

TECHNOLOGY PAPER

Machine Learning

The Critical Pillar of Digital Transformation

Contents

Introduction

1
What is
Machine Learning?

2
The benefits of
Machine Learning

3
Digital
transformation

4
The Role of
Unstructured Data

5
Intelligent Search

Conclusion

Gartner predicts that by the end of 2024, **75%** of enterprises will **shift from piloting to operationalizing AI**, driving a **5X increase** in **streaming data and analytics infrastructures**. Within the current pandemic context, AI techniques such as **machine learning (ML)**, optimization and **natural language processing (NLP)** are providing vital insights and predictions about the spread of the virus and the effectiveness and impact of countermeasures.



Introduction

The digital transformation wave has impacted organizations across geographies and verticals. Companies have realized that modernizing systems, implementing new-age technologies, embracing cloud, and investing in data analytics can help drive sustained value. And this has triggered varying degrees of digital transformation efforts.

Of all the technologies that contribute significantly to digital transformation, machine learning is one of the hottest trends, enabling organizations to unearth timely and accurate insights from the growing amounts of data.

Since data can overwhelm an organization's decision-making ability, machine learning empowers them to better understand enterprise data, improve business decision-making, and generate additional revenue. Using specialized algorithms, machine learning helps organizations understand data as well as the actions being handled by relevant processes – allowing them to improve those processes. As new data is fed, machine learning algorithms observe responses, and changes in the data environment – improving and refining performance overtime.

In this whitepaper, we will throw light upon

- What machine learning is
- The benefits of machine learning for various industries
- How machine learning drives digital transformation
- The role of unstructured data and why organizations need to care about it
- Intelligent Search – A powerful application of machine learning and NLP



Here are some machine learning statistics listed by Forbes

The global machine learning market is expected to reach **\$20.83 billion** in 2024

One in ten enterprises now use ten or more AI applications across chatbots, process optimization, fraud analysis, and more

\$28.5B was invested in machine learning applications in the first calendar quarter of 2019, leading all other AI investment categories

83% of IT leaders say AI & ML is transforming customer engagement while 69% say it is transforming their business

Reducing company costs (**38%**), generating customer insights & intelligence (**37%**), and improving customer experiences are the three most popular ML use cases

What is Machine Learning?

When fed with data, machine learning algorithms train computer systems to make accurate predictions across different business requirements. Identifying security vulnerabilities to detecting financial fraud, analyzing customer sentiments to providing personalized recommendations, improving healthcare diagnosis and treatment to powering smart applications are some of the many use cases of machine learning.

As technology advances, machine learning algorithms have become capable of analyzing far more complex data than humans can, leading to faster conclusions. Companies across sectors are increasingly using these conclusions to digitize business processes and make faster and more accurate decisions to improve business outcomes. Since these systems can learn from experience, they can continuously improve their analysis and, thus, business results.

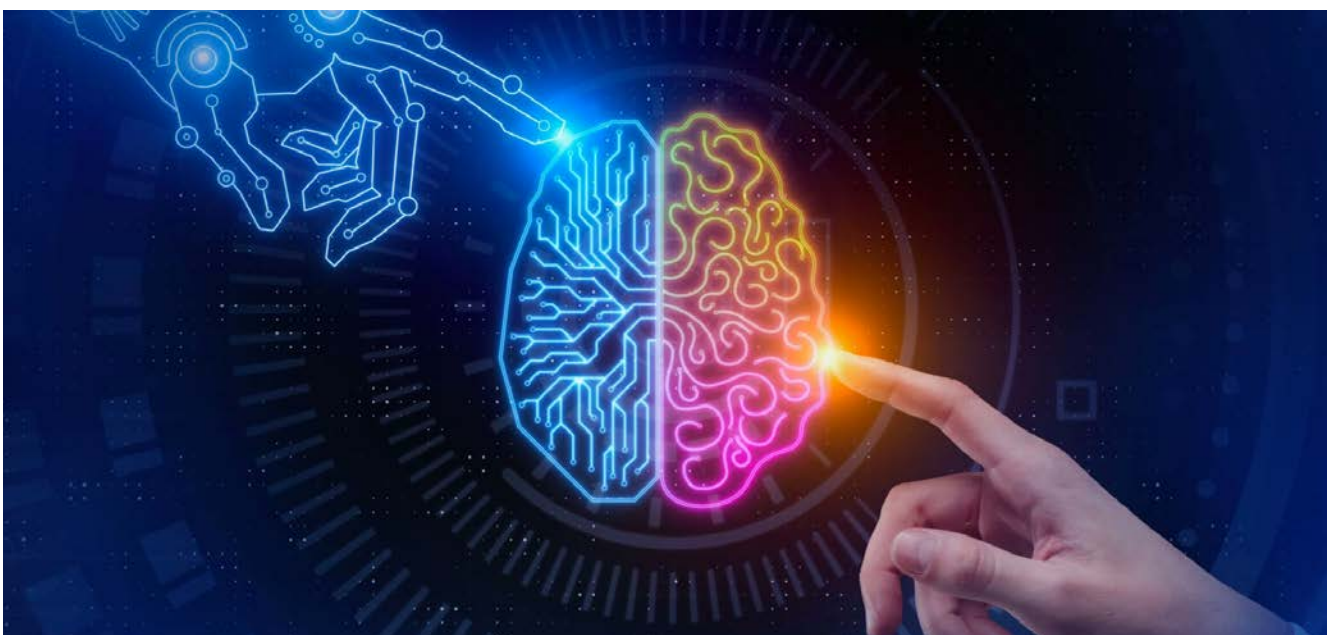
Using machine learning, organizations can

- Identify new opportunities for business excellence or problems needing immediate resolution
- Conduct creative problem-solving, respond to emerging stimuli and take action as needed to improve business processes
- Categorize and catalog information across transactions, accounts, products, markets, customers, and more
- Predict likely (or unlikely) outcomes and decide on actions by analyzing identified patterns
- Spot previously unknown patterns and relationships and detect new anomalous or unexpected behaviors and events within that data

Techopedia defines machine learning as

“
an artificial intelligence (AI) discipline geared toward the technological development of human knowledge. It facilitates the continuous advancement of computing through exposure to new scenarios, testing and adaptation, while employing pattern and trend detection for improved decisions in subsequent (though not identical) situations.

”



Benefits of Machine Learning for Various Industries

In a digital age, having anytime, anywhere access to actionable data has become a business imperative for those looking to succeed. Only those enterprises with a vision for intelligent, autonomous analytics will be able to tackle the growing complexity of business problems and move beyond ad-hoc decision-making to decision-making that drives efficiency, productivity, and competitive advantage.

Over the years, machine learning has expanded its wings and has helped solve enterprises' problems across several sectors and verticals. Let's look at some of the benefits of machine learning for various industries:

Finance

Given the far-reaching impact of modern sophisticated fraud, financial organizations are adopting machine learning for better risk management. Using machine learning, organizations can spot potential cases of fraud across different departments while clearly differentiating between legitimate and fraudulent transactions. Modern algorithms can also help discover outliers previously unseen or unheard of and identify transactions that seem risky or deceiving.



Logistics

For organizations struggling to accelerate their delivery schedules and meet time-to-market deadlines, machine learning-based algorithms can serve as the foundation of the next generation resource scheduling systems. By providing insights that organizations need into supply chain bottlenecks, machine learning can help identify complex constraints, cost, and delivery problems companies face today. Using these insights, organizations can then work towards anticipating anomalies before they occur and improving supply chain performance.



Data security

Data security has become an escalating problem for businesses worldwide. As breaches and hacks cause several millions of dollars of lost money and reputation, machine learning algorithms can proactively detect security loopholes and vulnerability with increased precision. By looking for patterns in how data is accessed, machine learning can report anomalies and prevent major security breaches from causing an enterprise-wide catastrophe.



Healthcare

The demands for better care outcomes have increased in the last few years, with tech-savvy and highly aware patients expecting more transparency and accuracy in diagnosis and treatment procedures. Machine learning algorithms can enable healthcare organizations to process growing patient and research data and spot patterns in health – quickly and easily. Such analysis can help understand risk factors for diseases in different populations while helping patients avoid hospitalizations through early detection.

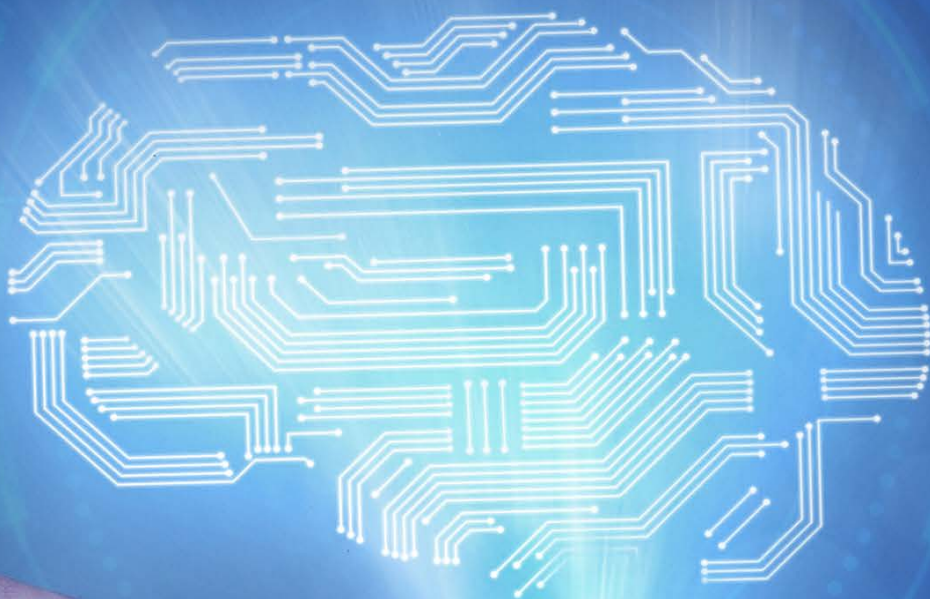


Customer Service

Machine learning is also being popularly used in the area of customer service. Since the more organizations understand their customers, the better they can serve them, machine learning paves the way for unmatched customer service. Using machine learning, organizations can proactively understand customer needs and wants, identify their issues and concerns, and set the stage for personalized recommendations and interactions. Machine learning can also help detect unhappy customers, so organizations can take the right steps in improving their experience with the brand.



Of all the technologies that contribute significantly to digital transformation, **machine learning** is one of the hottest trends, enabling organizations to unearth timely and accurate insights from the growing amounts of data.



How Machine Learning Drives Digital Transformation

Companies submerged in a sea of data often find it challenging to unearth value from that data for business decision-making. Having data does not hold much value unless organizations can harness it to unearth real-time insights. The challenges that this deluge of data bring restricts business value as well as a competitive advantage, limiting their ability to empower employees, improve processes, and meet customer and market demands.

With Gartner projecting that 40 percent of all new enterprise applications will include AI technologies, it is apparent that organizations big and small are quickly realizing the benefits (and potential) of AI and machine learning.

As the realm of machine learning expands rapidly, its allowing organizations to power their business operations with quicker and better data-driven decisions. Using machine learning models, they can transform traditional business intelligence and analytics and accelerate their transformation efforts. The path to digital transformation success requires modernization of the underlying data infrastructure. Here's how organizations can use machine learning to drive transformation:

Proactively handle equipment issues

Organizations in the digital transformation journey need to be able to drive maximum value from their IT systems and equipment. Since even the slightest problem can cause substantial downtime, machine learning allows organizations to take a proactive approach rather than a reactive approach to rectify equipment issues. Such early action can help sustain equipment efficiency while helping organizations meet their business goals and targets.

Automate data preparation

With machine learning-driven analytics, businesses can automate the process of data preparation and reveal hidden patterns through smart data discovery and interactive exploration. Using interactive visual explorations, they can improve the speed of unearthing data-driven insights. It can quickly and accurately navigate through the millions of data points across the enterprise and contextualize it for better understanding - leading to faster decision-making.

Better serve customers

Meeting the demands of the modern tech-savvy customer in the digital age has become extremely critical. Machine learning can help organizations make the right decisions to ensure customer satisfaction. They can identify unhappy customers, deliver targeted and contextually relevant offers, and build stronger and long-lasting relationships with them.

Organizations can use machine learning to drive transformation in following ways



Proactively handle equipment issues



Automate data preparation



Better serve customers

The Role of Unstructured Data and Why Organizations Need to Care about it

The growing volumes of data that gets generated every second can get extremely overwhelming for organizations – especially since most of it is unstructured. Despite all the efforts towards digitizing data, a lot of it still sits in text documents, PowerPoint presentations, email conversations, audio and video files, and more. At the same time, the lack of a systematic approach for data capture, management, measurement, and improvement leads to several issues with respect to cohesiveness and efficiency.

Although organizations have long been assimilating and storing unstructured data, several things keep them from successfully managing it. Some of these challenges include lack of the right tools, difficulty in integrating incoherent data with existing systems, shortage of the right resources, and turning a blind eye towards the importance of standardizing it.

As the volume and complexity of unstructured data grow, it begins to present several problems for organizations and limits their abilities to understand their business, anticipate market changes, and quickly act on risk and opportunity.

Because of a lack of a standard format in which unstructured data is stored, it isn't a good fit for relational databases. However, given the advances in technology, unstructured data opens doors to a world of opportunities for AI and machine learning algorithms. Because these algorithms are built to analyze different types, formats, sizes, and volumes of data, they can – with precision – deal with unstructured data and provide actionable insight across customer relationship management, predictive maintenance, regulatory compliance, and more.

A variety of natural and deep learning tools are being used across industries today to analyze unstructured data in a big data environment. With their ability to look for patterns, keywords and sentiments, these tools can help in understanding hidden meaning and context in unstructured data while delivering insights that can be used for improved decision-making.

As machine learning becomes increasingly mainstream, an enterprise wide search is quickly emerging as a business prerogative. Given that almost 80% of all enterprise data is unstructured, scattered across emails, documents, social media posts, service desk interactions, customer reviews, support requests, and more, extracting valuable information quickly and easily from unstructured data is extremely important.

Types of unstructured data



Text



Audio



Video



Images



Emails



Customer Interactions



System Logs



Social Media



Device

Intelligent Enterprise Search – A Powerful Application of Machine Learning and NLP

As machine learning becomes increasingly mainstream, Intelligent Search is quickly emerging as a business prerogative. Given that almost 80% of all enterprise data is unstructured, scattered across emails, documents, social media posts, service desk interactions, customer reviews, support requests, and more, extracting valuable information quickly and easily from unstructured data is extremely important.

Intelligent Search makes it easy for business users to discover relevant information from the massive volume of enterprise data and use it to carry out tasks, make decisions, and drive value. It uses NLP to translate human speech or text into a format that can be understood by computers and sets the foundation of the next generation of enterprise search. In contrast to traditional keyword-based search, which relies on simple statistics, Intelligent Search leverages AI and ML techniques to improve search accuracy and make it more cognitive.

Wissen's Intellisearch Accelerator

Wissen's IntelliSearch helps conduct targeted search and perform paragraph-level scoring while identifying events and relations to unstructured data. It also helps filter documents faster and with more

Intelligent Search Accelerator



Conduct targeted search



Perform paragraph-level scoring



Unearth relations in unstructured data



Filter documents quickly



Identify semantically similar tokens

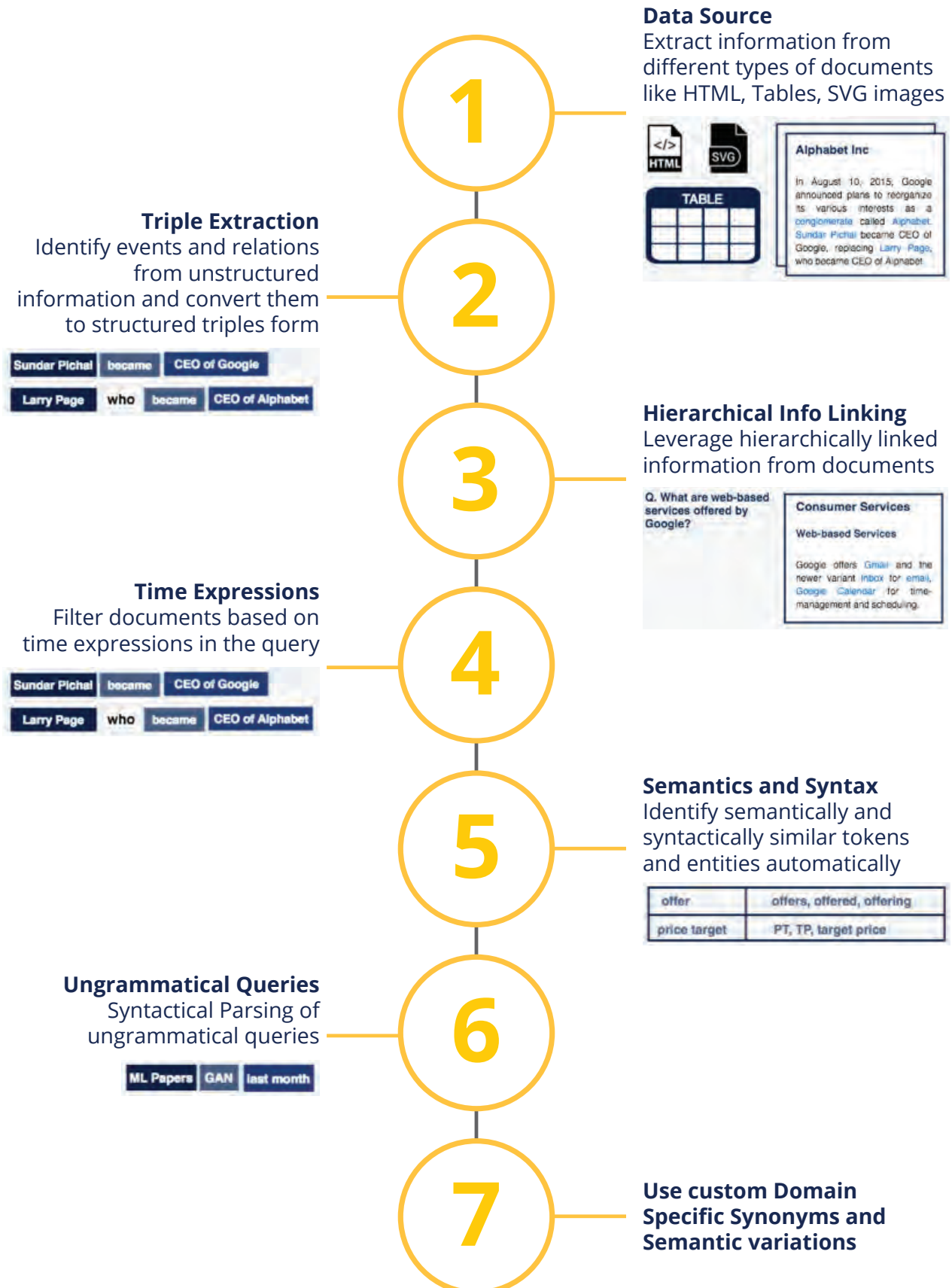


Boost search relevance



IntelliSearch helps conduct **targeted search** and **perform paragraph level scoring** while identifying events and relations to unstructured data. It also helps filter documents faster and with more accuracy based on time expressions in the query. Using Intelligent Search, users can achieve high-quality search results even with grammatically incorrect queries.

Wissen's IntelliSearch Accelerator



Using Wissen's IntelliSearch accelerator, organizations can



Easily scan through large and voluminous reports and get the most relevant results for questions



Gain robust and extensive text pre-processing capabilities to produce a deeply enriched version of the input. It also converts unstructured data from free form text, HTML documents, images, and tables into intermediate form and stores it as triples



Leverage lexical analysis, linguistic and semantic analysis on documents and queries, and paragraph relevance scoring for relevant search output



Boost relevance score by employing hierarchical properties of the document text



Link unstructured data with both internal and external structured data to drive powerful analysis



Get exact data from document tables even if the document is an image



Access context-aware entity extraction

Example 1 - User Question: What is the price target for XYZ

Top Results.....

XYZ Forecast

The 10 analysts offering 12-month price forecast for XYX have a median target of 125.50, with a high estimate of 142.00 and a low estimate of 105.00. The median estimate represents a +20.73% increase from the last price of 103.95.

Ticker	Price Target
XYZ	110

Example 2 - User Question: What is EBITDA of APPL in 2018 and 2019

Top Results.....

The diagram illustrates the difference between Plain OCR and Intelligent OCR. Plain OCR extracts text from a financial report, resulting in a messy, unstructured list of text. Intelligent OCR, on the other hand, uses table search to extract data from tables, resulting in a clean, structured table.

Plain OCR

Not useful other than Token search

Intelligent OCR

Table search is performed on the data

	2018	2019	2020	Comments
StuHub 2018 GMV	5416	5416	5416	+12% y/y
Take Rate	22.4%	22.4%	22.4%	Flat y/y
2018 Revenue	1211.3	1211.3	1211.3	
Revenue Multiple	3x	4x	5x	Comp. group trades at 4x EV/Sales
StuHub Value	3633.8	4845.1	6056.3	
StuHub Value Per Share	\$1.98	\$4.49	\$5.58	
Classified 2018 Revenue	938.1	938.1	938.1	+8% y/y vs. 9% y/y for Scout24
Est. Margin	45%	45%	45%	Scout24 EBITDA margin is ~68%
EBITDA	422.2	422.2	422.2	Scout24 trades at ~1x 2018 EV/EBITDA
EBITDA Multiple	14x	13x	13x	
Classified Value	998.2	632.4	675.5	
Classified Value Per Share	\$5.36	\$5.79	\$6.13	
StuHub and Classified Total Value	9544.0	11177.5	12838.9	
StuHub and Classified Total Value per Share	\$8.66	\$18.34	\$13.63	
StuHub and Classified as % of Current-day Enterprise Value	27%	31%	30%	

High Comments

- +12% y/y
- Flat y/y
- Low
- Med
- StuHub 2018 GMV
- Take Rate
- 2018 Revenue
- Revenue Multiple
- StuHub Value
- StuHub Value Per Share
- 5.416
- 22.4%
- 1,211.3
- 5,416
- 22.4%
- 1,211.3
- 5,416
- 22.4%
- 1,211.3
- 5,416
- 22.4%
- 1,211.3
- Comp. group trades at 4x EV/Sales
- 3,633.8
- \$5.58
- 6,056.3
- \$4.49
- 6,056.3
- \$5.50
- Classified 2018 Revenue
- Est. Margin
- EBITDA
- EBITDA Multiple
- Classified Value
- 938.1
- +8% y/y vs. 9% y/y for Scout24
- Scout24 EBITDA margin is ~68%
- 938.1
- 938.1
- 45%
- 422.2
- 13x
- 675.5
- 6,133
- 12,838.9
- \$13.63
- 30%

Key Features of the Intellisearch Accelerator

- Ability to easily **integrate with the organization's Contract Management Systems** and capably **scan legal documents** for specific clauses
- Easy **integration with a chatbot search** to **generate a relevant history** of data already present on the website
- **High scalability** and ability to be **integrated on the cloud and scaled dynamically** with ease
- **No dependency** on manually labeled data in the accelerator
- **Seamless integration** with the client's infrastructure (both on-premise and cloud)



Conclusion

As technology advances and becomes a differentiating factor for success, digital transformation has come into the spotlight. Only those organizations that drive efforts in transforming themselves digitally are expected to have a highly motivated workforce who can maximize business value, drive customer satisfaction and loyalty, and easily meet revenue goals and targets.

With data growing exponentially, enterprises are struggling to reinvent their processes to drive agility and outdo the competition. Harnessing the power of unstructured data requires them to embrace technologies like machine learning to stay the course as well as to unlock hidden value within that data and deliver transformative results.

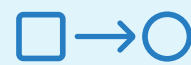
Through its inherent nature to learn from experience, machine learning has a big role to play in digital transformation.

Gartner predicts that by the end of 2024, 75% of enterprises will shift from piloting to operationalizing AI, driving a 5X increase in streaming data and analytics infrastructures. Within the current pandemic context, AI techniques such as machine learning (ML), optimization and natural language processing (NLP) are providing vital insights and predictions about the spread of the virus and the effectiveness and impact of countermeasures.

Using machine learning models, organizations can proactively identify bottlenecks, detect equipment issues, improve risk management, enhance business process efficiency, and more easily meet and exceed customer expectations. They can also use machine learning as a critical tool to set the stage for Intelligent Search – By using NLP, they can make it easy for business users to fetch the data they are looking for, unearth relationships, spot patterns and boost search relevance.



Digital transformation




Reinvent the process



75% enterprises will shift from piloting to AI



Intelligent Search

The background is a vibrant, abstract composition of glowing lines and circles. The colors range from deep blues and purples to bright pinks and oranges. The lines are thin and intersect to form a complex, web-like pattern. The circles are of various sizes and some are filled with a soft, glowing light, creating a sense of depth and movement. The overall effect is that of a digital or data visualization, possibly representing a network or a complex system.

As machine learning becomes increasingly mainstream, **Intelligent Search** is quickly emerging as a business prerogative. Given that almost 80% of all enterprise data is unstructured, scattered across emails, documents, social media posts, service desk interactions, customer reviews, support requests, and more, **extracting valuable information** quickly and easily **from unstructured data** is extremely important.

About Wissen

Established in the year 2000 in the US, Wissen is an Information Technology company headquartered in Bangalore, India. With global offices in US, India, UK, Australia, Mexico and Canada, Wissen is an end-to-end solution provider for companies in sectors such as Banking and Financial Services, Telecom, Healthcare, Manufacturing and Energy verticals.

With best in class infrastructure and development facilities spread across the globe, the company has successfully delivered \$650 million worth of projects for more than 20 of the Fortune 500 companies. Wissen's 1400+ highly skilled professionals, a strong leadership team, and technology expertise help clients build enterprise systems, implement a modern digital strategy, and gain a competitive advantage with business transformation.

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