How IT service providers can innovate AI-ML solutions with minimal data

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Worldwide, data is growing exponentially and fueling the information revolution. It is estimated that by 2025, the total global data will reach about 163 Zettabytes (see Fig. 1).

While this data is being produced, distributed and consumed across the internet, a large chunk of it is harnessed by tech giants like Google, Facebook, Amazon, Apple, Baidu & Microsoft to develop innovative insights about consumer behavior, experience and needs, through AI-ML algorithms. These algorithms help in figuring out ways to perform important tasks by decoding and interpreting the available data. With increase in data availability, solutions for complex problems can be ascertained.

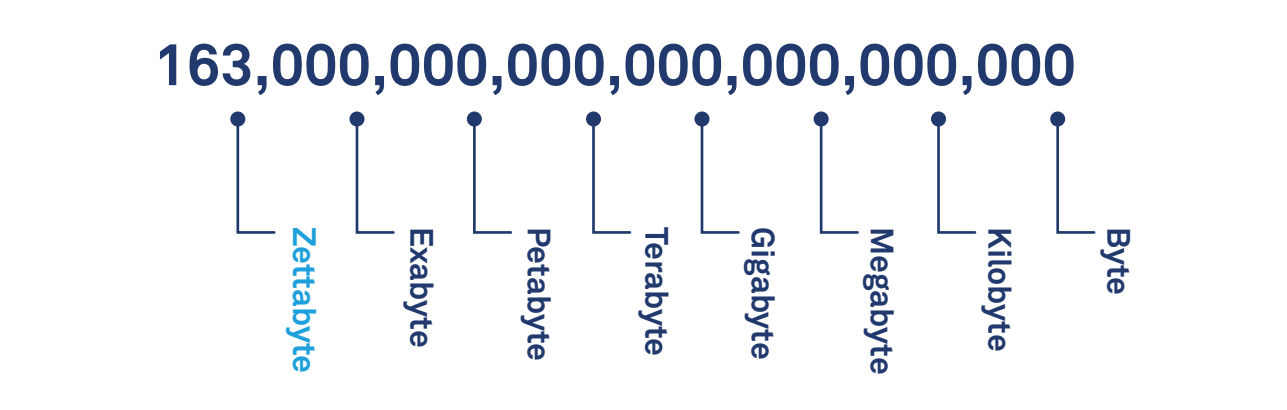

Fig. 1-Source: IDC's Data Age 2025 study, sponsored by Seagate, April 2017

The essential ingredients for building such intelligent solutions are - compute power, platform, algorithms and data (see Fig. 2).

Access to such a large dataset gives the tech giants a definitive competitive advantage - to understand, predict and even nudge consumer behavior. Moreover, insights drawn from data propagate through the network effect drawing more people to it, which, in turn, adds to the available data.

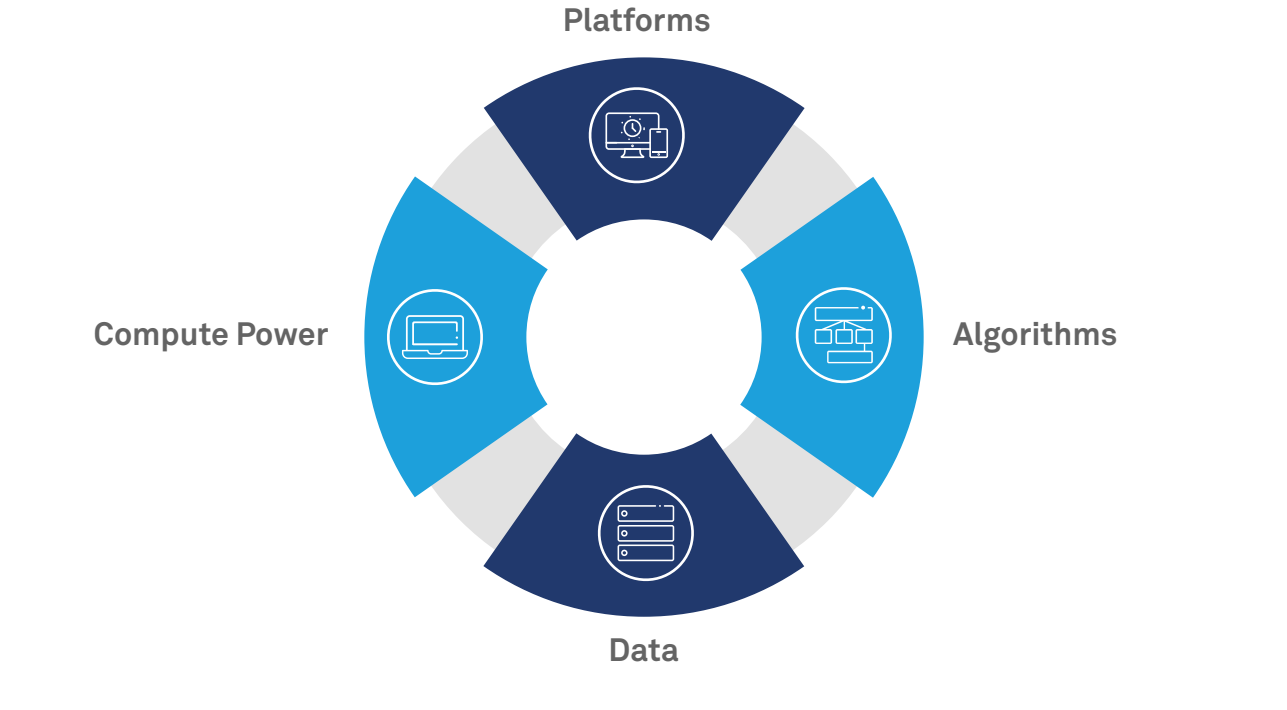

Fig. 2

The question, however, remains as to how IT service providers can create disruptive innovations[i] in this space and withstand competition. There are three main challenges with respect to data that IT service providers face while building AI-ML solutions:

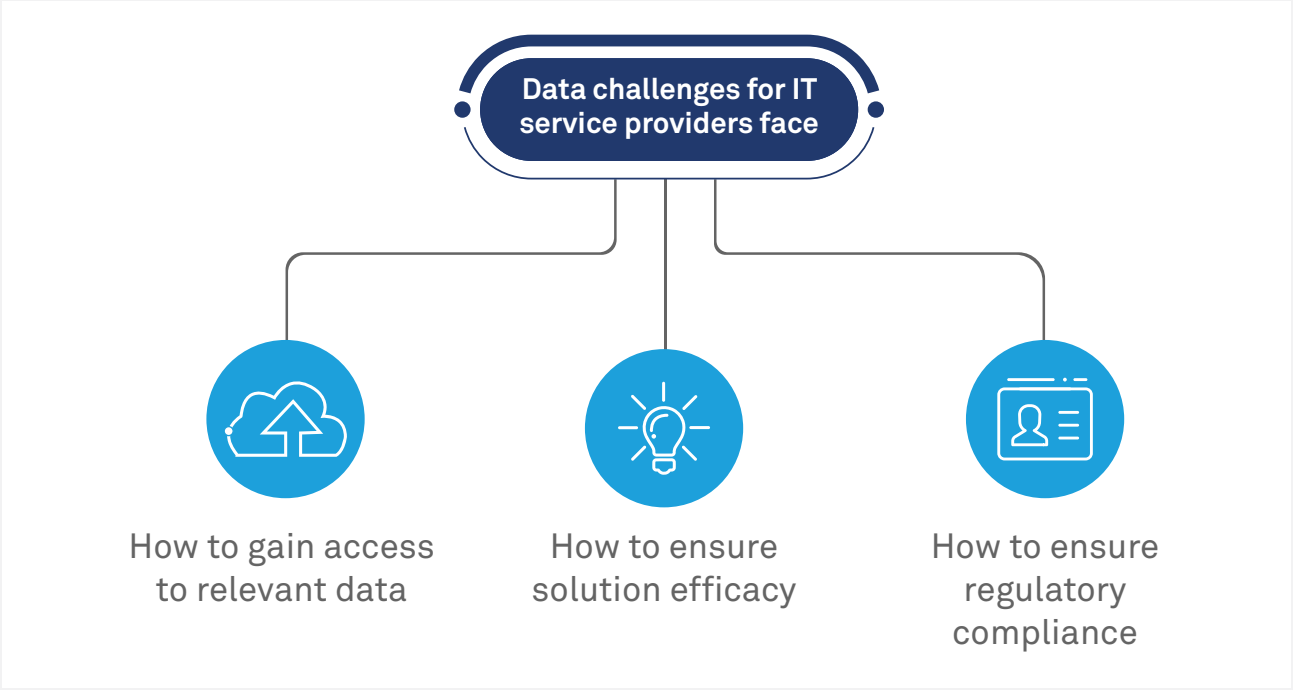

Fig. 3

Gaining access to relevant data: How can data seamlessly flow out of the client systems and the actionable insights flow back into the system in a secure, consistent and transparent manner under a unified governance umbrella?

Ensuring solution efficacy: How can accuracy of the insights that the solutions offer with lesser data, including solution efficacy, be ensured?

Ensuring regulatory compliance: Respecting privacy of consumer data with ethical and transparent usage is very important. Stricter data privacy regulations like the new European General Data Protection Regulation (GDPR) increase restrictions on the ways in which data can be processed. Ensuring regulatory compliance is a big challenge.

To understand how service providers can build innovative AI-ML solutions, we need to consider AI as a set of technologies and building blocks that span across a continuum of various capabilities (see Fig. 4). The techniques discussed below can help service providers build advanced models, and enable them to better map domain use cases to capabilities across the AI continuum.

Fig. 4

Generative Adversarial Networks (GAN)

GAN[ii] was introduced in 2014 by Ian Goodfellow. This technique combines generative and discriminative data models that are simultaneously trained and pitted against each other - like a two player Min-Max game.
The generative model is trained to generate synthetic data from random noise while the discriminative model is trained to classify if the generated data is part of the training data or not i.e. to make the generator rollout better data.

Let us illustrate this with an example. If we want to train a binary classifier on 50 independent variables with say, 1 million annotated data samples, it essentially leaves a gap of 2^{50} - 10^6 possible occurrences in the real world whose classes cannot be trained in the model.
The generator can fill this gap by generating sample data points, which the discriminator will ensure are correct and facilitate accurate overall prediction.

GANs are being applied in many innovative ways like generating images from text description[iii] and cancer drug discovery[iv]. Apart from applications in industrial domains, IT service providers can apply them to solve complex tasks like generating project plans from requirement documents or code from use cases.

Transfer learning

Transfer Learning[v] leverages knowledge from one or more related tasks to achieve higher learning performance by:

Having a higher initial performance in the target task as compared to that of an untrained agent

Requiring lesser time to learn the target task

Achieving higher final performance in the target task as compared to the performance achieved without transferred knowledge

There are several popular pre-trained models available in computer vision and natural language processing such as:

- Keras[vi] – It has models like Microsoft ResNet50 and Google Inception-V3 for image recognition. These models are trained on ImageNet[vii], an annotated library of 14 million images
- Google - It offers word2vec[viii], a pre-trained model for natural language processing which is trained in 100 billion words

To conclude, the techniques discussed in this article enable new levers for IT service providers, helping them to develop recombinant data strategies and machine learning models to create innovative offerings in the AI-ML space.

About the author

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He has over 20 years of professional experience in the IT Industry in delivery execution and strategic program management. Sunil played a central role in the rollout of Wipro's Next-Gen delivery model and adoption of Wipro's HOLMES™ automation platform in the Consumer Business Unit leading to millions of dollars of value realization. He is passionate about application of AI-ML solutions in business transformation. His current focus is evangelization and building of verticalized solutions in Consumer, Retail, Media and Hospitality domains using AI-ML technologies.

References

[i]https://www.weforum.org/agenda/2015/04/how-to-create-disruptive-innovation/

[ii]https://arxiv.org/abs/1406.2661

[iii]https://arxiv.org/pdf/1605.05396.pdf

[iv]http://www.oncotarget.com/index.php?journal=oncotarget&page=article&op=view&path%5B0%5D=14073&path%5B1%5D=44886

[v]https://en.wikipedia.org/wiki/Transfer_learning

[vi]https://keras.io/applications/

[vii]http://image-net.org/about-stats

[viii]https://code.google.com/archive/p/word2vec/

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