SOLUTION BRIEF

Intel® AI Builders
AI-Guided Market Research

Using AI to Analyze Fashion and Luxury Market Performance

Recurrent neural networks, AI-based forecasting engines, and optimized frameworks from Intel help convert raw data into market insights to guide decision making and inform investors in speciality industries.

"At IFDAQ, we're developing and applying deep learning analytics to high-value use cases for analyzing the fashion and luxury industry down to the smallest unit, and the Intel® AI Builders program will help us gain access to new marketing channels and partners who can benefit from the deepest industry and market analytics."
– Daryl de Jori, Founder and Head of Innovation, IFDAQ

IFDAQ

Industry Challenges

In prior years, key parties involved in the fashion and luxury industries were handicapped by a dearth of actionable information to guide decision making and launch business initiatives. Stakeholders in existing businesses and investors contemplating the fortunes of promising rising stars had no clear way to gauge prospects and predict the direction of the industry. Before the advent of big data analytics and artificial intelligence-guided insights, obtaining metrics to accurately measure performance and evaluate trends in the fashion and luxury industry was difficult, if not impossible. Many important key performance indicators (KPIs)—including effective market value, market power, influence, reputation, and marketing performance—could not be measured adequately. Results of traditional industry analyses typically took several weeks to generate.

New tools and technologies have brought data to the forefront as AI techniques and big data analytics have reached maturity, reshaping entire industries. The IFDAQ (International Fashion Digital Automated Quantification) analysis tool extracts insights from data across the fashion and luxury markets and uses deep learning techniques and predictive analytics to identify trends, highlight opportunities, and guide investor strategies.

Clients engaged with the IFDAQ group gain vital AI-enhanced business information in seconds rather than weeks. Big data and AI provide these benefits to the solution:

- Fundamental KPIs generated every few minutes and an intelligent performance index (IPX) let clients compare specific aspects of the industry in real time for making sound business decisions.
- A recurrent neural network (RNN) at the core of IFDAQ's intelligent ecosystem works in combination with trained forecasting engines and other optimized AI frameworks to parse, filter, and distill intelligence from the data inputs. The RNN also performs sentiment analysis to gauge the nature of news articles, blog posts, and other commentary.
- Smart quantification techniques pioneered by IFDAQ include mechanisms for validating and auto-calibrating analysis results.

Demystifying the complexities and unpredictability of the fashion and luxury market fluctuations and trends requires rethinking traditional methods of analysis. Incorporating new tools, including the AI technologies using advanced pattern recognition algorithms, enable better understanding of intricate system behaviors.

IFDAQ Overview

IFDAQ is a proprietary system built on an Intel® architecture-based infrastructure that combines AI-guided algorithms, multilayered RNNs, trained forecasting engines, and optimized frameworks to analyze trends and generate predictions in the fashion and luxury industries.

Data Assets Stored in a Data Lake

Data assets are ingested from a proprietary 30-terabyte data lake that includes the world's largest fashion industry database, FMDB, as well as numerous sources that address market and industry performance, industry demand in online and print media, global digital demand (search volume, trends), and social media performance. Resulting analyses can provide transparency into a complex industry and offer data-driven market predictions.

Data that is incorporated into the models developed by IFDAQ spans more than a century of fashion industry statistics, dating back to 1894.

The IFDAQ venture began in 2008 as a scientific research project. The project brought together AI pioneers and leaders in the big data sector to explore methods for measuring and comparing KPIs in the fashion and luxury industries, with the intent to automate the research analytics and accelerate results using computer technologies.

Figure 1 provides a high-level conceptual view of the components used in the IFDAQ solution.

The key components used in IFDAQ include the following:

- **EDAQS Smart Quantification I/II (ESQ)**: Originally developed by EDAQS Research, ESQ is an algorithm that creates benchmarks through a relational network. This algorithm also transforms unstructured qualitative information into structured, meaningful and quantitative data. This becomes the basis for the KPIs that IFDAQ produces for its clients.
- **Amplified Data Extraction for High-Dimensional Data**: Using automated data retrieval mechanisms, this innovative technique controls operations across the span of the IFDAQ data lake.
- **Augmented Data Recycling**: This methodology draws data from public and private data pools and converts unstructured data that lacks a predefined data model into structured data to provide actionable business intelligence to clients.
- **Social Media Subsystem (SOMA)**: The tone and nature of sentiments expressed in social media content is addressed by this subsystem that was added to Version 2 of IFDAQ. SOMA analyzes and rates the ecosystems of fashion influencers and their followers on social media across four separate tiers. Commenters are analyzed across two tiers. The scoring system results go through a recalibration and reevaluation process for each entity to generate a rating index known as SOMIX.

The actionable intelligence produced by IFDAQ can guide investment decisions, help brands strengthen their presence in the industry, assess alternate strategies for developing brand assets, and calculate methods for increasing return on investments (ROIs).

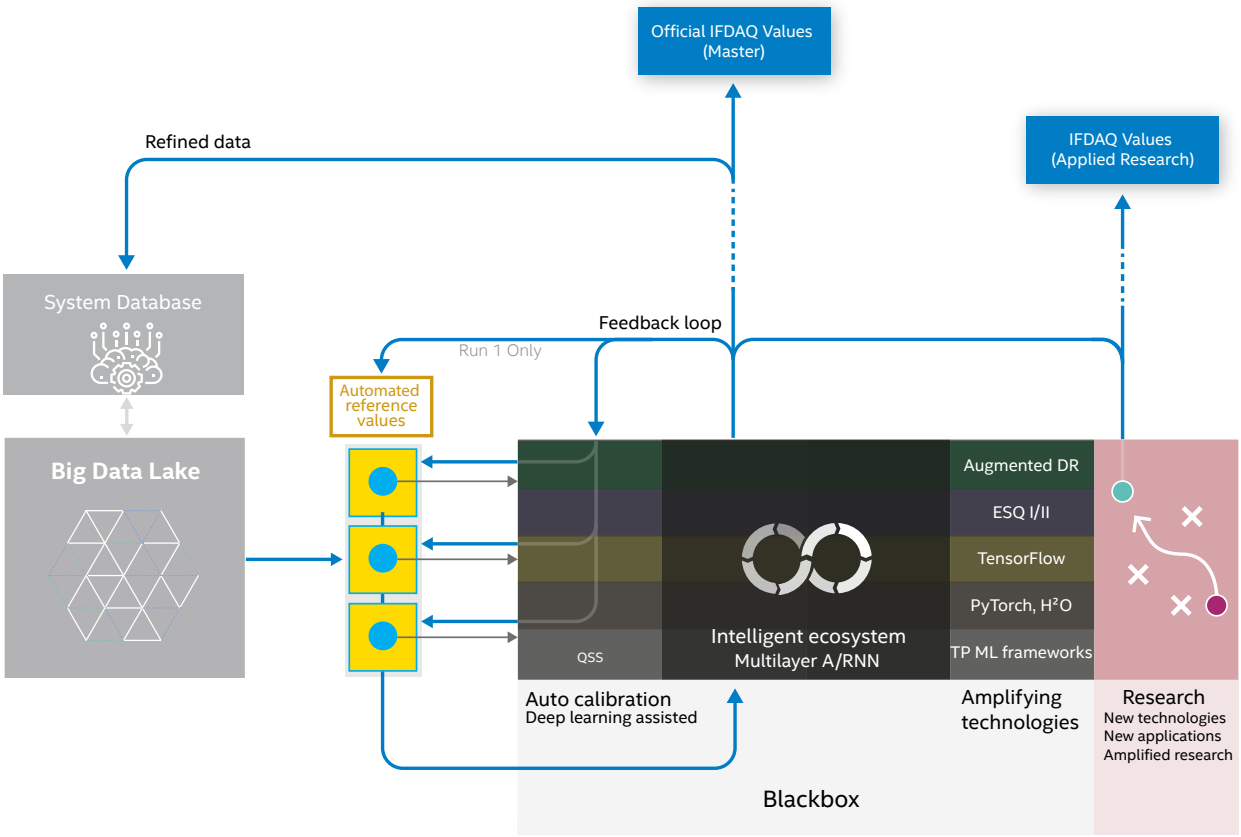


Figure 1. Conceptual view of IFDAQ.

Solution Insights and Benefits

Comparing success factors in the fashion industry includes these key factors:

- Effective market value
- Market power
- Reputation
- Influence
- Marketing performance
- Segment strength

Although these factors have been recognized for many years, the difficulty in measuring them and the ambiguity in evaluating results has kept stakeholders in the dark. Previously, the only available option was to commission very expensive market research. This approach typically took many weeks to collect all the data, organize the results, and put together a qualitative client report. Decision makers and investors faced risk and uncertainty.

In comparison, the IFDAQ solution offers these benefits:

- Real-time analysis drawn from an expansive data lake with input updated every few minutes.
- Generation of fundamental KPIs drawn from AI-enhanced data sources.
- An intelligent performance index (IPX) based solely on AI-computed values that can compare and rank specific aspects of the industry (for example, fashion capitals of the world or best casting performance).
- Tracking of marketing activities in real time and generation of ROI values for hundreds of thousands of professional fashion works and industry positions.

By fulfilling a critical need in the fashion and luxury industry—near real-time data analytics on trends and the status of entities in the ecosystem—IFDAQ has established an infrastructure they refer to as Research-as-a-Service. Clients can quickly gain access to cost-effective, highly automated research reports driven by IFDAQ technologies.

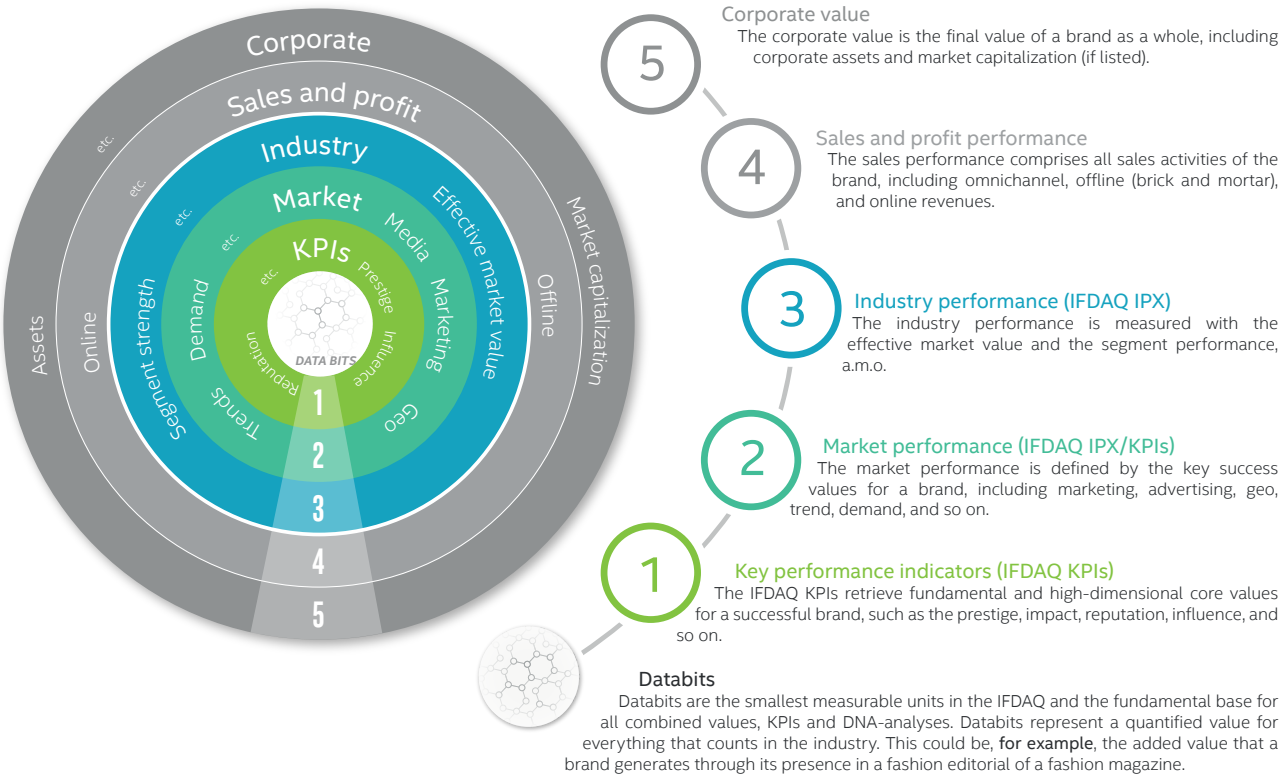


Figure 2. The brand anatomy (DNA) in IFDAQ.

Optimizations and Results

The infrastructure on which the IFDAQ solution runs (both on premises and in the cloud) relies exclusively on Intel architecture-based processors and chipsets. Running on an AI cloud hardware platform powered by an Intel Xeon® Gold 6248 processor reduced training time substantially when using the optimized version of TensorFlow.[2] See Figure 4.

> "We achieved a 3.56x improvement in training using the Intel Optimization for TensorFlow 1.12 on 2nd Generation Intel Xeon Gold 6248 processor. In an operative environment, this would enable the system to calculate new data on an hourly basis (instead of daily). This enables clients to readily receive timely, accurate analyses to support their decision making."
>
> — Daryl de Jori, Founder and Head of Innovation, IFDAQ

Using the same platform on which the training tests were performed, a technical solutions engineer at Intel compared inference time, comparing the performance of a non-optimized version of TensorFlow 1.12.0 with Intel Optimization for TensorFlow 1.12.0.[3] The test results indicated that the optimized version achieved a performance gain of 2.49 times over the non-optimized version, as shown in Figure 3.

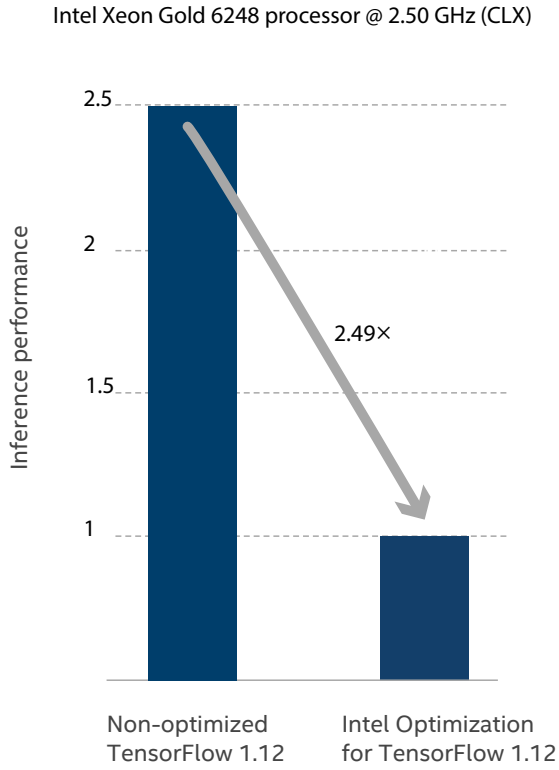


Figure 3. Inference performance with and without Intel Optimization for TensorFlow.

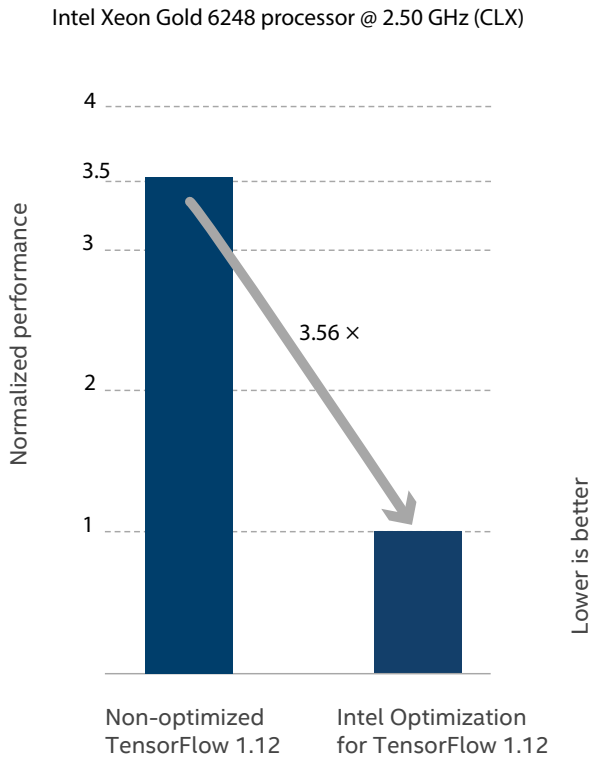


Figure 4. Training performance with and without Intel Optimization for TensorFlow.

Depending on the requirements of the independent software vendor (ISV), the IFDAQ solution can be deployed on premises or as a private cloud deployment. The company offers several tiers of options, including Platform-as-a-Service, AI-as-a-Service, Research-as-a-Service, and a full breadth of consulting services.

Use Cases in the Fashion and Luxury Industry

By generating successive sets of relative and absolute data, IFDAQ derives useful business insights and employs predictive analytics to forecast near-term changes and long-term trends in the fashion and luxury industries. The data and values are generated through machine-learning techniques that depict the targeted industry as a multidimensional virtual image. This makes it possible to measure and compare fundamental KPIs that are recognized benchmarks of success in the industry, but could not be precisely measured until now.

Out of a universe of potential applications, the most important include applied intelligence services with in-depth and combined analyses.

For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

Recent works include the following

IFDAQ conducted a brand portfolio analysis for department stores, evaluating chances and risk and portfolio optimization and brand recommendations. Custom IPX indices let the client analyze the historical and future development of the in-house segment and brand portfolio. With other methodologies, IFDAQ's data was able to analyze the socio-demographic compatibility of the client's brand portfolio and target group to further determine the competitive risk from other nearby businesses and brand stores.

On a marketing level, IFDAQ's KPIs help create the right ambassador strategy for the desired market by identifying the perfect match for a brand's testimonial campaign. Apart from conducting an in-depth brand analysis to assess the brand's DNA and the brand-testimonial compatibility, the data aids decision making with values for market credibility, momentum rating (for push/network effects), and simulation of value and risks associated with the advertising campaign.

For solution applications in the FinTech (financial technology) sector, the data used by the IFDAQ solution is the first alternative data set that measures the core value of publicly quoted fashion groups. This data can deliver predictive and significant correlation values (typically greater than 90 percent) to train automated stock trading models without relying on financial data. In venture capital and private equity, IFDAQ's KPIs contribute to the decision-making process for investments and participation sizes for emerging and undervalued brands.

The use of these precise KPIs lets IFDAQ keep clients well informed and improve their decision making when faced with the complexities of the fashion and luxury markets, providing transparency in place of unpredictability. Stakeholders receive personalized support with exclusive marketing and performance monitoring that can deliver distinct advantages in competitive markets. Near real-time processing of data points results in immediate feedback to clients, as well as a detailed ROI audit for their marketing activities.

> "IFDAQ has a critical role to play in fashion. As a groundbreaking and unique analysis tool for the industry it can help leading fashion stakeholders to spot the next big name. IFDAQ stands to become a breakthrough in intelligent quantification systems, notably to predict careers and performance of fashion professionals. This is a huge unknown, currently, for which we have no consistent methods of evaluation, and yet it can make or break the success of any fashion entity."[4]
>
> – Professor Frédéric Godart, Professor of Organizational Behavior and Co-CEO, IFDAQ

AI-driven market research from IFDAQ disrupts the traditional consulting model with real-time metrics and performance values that turn unseen crucial dynamics into clear insights instantly. In an industry where market leaders spend dozens of hours and huge budgets for an on-demand industry analysis, an equivalent analysis in the IFDAQ system requires only a few seconds. Each analysis is updated daily and offers a high degree of accuracy.

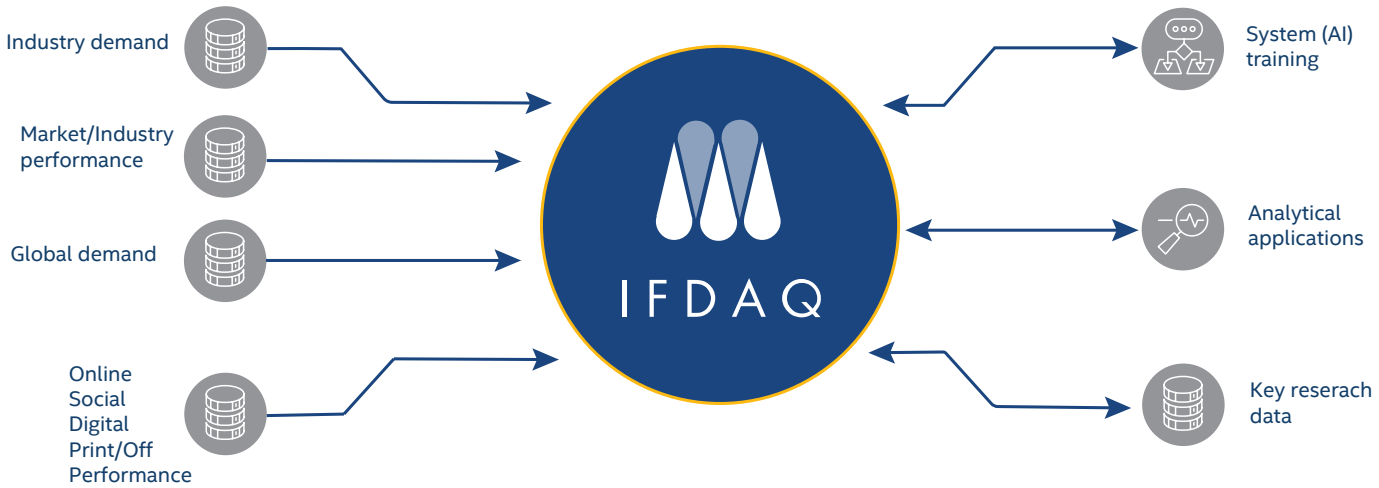


Figure 5. Inputs and outputs used by the IFDAQ solution.

Summary

As AI-enhanced applications and sophisticated analytical tools become increasingly valuable to business operations, the solution resulting from the collaboration between IFDAQ and Intel offers an effective model for gauging the dynamics of complex markets. The ability to be able to predict upturns and downturns in market conditions can help companies determine how to use their resources effectively and rapidly adapt to trends, responding appropriately to feedback from the market dynamics.

The Intel AI Builders program provides both an incubator for accelerating technology advances and an ecosystem primed to bring together the right companies and the hardware and software ingredients for creating smart solutions. As AI technology continues to reshape entire industries, Intel helps bring together the companies and technologies that enable the innovative breakthroughs and successes.

About IFDAQ

The IFDAQ consists of a proprietary and multiple-awarded AI-technology that combines deep, out-of-the-box thinking and cutting-edge methodologies to turn a highly complex fashion and luxury industry into an intelligent, predictable, and transparent AI-ecosystem by providing fundamental KPIs that are made visible for the first time.

As an industry game changer, IFDAQ disrupts the traditional consulting model with deep learning-shaped real-time metrics and performance values that turn unseen crucial dynamics into clear insights instantly.

The data and values are the result of a sophisticated machine learning mechanism that reflects the monitored industry within a high-dimensional virtual image, introducing a new era of highly intelligent data processing by breaking down one of the world's largest industries to the absolute smallest quantifiable unit.

"The Intel AI Builders program helped us to gain access to the [Intel] AI DevCloud to experiment and train models. I think Intel provides a major exposure in a perfectly fitted ecosystem of tech ventures. Considering that part of business is to measure the reputation gain, I believe that it helps all AI-related ventures and startups to gain on brand value."

— Daryl de Jori,
Founder and
Head of Innovation, IFDAQ

Learn More

For more information about the ways that IFDAQ uses AI technology to provide deep insights and real-time KPIs in the fashion and luxury industry market, visit **https://www.ifdaq.com.**

Visit the Intel AI Builders site to learn more about opportunities and fostering the next generation of AI: **https://builders.intel.com/ai**.

End Notes

[1] *IFDAQ Selected to Join Intel AI Builders Partner Program.* SBWire. November 2018. http://www.sbwire.com/press-releases/ifdaq-selected-to-join-intel-ai-builders-partner-program-1088458.htm.

[2] **Training system configuration –** BASELINE AND TEST COMPARISON: Tested by Intel as of 08/06/2019. Intel Xeon Gold 6248 processor @ 2.50 GHz. Two sockets, 20 cores per socket, 80 cores/160 threads, Ubuntu 18/04.2, Python v3.6, TensorFlow 1.12.0 (Intel optimized versus non-optimized), Python v3.6, Anaconda v4.5.11, GCC v4.8.2, Keras v2.2.4, NumPy 1.15.4 Intel. Framework: Intel Math Kernel Library (Intel MKL), feed forward—single layer topology, batch size 200, dataset 124K.

[3] **Inference system configuration –** BASELINE AND TEST COMPARISON Tested by Intel TSE as of 08/06/2019. Intel Xeon Gold 6248 processor @ 2.50 GHz. Two sockets, 20 cores per socket, 80 cores/160 threads, Ubuntu 18.04.2, Python v3.6, TensorFlow 1.12.0 (Intel optimized versus non-optimized), Python v3.6, Anaconda v4.5.11, GCC v4.8.2, Keras v2.2.4, NumPy 1.15.4 Intel. Framework: Intel Math Kernel Library (Intel MKL), feed forward—single layer topology, batch size 200, dataset 124K.

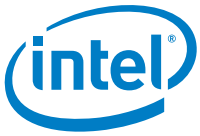
[4] *IFDAQ Announces Professor Godart as New Advisor.* IFDAQ NEWS/PR. January 2017. http://www.edaqs.com/2017/02/ifdaq-announces-professor-godart-as-new-advisor/

Notices and Disclaimers

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to www.intel.com/benchmarks.

Optimization Notice: Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessordependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice. Notice Revision #20110804

Performance results are based on testing as of August 6th, 2019 and may not reflect all publicly available security updates. See configuration disclosure for details. No product or component can be absolutely secure. Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration.



0220/RA/MESH/PDF 338147-001US