processing units (GPUs)) to network traffic shaping, the scope of infrastructure-related problems faced by internet enterprises is rich and multifaceted. This special issue is designed to showcase advancements in the application of optimization, machine learning, and data science techniques that have arisen to meet efficiency, reliability, and scalability challenges precipitated by the growth of large-scale backend systems. Creative analytical solutions in this data-rich environment can help support the far-reaching ambitions of emerging AI-based technologies and carry

insights over to general practice for managing operations at scale.

Authors are invited to submit applied papers on the following nonexhaustive list of topics:

- Capacity Planning and Management
 - Resource allocation for heterogeneous microservices
 - Scheduling for batch analytics and machine learning workloads
 - Adaptive bitrate controls for real-time media (video, voice over internet protocol)
 - Network traffic forecasting, optimization, and simulation
 - Maintenance scheduling
- Supply Chain Optimization for Technical Infrastructure
 - Supply chain optimization for servers and specialized hardware (ASICs, GPUs)
 - Integrated modeling and optimization of end-to-end infrastructure operations
 - Analytics for scaling infrastructure to meet forecasted demands
- Optimization of Technical Infrastructure Operations and Marketing
 - Optimal data center capacity planning and allocation
 - Demand uncertainty in server and network allocation and capacity planning
 - Machine learning and AI methods in load-balancing optimizations
 - Total cost of ownership (TCO) optimization
- Innovation in Applied Mathematics for Technical Infrastructure
 - Anomaly detection on server fleets, including distributed denial-of-service attacks
 - Machine learning and AI in datacenter performance and fault analytics

◦ Application of new algorithms (genetic algorithms, reinforcement learning, adversarial models, etc.) to infrastructure

The editors encourage potential authors to contact them with ideas for papers before making a full submission of a paper. Please note the following dates:

- **April 15, 2020:** Letter of intention to publish due to the editors, with an abstract including the organization at which the work was implemented.
- **August 15, 2020:** Target deadline for first round of submissions.
- **September 30, 2020:** First round of reviews completed; decisions (and requests for revision, if appropriate) delivered to authors.
- **December 15, 2020:** Second round of reviews delivered to authors.
- **February 15, 2021:** Final versions of accepted papers must be submitted.

Authors should review the instructions on preparing a paper for the *INFORMS Journal on Applied*

Analytics at <https://pubsonline.informs.org/page/inte/submission-guidelines>.

Papers must be submitted online at <https://mc.manuscriptcentral.com/inte>.

When submitting a paper, please note the following:

- Under “Step 1: Type, Title, & Abstract,” select “Special Issue” for “Type.”
- Under “Step 5: Details & Comments,” answer “This paper is for which special issue?” with “Technical Infrastructure.”

Publication contact information for the special issue editors:

Martin Valdez-Vivas
Facebook, Menlo Park, California
mvv@fb.com

Julie Drew
Facebook, Menlo Park, California
juliedrew@fb.com

Alexander Gilgur
Facebook, Menlo Park, California
agilgur@fb.com