IoTIntelligence™ REPORTS

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IoT Community

IIoT Applications at the Intersection of Digital Twins

Areas of Innovation Included:

Digital Transformation

Industry 4.0

Spatial Intelligence

Predictive Intelligence

Cloud-Based Digital Twin

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Digital Transformation

Digital transformation refers to the utilization of digital technologies, including artificial intelligence (AI), cloud computing, the Internet of Things (IoT), and edge computing, among others, within companies' processes and strategies.

This shift is expected to bring companies benefits on several levels, from improved and optimized production processes to efficient resource usage and increased workforce engagement, giving them a competitive advantage in the evolving markets.

From the Valuer platform:

Average funding of the Digital Transformation companies

19,415,800 USD

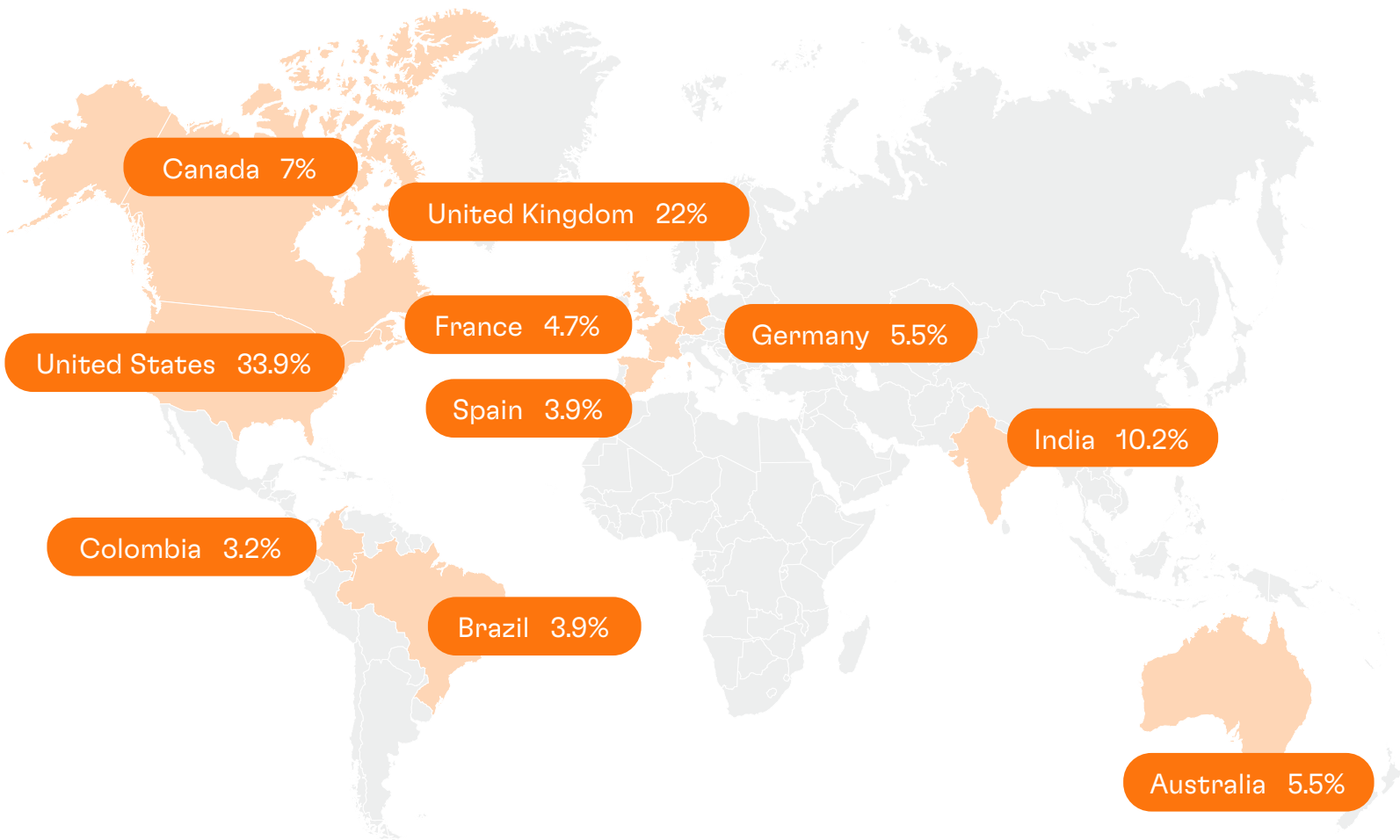
Technology Trends:

ⓘ Click on the tech trends to learn more

Blockchain: Blockchain is a decentralized and distributed network of digital ledgers that facilitates the process of recording transactions and tracking assets in a business network. Popularized with the rise of cryptocurrencies, the blockchain delivers immediate and completely transparent information between nodes with high security in place.

AIOps and Automation: AIOps combines advanced Big Data analytics with Machine Learning (ML) and Artificial Intelligence (AI) to automate IT operations. It is used to deliver faster root cause analysis (RCA) and accelerate the mean time to repair (MTTR).

10 countries with the most Digital Transformation companies on the Valuer platform:



Company Highlight:

Norlean

Year of inception:
2017

Location:
Pontevedra, Spain

Company stage:
Go-to-Market

Funding:
N/A

Team size:
14

Website:
norlean.com/en/

Norlean is a software company that develops digital twin solutions for organizations. The company's flagship product, NOA, is a cloud-based Digital Twin of an Organization (DTO) platform that enables businesses to gain greater control and real-time visibility into their internal processes.

Empowered by AI, the solution allows users to simulate different scenarios through data and process analysis to enhance and optimize their performance. Norlean was established in 2017 and currently operates from its premises in Pontevedra, Spain, employing a multidisciplinary team of 14 professionals.

Customers:

Citroën

Schneider Electric

Grupo Marsan

ASIME

Business Model

The company's business model is centered around the following characteristics:

- Norlean operates on a B2B and B2G basis, offering its NOA platform to enterprises and organizations across the automotive, food, healthcare, and energy sectors.
- NOA encompasses an intuitive, visual tool that can be deployed across any level of companies' chain of command. The platform leverages operational data and converts it into key indicators and 3D models using AI analysis.
- The company's offering is applicable for various use case scenarios, namely production planning, supply optimization, yield prediction, and more.
- Norlean generates revenue on a SaaS-based model.

Value Proposition

The company communicates the following as its main value propositions:

- The AI-enhanced platform utilizes advanced algorithms to perform business feasibility simulations. According to the company, NOA has carried out more than 100,000 scenarios across its simulator, accommodating service to over 400 users to date.
- The solution features easy integration, allowing users to generate and simulate complex scenarios that can improve the decision-making process for middle and executive management.
- Moreover, the platform doesn't entail calculation capacity limits and can conduct real-time process monitoring.
- Norlean has successfully deployed NOA across the operation of numerous eminent industry players, including PSA Peugeot Citroen, Schneider Electric orGrupo Marsan, among other.

Product Portfolio 1/2

Norlean's product portfolio comprises NOA, a cloud-based platform whose core feature is creating DTO (digital twins of an organization). To create a DTO, the software acquires and exploits data from IoT sensors, business processes, and logistic flows. Moreover, it utilizes statistical and mathematical models to conduct performance analysis while applying advanced AI algorithms to form and deliver predictions. In essence, NOA allows users to run virtual scenarios and create comprehensive simulations of an industrial or business process to identify areas for improvement across their operations.

Norlean employs a six-phase process when creating a DTO:

1. Analysis - the initial phase wherein Norlean acquires and contextualizes the client's metrics, key performance indicators (KPIs), sensors, IoT, and business data. During this stage, the software creates a 3D design of the process to display each process within the DTO visually.
2. Usability - during this phase, the software details the interaction and simulation interfaces, which are cloud-hosted and are programmed to account for various input metrics, including raw materials, purchase orders, manufacturing capacity, and more.
3. Programming - the process utilizes mathematical modeling and AI algorithms to deliver a beta version of the digital twin that will be used to validate data and processes and ensure correct simulations.
4. Connection - entails defining I/O connections, data input and output, type of integration, and twin location. Users can choose between deployments on Norlean's cloud or within their own cloud/server environments.
5. Activation - also known as the go-live phase, during which the software conducts the first tests to evaluate the implementation of various points of view, namely security, speed, server load times, cloud services, and response time.
6. Delivery - encompasses the last stage, wherein Norlean completes NOA's integration with documentation, training, and support.

NOA's digital twins feature three layers: (1) a process layer that allows users to assess and define their production capacity via analysis of supply performance, simulation and evaluation of production capabilities, and review and optimization of the production system, (2) a financial layer that provides a real-time cost/benefit per product analysis, complemented with a financial and HR analysis, and (3) an economic layer that interrelates the gross profit of the client's product lines according to production costs, featuring economic analysis of elements involved in the process and of various economic rates, poised to be incorporated within the organization's processes.

NOA Health

Another offering in Norlean's portfolio is NOA Health, a NOA-based solution that automates, standardizes, and optimizes the process of scheduling patients and allocating resources in radiation and oncology units. The solution uses mathematical optimization techniques to identify field-related issues and provide solutions. As its primary client for NOA Health, Norlean targets radiology centers within private and public hospitals across Europe and the USA.

In terms of application, NOA Health can be used for assigning and scheduling issues, operational management (defining the accelerator schedule for a specified plan horizon and RTU configuration), and tactical management (analyzing and evaluating different alternatives or settings for setting up the RTU on short/medium term shifts and vacant accelerators).

Market Opportunities

The company is operating in the digital twin market.

- According to Markets and Markets, this market was valued at $6.9 billion in 2022, anticipated to grow to $73.5 billion by 2027 while registering a CAGR of 60.6% during the forecast period.
- The market is forecasted to remain lucrative on account of the growing emphasis on digital twins in manufacturing industries to decrease costs and improve supply chain operations, coupled with the surging demand for digital twin solutions from the healthcare industry. The rising focus on predictive maintenance is anticipated to further drive the market growth.
- In terms of region, North America is anticipated to hold the largest share of the global digital twin market between 2022 and 2027 due to its early adoption of digital twin and related technologies.
- Key market players include Robert Bosch, Oracle, DNV, Autodesk, SAP, Emerson, ABB, Honeywell, and IBM, among others.

Achievements

To date, the company has achieved the following milestones:

- In 2021, Norlean was listed among the “46 Best Data Visualization Startups in Spain” by Data Magazine.
- In 2020, the company was named among the winners of the EACN Best Practices Award in recognition of its industrial modernization innovation.
- In 2019, Norlean was awarded the Prize for Galician Industry by ICOIIG (Galician Industrial Engineers Illustrious Board).
- Moreover, Norlean was selected as a participant in the second and third edition of the BFA (Business Factory Auto) initiative, taking place in 2018 and 2019, respectively. The initiative is promoted by the Xunta de Galicia, whose objective is to accelerate specialized projects in the automotive industry and to help them grow into viable and scalable companies.
- The company has received the “Innovative SME Seal” awarded by the Ministry of Science and Innovation of Spain.
- Another accolade encompasses the Neotec Prize for developing intelligent software based on LEAN methodology and advanced simulation technology.

Executive Team 1/2

Daniel Prieto, PhD

Co-Founder & CEO

Experience:

- General Partner at Noso Capital (current)
- CEO of Soltec Ingenieros S.L. (current)
- Co-Founder of WannaCheck S.L. (current)
- Member of Board of Directors at Eneo Gestion S.A.
- Director of Quality and Production at Trocarsa
- Country Manager at Optime Limited - India

Academic Background:

- PhD in Industrial Engineering from The University of Vigo
- MEng in Industrial Engineering from the University of Galway
- BIE from The University of Vigo

Tomás Pérez

Co-Founder

Experience:

- CEO at Noso Capital (current)
- Partner at OPF (current)
- Economy and Business Counselor at On Tax & Legal
- CEO at Dairylac S.L.
- Advisory Counselor at Improven
- Managing Partner at Grupo Cafés Dakar, Bodegas Solano S.L., Valensia Fruits, and Bodegas Torroja

Academic Background:

- Diploma from the University of Zaragoza
- Diploma in Operational Research and Systems from the University of Valencia

Executive Team 2/2

Iñigo Gonzalez

General Manager

Experience:

- General Manager and Sales Director of Gocsa
- Sales Director at Metaldeza
- Director of Distribution and Logistics and Managing Director for Angola at Companhia Previdente Group
- Managing and Sales Director at Sonkyo-Energy S.L. and Mecanizados Rodriguez Fernandez
- Management Consultant at Prisma Group S.L.
- Managing Director at Vinhos Ibericos and Kiwi Iberica

Academic Background:

- Degree in Business and Economics from The Complutense University of Madrid

Industry 4.0

Industry 4.0 is a concept that refers to automation and data exchange in manufacturing technologies, all with the goal of providing benefits such as predictive maintenance, self-optimization, and process optimization, among others.

Some of the technologies closely associated with this concept are artificial intelligence (AI), the Internet of Things (IoT), cloud computing, and machine learning (ML).

From the Valuer platform:

Average funding of the Industry 4.0 companies

14,313,953 USD

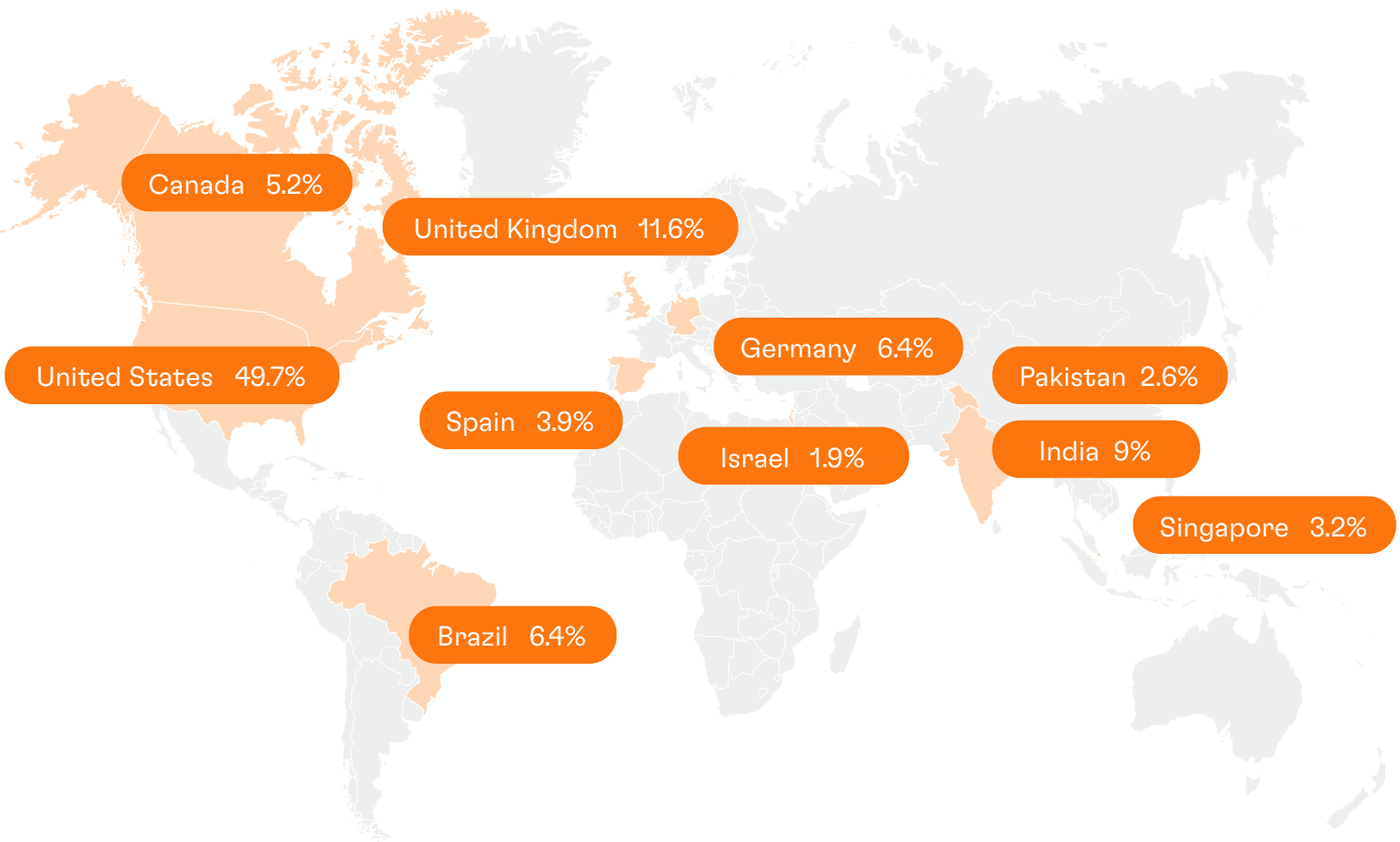
Technology Trends:

ⓘ Click on the tech trends to learn more

Big Data in Industry 4.0: Big Data is a field that consists of large, complex, and voluminous data sets, along with the processes and methods used to analyze and extract actionable insights from them. The technology plays a crucial role in Industry 4.0, analyzing sensor data from production machinery and providing valuable insights for smart factory management.

5G Technologies: 5G is the fifth, and latest, generation mobile network and global wireless standard after 4G. It promises to deliver higher speed, lower latency, and massive network capacity, essentially opening new industry applications.

10 countries with the most Industry 4.0 companies on the Valuer platform:



Company Highlight:

Decisyon

Year of inception:
2005

Location:
San Francisco, CA, United States

Company stage:
Growth/Expansion

Funding:
45,100,000 USD

Team size:
22

Website:
decisyon.com

Decisyon is a developer of bespoke software solutions that leverage IIoT (Industrial Internet of Things) technology to aid manufacturers' end-to-end digital transformation of their enterprise. Decisyon's solutions connect an organization's infrastructure and machinery, gather and analyze relevant data, and provide real-time insights into the operational footprint through digital twin technology.

Founded in 2005 in San Francisco (CA), Decisyon has grown to 22 industry experts and entrepreneurs led by the seasoned executive Alex Aminian, who holds the title of President & CEO, and Massimiliano Pane as the company's CTO.

Customers:

Schneider Electric

General Electric

Business Model

The company's business model is centered around the following characteristics:

- Decisyon is a B2B-oriented company targeting clients in the global manufacturing sector, including the pharmaceutical, energy, consumer goods, aviation, food and beverage, and electronics industries.
- Decisyon provides access to its platform via a Software-as-a-Service model, generating revenue through subscription fees.
- The company also collaborates with sales partners to reach a broader market, with notable providers including Microsoft, Schneider Electric, GE, SAS, and AWS.

Value Proposition

The company communicates the following as its main value propositions:

- Decisyon claims its production-ready vertical solutions can dramatically increase the speed to outcome in various manufacturing environments.
- The Decisyon App Composer platform allows for low-code or codeless application development and includes business process features that accelerate clients' digital transformation.
- The App Composer features enhanced usability and seamless integration with existing organization infrastructure through one-click deployment, reducing the time to market of the client's products.
- In addition to the App Composer Platform, Decisyon offers a wide range of products to comprehensively digitize the client's operations, covering data collection, analysis, prescriptive maintenance, supply chain management, etc.

Product Portfolio

Decisyon's product portfolio tackles various challenges in the manufacturing sector. The company's flagship product is the App Composer platform.

Decisyon App Composer

The platform presents a Low-Code/No-Code (LCNC) visual development environment that allows users to build and modify insight-driven applications. It simplifies the development and deployment of IIoT solutions through visual drag-and-drop functions, allowing less experienced developers to create industrial SaaS solutions. Notable features include a smart IoT gateway, API SDK management, data virtualization, white labeling, workflow alerts, edge analytics, self-service analytics, widgets, in-text collaboration, role hierarchies, device data management, and multiple languages. Additionally, Decisyon has developed custom integrated platform solutions for Schneider Electric, AWS, GE, and Microsoft Azure.

Digital Twin Solutions

Digital Factory

This solution comprises Industry 4.0-empowered applications that allow clients to create integrated digital factories, tailor products according to customer requirements, and respond to shifting market demands. The software suite is built with Decisyon's App Composer platform and is integrated with its Smart Gateway module.

The suite helps manufacturers achieve a complete end-to-end digital transformation by connecting all the moving parts within an enterprise, gathering and analyzing real-time data, and delivering a holistic view of operations through a digital twin. The cloud-based software solution can be applied to an existing workflow or adapted to specific client requests. According to Decisyon, Digital Factory increases production line productivity by up to 10%. It also reduces activities for shift handovers by 25%, delays in maintenance intervention by 10%, and data collection activities for process excellence meetings by 25%.

Smart Gateway

This tool is used for creating a digital twin of an organization's facility and processes. It serves to collect streaming sensor data from devices and machinery, store and orchestrate it in a data lake, and generate a digital twin at the edge, in the cloud, or on-premise. Other Decisyon applications, like the Manufacturing Execution System (MES), then utilize the digital twin to process and analyze the data and recommend appropriate action. Smart Gateway provides companies with a comprehensive view of floor operations and monitoring and diagnostics features that help reduce downtime and increase profit margins.

Asset Performance Management (APM)

The APM application addresses the need for essential insights into asset maintenance and operations. It helps organizations manage their assets by seamlessly integrating collaboration, task management, workflow, and alert features. The APM solution utilizes real-time data from multiple systems and sources to provide a single point of access to critical data generated by key assets, using predictive models to transform trends and historical data into actionable insight.

Other solutions within Decisyon's portfolio include:

Manufacturing Execution System (MES),

Control Tower,

Prescriptive Maintenance,

Digital Inspection Workflow,

Lean Manufacturing Optimizer, and

Supply Chain Management.

Market Opportunities

The company is operating in the global Industrial Internet of Things (IIoT) market.

- According to a report by Grand View Research, the global IIoT market size was evaluated at $321.81 billion in 2022 and is projected to reach a value of $1.69 trillion by 2030.
- The market is expected to grow at a CAGR of 23.1% during the 2022-2030 forecast period. This growth is attributed to the rising popularity and decreasing costs of industrial equipment sensors and processors and the growing need for operational competence and collaboration between major market participants.
- In terms of region, the North American market held the largest share of 33% in 2021, while the Asia-Pacific region is expected to exhibit the fastest growth rate of 26.6% during the forecast period.
- Leading providers of digital twin solutions include ABB, General Electric (GE), IBM, Intel, Rockwell Automation, Siemens, and Microsoft.

Achievements

To date, the company has achieved the following milestones:

- In August 2020, Decisyon formed a reselling partnership with Schneider Electric to accelerate the pace of digital transformation for their respective clients.
- Decisyon achieved the AWS Industrial Software Competency Partner status in March 2019.
- Decisyon officially launched its App Composer platform for GE's Predix as the first no-code visual software development environment in 2017.

Executive Team

Alex Aminian

President & CEO

Experience:

- President, CEO, and Director of DAVID Corporation
- CTO and Senior Vice President of LexisNexis
- CIO and Senior Vice President of Divine Interventures
- Vice President of Priceline.com
- Senior Director at Oracle
- Senior Manager at Intergraph

Academic Background:

- Executive Course in Finance from the MIT Sloan School of Management
- Executive Course in Marketing from Harvard Business School
- MSc in Civil Engineering from Louisiana State University
- BSc in Civil & Environmental Engineering from Utah State University

Massimiliano Pane

Co-Founder & CTO

Experience:

- Partner at Unyversys Consulting

Academic Background:

- Attended ITIS Galileo Galilei

Spatial Intelligence

Spatial intelligence refers to the concept of generating, retaining, retrieving, and transforming well-structured visual images using data. It provides micro-location and data analytics functionalities to numerous technical systems and software that learn position-based information and update its behavior accordingly.

As such, the technology is widely utilized in fields like transportation, retail, and augmented reality (AR).

From the Valuer platform:

Average funding of the Spatial Intelligence companies

12,119,927 USD

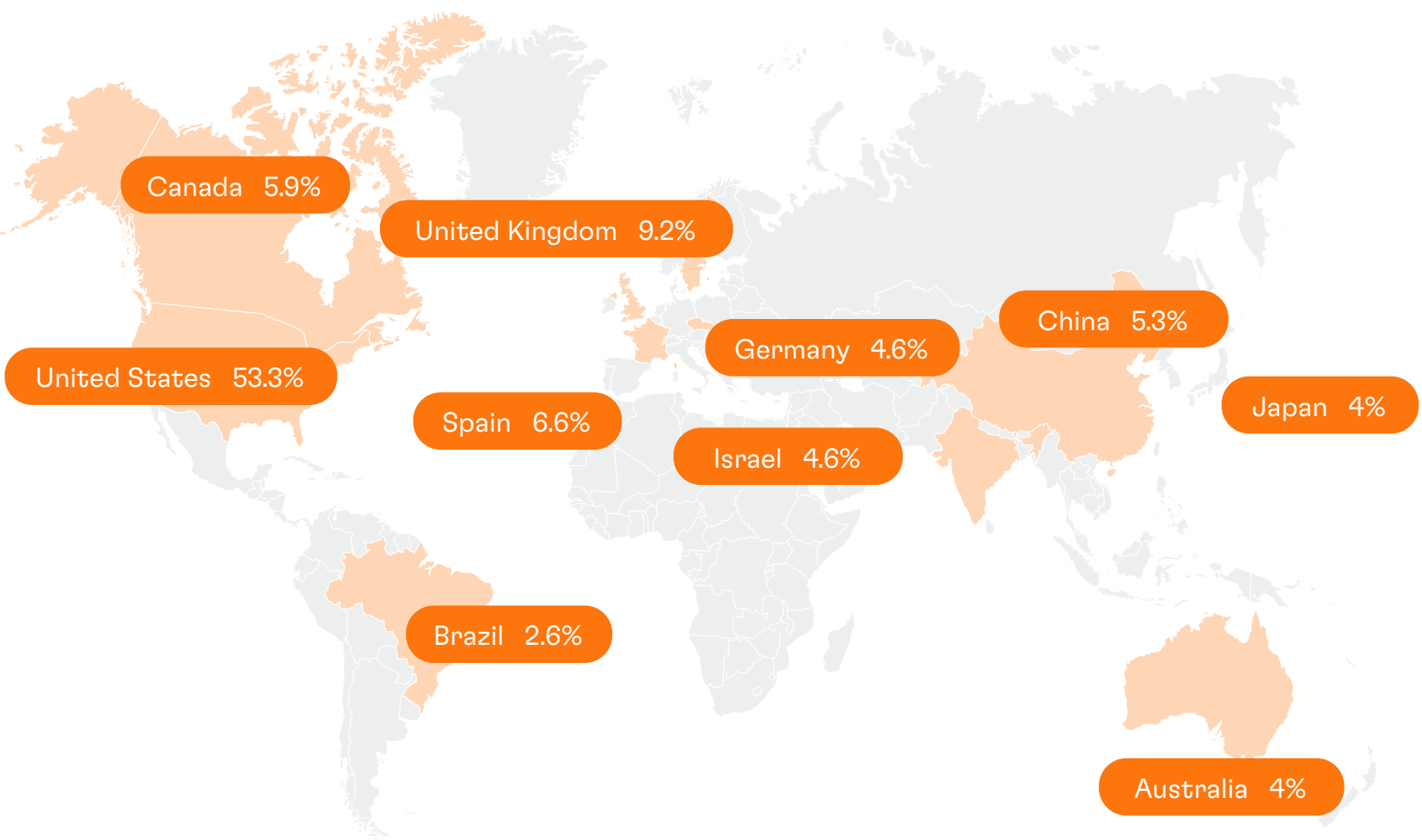
Technology Trends:

ⓘ Click on the tech trends to learn more

Augmented Reality (AR): Augmented Reality (AR) is an interactive, reality-based display technology that enhances the user's real-world environment by projecting digital information on top of it, such as audio, graphics, text, and other sensory stimuli. The technology is applicable for heads-up displays, AR glasses, smartphones, tablets, and smart lenses.

Mobility Modeling and Visualization: Mobility visualization tools use geographic location data to develop visual models that present people's movement in urban environments. The technology is used to influence civil infrastructure development, mainly focused on transportation, such as planning roads and public transportation networks.

10 countries with the most Spatial Intelligence companies on the Valuer platform:



Company Highlight:

ZeroKey

Year of inception:
2016

Location:
Calgary, Canada

Company stage:
Growth/Expansion

Funding:
N/A

Team size:
36

Website:
zerokey.com

ZeroKey has developed an IIoT sensor technology that provides 3D millimeter-level position accuracy for real-time workflow tracking. The solution promises operational visibility with unprecedented resolution—a key requisite for manufacturers to digitize manual processes and drive greater agility and productivity. Notably, ZeroKey's technology features process optimization, workflow tracking, and digital twin functionalities, poised to support clients in their digital transformation journey.

The company started its initial operations in 2016 in Calgary (Canada) and has since expanded to the United States, with a second office in Sunnyvale (CA), employing cumulatively 36 experts.

Customers:

This company has not disclosed information for its client list.

Business Model

The company's business model is centered around the following characteristics:

- ZeroKey is a B2B company aiding OEMs, factories, warehouses, and industrial businesses in their digital transformation processes across the entire organization.
- The technology is versatile, with applications in smart manufacturing, supply chain management, logistics, robotics, machine automation, and personnel safety, among others.
- ZeroKey has several revenue streams, mainly based on direct sales of its sensor technology, pilot kits, and software solutions.
- The company takes into account the client's unique needs and tailors the pricing of their offer accordingly. Potential customers can reach out to ZeroKey directly to obtain a quote.

Value Proposition

The company communicates the following as its main value propositions:

- ZeroKey's technology digitizes time and location, offering 4D operational intelligence with 3D millimeter-accuracy localization on any scale, ranging from large-scale wide-area coverage to localized work-area.
- Another benefit is the low latency data transmission, which helps users drive real-time control systems.
- The solution is further empowered by a simultaneous localization and mapping (SLAM) technology that auto-calibrates deployment without requiring surveying.
- It also provides seamless integration at any level, which is enabled by open APIs and extensible plugin interfaces.

Product Portfolio

ZeroKey's product suite can be segmented into the following products:

1. Quantum RTLS

Quantum RTLS is a sensor technology with 3D millimeter-level position accuracy, suitable for real-time workflow quality control, machine navigation, and task monitoring. The patented technology is underpinned by acoustic signaling, proprietary modulation, and signal processing functionalities, with the last two eradicating time synchronization and systematic errors to power the positioning engine with a clean, sub-millimeter range.

The Quantum RTLS anchor nodes support versatile installation and can be mounted on the ceiling, walls, pillars, workstations, or any other static surface that requires coverage. The technology also bears flexibility in terms of scalability, allowing deployment for localized and wide-area coverage alike, with an option for further expansion. Consequently, the system ensures operational visibility of everything "from a singular mission-critical process to complete digital twinning of an entire facility." ZeroKey's proprietary localization approach also enables self-calibrating deployment, i.e., the anchor network calibration is automatically calculated without requiring device location surveying.

In addition to its accurate ultrasonic-based positioning capabilities, Quantum RTLS exploits the sensitivity of radio-frequency signals to deliver undisrupted positioning even in obstructed conditions. The ZeroKey team also implemented an RSSI-based fallback positioning approach to enable users to locate their assets at all times. Furthermore, to ensure industry-grade data integrity, the technology employs security empowered by an on-chip ARM CryptoCell cryptographic accelerator.

The Quantum RTLS line encompasses several models with diverse use cases, including health and safety tracking, supply chain automation, and similar applications requiring prompt and accurate automated localization.

2. Spatial Intelligence Platform

ZeroKey's software solution Spatial Intelligence harnesses millimeter-level spatial data to empower users to preview operations through a 4D lens. Users can automatically gather, organize and analyze business data to extract insights, which can be utilized for real-time optimization and decision-making processes. The platform creates a projection of a smart space by separating the area into virtual zones. Empowered by advanced analytics, the software decodes inferences of spatial relationships, thus allowing operational issues to be resolved before they occur.

The software solution also features intuitive visualization, which ensures all 4D data is consistent and presented in an actionable way while delivering contextualized information that creates insights for making operations more productive.

3. Pilot Kit

The Pilot Kit is a ready-to-use solution for building proof-of-concept or running a precise positioning project completely wirelessly, covering up to 400m2. The kit includes six anchor nodes and two mobile nodes in ZeroKey universal form factor. The offering can be promptly deployed, auto-calibrated, and used for managing the Quantum RTLS platform account via ZeroKey RTLS management software. It also features a 3D visualization tool for intuitively overviewing the workplace to ensure agile and productive operations.

Market Opportunities

The company operates in the global location intelligence market.

- As projected by Grand View Research, this market is poised to grow from $16.09 billion in 2022 to an estimated $51.25 billion by 2030, registering a CAGR of 15.6% in the forecast period.
- The market growth can be attributed to the rising investments in IoT and the increasing penetration of smart devices and network services to enable smarter applications and better connectivity.
- Geographically, North America accounted for over 30% of the revenue share in 2021, with the rising number of key providers of IoT technologies and location intelligence anticipated to propel the growth further in the region.
- Notable players in the market include Pitney Bowes, Apple, Qualcomm Technologies, Wireless Logic, HERE Technologies, Bosch Software Innovations GmbH, and Trimble, among others.

Achievements

To date, the company has achieved the following milestones:

- In 2022, ZeroKey was awarded an ISO 9001:2015 certification, which ensures that its offerings accommodate the clients' needs via an effective quality management system.
- The company's technology piqued the interest of several VCs, leading to its Series A in January 2022. The total proceeds remain undisclosed by the company.
- Notable ZeroKey investors include Brick and Mortar Ventures, Asahi Kasei Corporation, and Plug and Play Ventures, to name a few.
- In 2019, ZeroKey won the Machine Demo pitch at Collision Conference, dubbed "America's fastest-growing tech conference", created by the team behind Web Summit.
- Two years prior, ZeroKey won the Samsung Developer Conference Pitch Competition 2017.

Executive Team

Matthew Lowe

Co-Founder & CEO

Experience:

- CEO at Helio Technology
- Founder of SpireTECH Inc.
- Head of IT at Wilo Canada inc./Wilo USA LLC
- Software Developer at Onyx Energye

Academic Background:

- Attended the Computer Science and Physics program at the University of Calgary

Predictive Intelligence

Predictive intelligence combines statistical techniques and technologies coupled with artificial intelligence (AI) and machine learning (ML) in order to anticipate future outcomes.

Initiated by collecting data and categorizing it based on different profiles, it can be used to deliver relevant actions depending on the predicted outcome, such as tailored offers to customers or improved performance of some processes.

From the Valuer platform:

Average funding of the Predictive Intelligence companies

6,816,339 USD

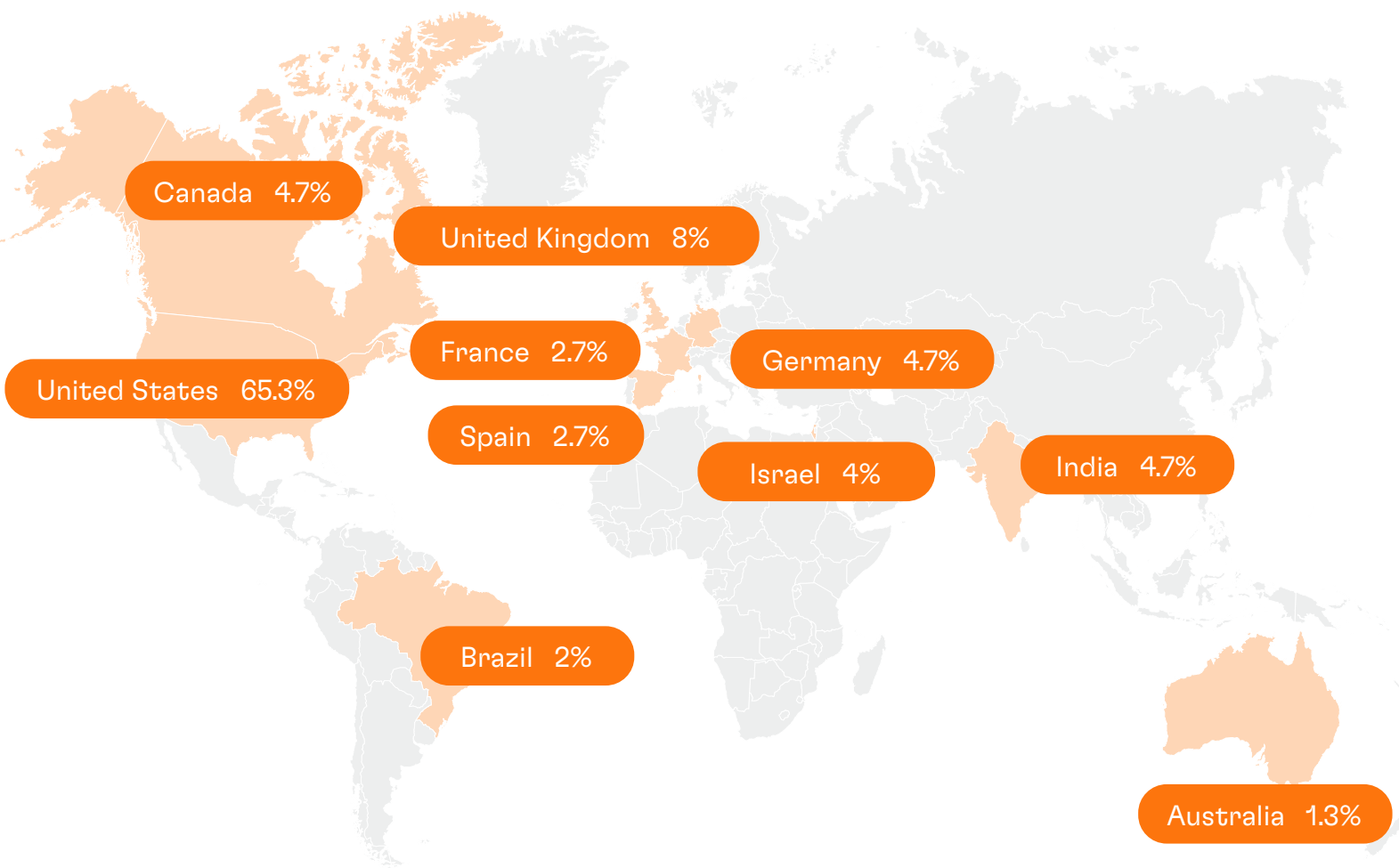
Technology Trends:

ⓘ Click on the tech trends to learn more

Predictive Analytics: Predictive analytics entails using current and historical data, statistical modeling, data mining, and machine learning (ML) to extract future outcomes and performance insights toward enhancing resource use and operational efficiencies and reducing risks based on predictions about future events.

Cloud Computing: Cloud computing refers to delivering diverse on-demand computing services, from applications and servers to data storage and development tools. Hosted on both private and public networks, these services are controlled by a cloud service provider (CSP), charging users a monthly subscription fee or billing them according to their usage.

10 countries with the most Predictive Intelligence companies on the Valuer platform:



Company Highlight:

Geminus.AI

Year of inception:
2018

Location:
Palo Alto, CA, United States

Company stage:
Go-to-Market

Funding:
9,400,000 USD

Team size:
18

Website:
geminus.ai

Geminus.AI's hybrid modeling platform simplifies and automates the creation, management, and updating of sophisticated AI models for industrial applications. By automatically combining measurement data with physics-based simulations, Geminus produces AI models that run faster than traditional simulation models with the same or higher levels of accuracy. This new capability enables industrial optimization workflows that run in real or near-real time.

Geminus.AI was founded in 2018 by Dr. Karthik Duraisamy, a Professor at the University of Michigan and a leader in the field of AI-augmented computational physics. Dr. Duraisamy acts as the company's Chief Scientist, while industrial technology veteran Greg Fallon holds the position of CEO. Geminus' team has since grown to over 18 members, operating from the company's two main offices in Cambridge (MA) and Palo Alto (CA).

Customers:

This company has not disclosed information for its client list.

Business Model

The company's business model is centered around the following characteristics:

- Geminus.AI operates on a B2B model, targeting clients across various industries that could benefit from advanced digital twin simulation technology.
- Its platform can be applied to numerous sectors, including energy, chemical manufacturing, material manufacturing, critical infrastructure, and semiconductor manufacturing, among others.
- The company is in its go-to-market stage. It launched its first product in March 2022 and closed a $5.9 million seed investment in June of that year. Geminus plans to use the funding to accelerate its customer acquisition, scale up its go-to-market team, and expand on key channel partnerships.

Value Proposition

The company communicates the following as its main value propositions:

- Model execution speed - The company claims it can create ML surrogate models that execute 1,000s of times faster than conventional simulation.
- Accuracy - By combining simulations with measurement data, Geminus improves model accuracy by up to 50%. Uncertainty is automatically quantified and tracked as a part of its process.
- Model creation efficiency - Geminus' techniques reduce both the time and resources necessary to create AI models. Model creation time is typically reduced from months to hours, while data requirements are reduced by 50%.
- Model adaptation - Geminus' techniques allow for rapid model updating, ensuring that models maintain their predictive accuracy by accounting for changing operating inputs and conditions as well as system degradation.
- Geminus also aids clients in addressing sustainability challenges. It enables customers to optimize operational efficiency and significantly accelerate the time required to develop and scale new technologies. The company reported that the platform has helped engineers identify opportunities to decrease energy consumption by more than 40% (in under a week) by optimizing the performance of an industrial pumping network.

Product Portfolio

Geminus.AI has launched a physics-informed AI platform that combines multiple information sources to generate digital twins for optimizing performance and predicting asset degradation and system changes.

The Geminus platform was developed to provide resilient process and equipment models, display essential information, and optimize decision-making processes. It is designed to augment conventional modeling methods that are typically slow and computationally-intensive while also providing a higher degree of usability for less experienced users. Another challenge tackled by the company is the struggle of existing AI modeling techniques to provide ROI when deployed in complex and dynamic systems with low accuracy tolerance.

The company's predictive intelligence platform intersects adaptive AI with physics via multi-fidelity modeling to generate predictive models for industrial products and processes. It utilizes both low- and high-fidelity simulation and real-world data to efficiently create high-performance predictive models that are valuable for process design and control optimization. The platform's hybrid modeling capabilities are essential for predicting equipment behavior during high-volume manufacturing and optimizing design for those scenarios.

Geminus.AI is embedded with first-principles, making it more intelligent and contextualized than conventional modeling approaches. As such, the platform can generate valuable models using sparse data, further enabling organizations to shift from data-driven operations to prediction-driven planning. This positively affects decision confidence by helping users quantify the intrinsic uncertainties in model simulations and apply these insights toward inciting causal reasoning.

The user journey comprises three steps:

1. Ingesting data and existing models. Users import internally and externally generated data and previous digital models into the Geminus platform.

2. Refining existing models and creating hybrid models. This step comprises several activities:

- Initially, the imported models are refined via the platform's hybrid model toolkit to improve accuracy.
- Next, uncertainties are quantified and made instantly accessible to the user.
- Finally, the platform generates surrogates, further bolstered by disparate information that the user uploads into the toolkit.

3. Querying hybrid models and building applications. The third step aims to generate predictions through hybrid model inference. It can also help solve case-specific challenges through bespoke applications developed with the Geminus open API.

The Geminus platform is valuable for data scientists, engineers, and application developers alike. Its ultimate aim is to improve clients' ROI and reduce the risks associated with decision-making processes.

Market Opportunities

The company is operating in the global digital twin market.

- According to a report by Grand View Research, the global digital twin market size was evaluated at $11.1 billion in 2022 and is projected to reach a value of $155.8 billion by 2030.
- The market is expected to grow at a CAGR of 39.1% during the 2022-2030 projection period, which is attributed to the rising popularity of IoT, AI, and cloud computing technologies.
- The North American region held the largest share of the market during 2021, while the Asia-Pacific region is expected to exhibit the largest growth rate of 43% during the forecast period.
- Key players in the global digital twin market include ABB, AVEVA Group,. Dassault Systemes, General Electric, Hexagon, IBM, and SAP, among others.

Achievements

To date, the company has achieved the following milestones:

- In July 2022, Geminus.AI was selected among the 34 startups to join the latest cohort at Third Derivative, a collaborative climate tech ecosystem operating across multiple locations worldwide.
- In June 2022, the company closed a $5.9 million seed round led by Lam Research, the VC arm of semiconductor equipment manufacturer and industrial conglomerate SK, Inc. Other participants in the round were SkyRiver Ventures, The Hive, Darling Ventures, and Sentiero Ventures.
- Earlier that month, Geminus.AI announced the launch of its first product, which the team refers to as a predictive intelligence platform—a fuse between adaptive AI, physics, and multi-fidelity modeling.

Executive Team

Greg Fallon

CEO & Board Director

Experience:

- VP of Product, Strategy, and Marketing at Autodesk
- Sales and Marketing Leadership at ANSYS
- Sales Leadership for Americas & Europe at Fluent Inc.

Academic Background:

- MS in Mechanical and Aerospace Engineering from the University of Virginia
- BS in Mechanical Engineering from the University of Vermont

Karthik Duraisamy, PhD

Founder & Chief Scientist

Experience:

- Professor of Aerospace Engineering, Director of the PhD program in Computational Sciences, and Associate Director of Michigan Institute for Computational Discovery and Engineering at the University of Michigan (current)
- Assistant (Consulting) Professor at Stanford University
- Lecturer of Computational Fluid Dynamics at the University of Glasgow

Academic Background:

- PhD in Aerospace Engineering from the University of Maryland
- ME in Aerospace Engineering from the Indian Institute of Science
- MS in Applied Mathematics from the University of Maryland
- BE in Mechanical Engineering from the Coimbatore Institute of Technology

Cloud-Based Digital Twin

Digital twins encapsulate a real-world process, object, or system in a digital representation or virtual model. They are powered by real-time data from sensors and the Internet of Things (IoT) technology and use machine learning (ML) and artificial intelligence (AI) to provide data analytics.

As such, it can be continually updated with real-time operating information via the cloud.

From the Valuer platform:

Average funding of the Cloud-Based Digital Twin companies

11,148,889 USD

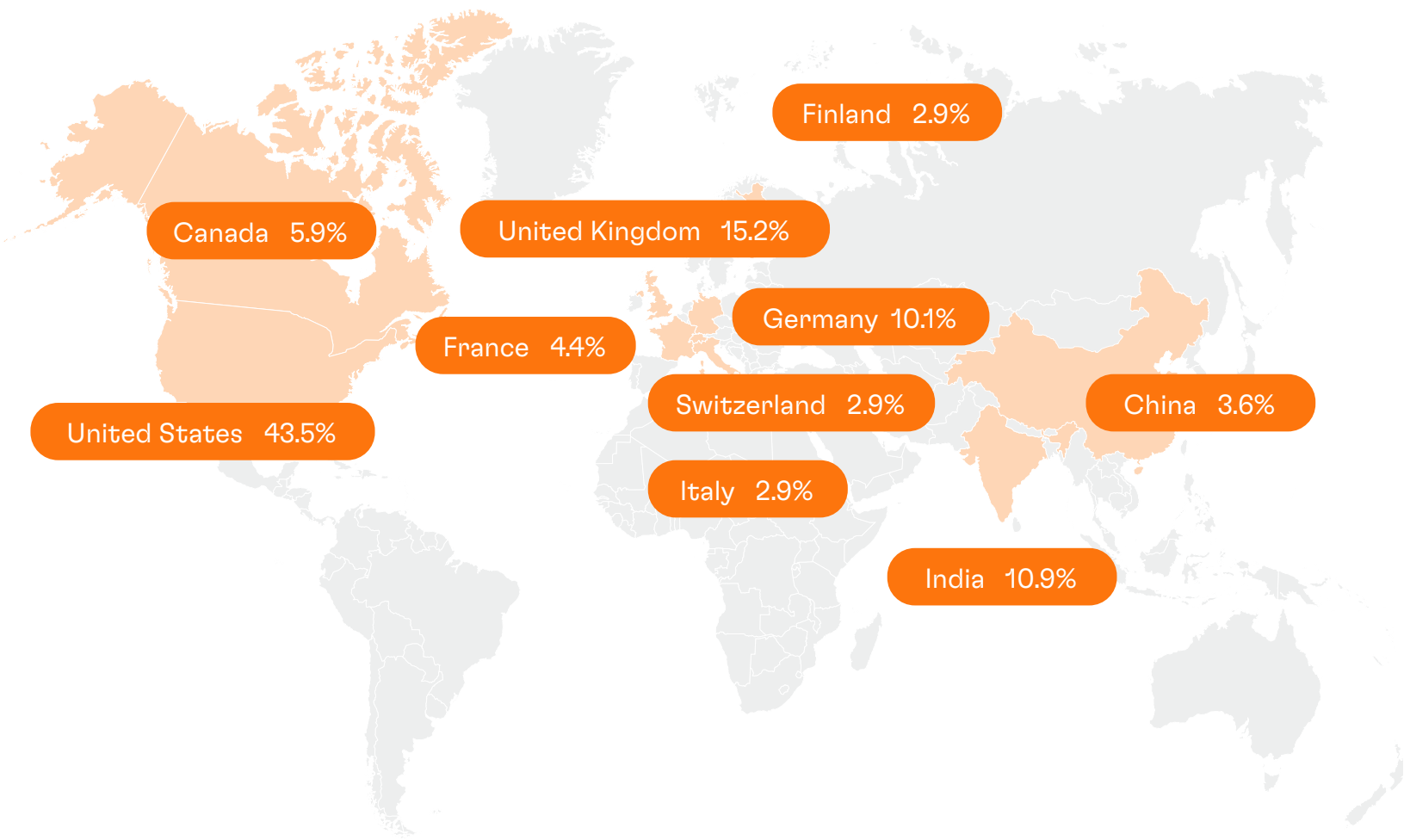
Technology Trends:

ⓘ Click on the tech trends to learn more

3D Printing in Construction: 3D printing in construction is used to fabricate construction elements or entire objects by depositing concrete, polymer, metal, or other materials to build an object layer-by-layer. The technology promises to speed up construction times, lower labor costs, material usage, and waste, and create more complex designs.

Building Information Modeling (BIM): Building Information Modeling (BIM) is the process of creating and managing information for a building by using intelligent building models and cloud platforms. BIMs produce digital representations of an asset through its entire lifecycle and provide structured multidisciplinary data.

10 countries with the most Cloud-Based Digital Twin companies on the Valuer platform:



Company Highlight:

TwinThread

Year of inception:
2018

Location:
Charlottesville, VA, United States

Company stage:
Growth/Expansion

Funding:
6,400,000 USD

Team size:
26

Website:
twinthread.com

TwinThread has developed an AI-powered platform for manufacturing and maintaining field-based equipment, enabling enterprises to enhance their industrial automation and digital manufacturing processes. To this end, the platform utilizes digital twins, key performance indicators, and optimization applications that deliver actionable insights for reducing costs and increasing productivity.

TwinThread was founded in 2018 by industrial automation and digital manufacturing experts Erik Udstuen, Andrew Waycott, and Tom Nettell, aiming to bring fleet monitoring and predictive maintenance capabilities to clients who cannot develop in-house systems. Headquartered in Charlottesville (VA), the company has grown to a team of 26 people.

Customers:

Colgate-Palmolive

ERM

Resideo

GE Digital

Hill's Pet Nutrition

Nova Scotia Spirit Co.

AVEVA

Microsoft Corporation

Consol Energy Inc.

GrayMatter

Business Model

The company's business model is centered around the following characteristics:

- TwinThread is a B2B-oriented company offering its platform through a SaaS-based model. The company caters to enterprise manufacturers and field-deployed equipment providers, delivering an industrial operations platform, complementary services, and support.
- The company generates revenue from its three different platform subscriptions, with the pricing tailored according to the subscription model and the quantity of data-emitting sensors.
- Furthermore, the company offers three distinct onboarding packages: self-provisioned, assisted, and turnkey with on-demand engineering services.

Value Proposition

The company communicates the following as its main value propositions:

- TwinThread helps manufacturers, operations professionals, product owners, and other manufacturing professionals to identify, address, and eliminate system inefficiencies.
- The company claims its products are quick to deploy and connect with existing data sources—delivering improvements and value increase in under an hour of use and having substantial scalability across all lines of operations and assets.
- TwinThread markets its platforms as suitable for lean and agile manufacturing, increasing agility, autonomy, and resiliency for enterprises and field equipment providers.
- According to the company, the platform's users have reported a 100% first pass quality, a 90% reduction in development costs, and a tenfold return on investment. Moreover, TwinThread states that its products and services decrease testing time by 75% and reduce downtime events by 25%.

Product Portfolio

TwinThread has developed a cloud-based platform for industrial operations, aiming to provide actionable intelligence and increase agility, resiliency, and productivity. The platform utilizes digital twins and AI technology that provide a return on investment for a diverse set of industrial use cases.

Specifically, the platform's operation starts with deploying pre-built digital data agents that can connect and gather data from various industrial sources such as programmable logic controllers, maintenance databases, smart devices, and data historians. The collected data is then used to create digital twins that provide visibility, insight, and agency over industrial operations and assets. The twins are utilized for automation processes further augmented by machine learning, scalability practices, and Azure's cloud computing capabilities.

The client can engage with the platform via a dashboard that contains various tools and functionalities, including out-of-the-box visualizations, graphs, integrations for all Office 365 tools, no-code workflows, and intelligent predictive alerts. Moreover, the platform includes a collection of preconfigured datasets that can filter and synthesize data from energy consumption, downtime, and throughput with increased efficiency and route the information to commercial business intelligence tools.

The no-code logical workflows, named digital threads, are background processes that consistently evaluate various operating parameters and production aspects. The digital threads trigger effective responses such as notifying the service team, relaying to the SCADA system, or enacting an automated set-point change. Additionally, the Model Factory provides users with a digital assembly line for creating, deploying, and fine-tuning machine learning algorithms to configure and optimize pre-built data science templates. Furthermore, a comprehensive API allows clients to utilize the TwinThread data model to develop custom interfaces for any system.

At present, the platform is offered for two different use cases:

For Manufacturers, TwinThread's product enables clients to streamline, optimize, and scale their production processes in complex manufacturing environments. The platform delivers increased operational efficiency, reduced operating costs, and greater throughput by communicating specific and prescriptive insights and recommendations from the manufacturing environment's digital copy.

For Field-Based Equipment, the platform utilizes the large amounts of data emitted by modern field-deployed assets to deliver actionable information to optimize energy consumption, maximize service life, predict failure, and increase uptime. Consequently, TwinThread's platform helps its clients to provide their customers with reliability and responsiveness.

Market Opportunities

The company is operating in the digital twin market.

- According to Markets and Markets, this market is projected to grow from $6.9 billion in 2022 to $73.5 billion by 2027 at a CAGR of 60.6% during the forecast period.
- The main growth factors are the increasing use of digital twins in manufacturing industries for cost reduction and optimizing supply chain operations, rising demand for digital twins in the healthcare industry, and a growing emphasis on predictive maintenance.
- In terms of applications, the automotive & transportation segment is expected to account for the largest market share during the forecast period and continue growing rapidly. This is due to the rising adoption of digital twins for design, simulation, MRO (maintenance, repair, and overhaul), production, and after service.
- Region-wise, North America is expected to dominate the market during the forecast period being a major focal point for technological innovations. The presence of both manufacturing giants and IIoT providers provides an environment with optimal conditions for market growth.
- Major vendors in the digital twin market include General Electric, Microsoft, AWS, Oracle, SAP, and Siemens.

Achievements

To date, the company has achieved the following milestones:

- In 2021, TwinThread won the Data Analytics and Software Company of the Year Award at the Compass Intelligence Mobile, IoT & Emerging Tech Awards.
- The company has partnered with leaders from multiple industrial sectors such as Microsoft, General Electric Digital, MES Automation, Next Frontier Capital, GrayMatter, and AVEVA.

Executive Team 1/2

Erik Udstuen

Co-Founder & CEO

Experience:

- Co-Founder of Alpine Metrics
- Senior Executive at General Electric
- Founder of Andesite Software
- Co-Founder and CEO of Mountain Systems Inc.

Academic Background:

- Attended Miami University

Andrew Waycott

Co-Founder & COO

Experience:

- COO and CTO of Factora
- Co-Founder and President of SlimSoft Solutions Inc.
- MES CoE Leader at General Electric Intelligent Platforms
- Application Engineer at Mountain Systems Inc.
- IT Analyst at Stora Enso

Academic Background:

- Attended the Business Administration and Information Systems program at Thompson Rivers University

Executive Team 2/2

Tom Nettell

Co-Founder & CTO

Experience:

- Co-Founder and CTO of Alpine Metrics
- Plant Apps Development Lead at General Electric Intelligent Platforms
- Co-Founder and CTO of Mountain Systems Inc.
- System Engineer at Champion International Paper

Academic Background:

- Degree in Mathematics and Computer Science from the Northern Michigan University

About IoT Community

(Internet of Things Community)

The IoT Community is a privately held UK based and registered corporation, serving as the world's largest and longest standing CxO community of senior business leaders and IoT practitioners comprising 30,000+ members globally.

Founded in 2015, the function of the community is to focus on the adoption and application of IoT in commercial environments, seeking to understand and contribute to applying the technology or overcoming the wide variety of barriers, inhibitors, and technical and operational issues.

The IoT Community aims to be the place to be or place to come for IoT information and insights on the implementation and operation of IoT systems and applications. Their focus is on accelerating the adoption and implementation of IoT systems and applications, making these processes easier, widespread, and secure.

For more information, visit:

iotcommunity.net

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#IoTCommunity

IoT Community

About Valuer

Valuer's vision is to fuel and foster the world's innovation by mapping global innovation activities. By combining data about startups and technologies, they identify and present patterns to forward-thinking companies, startups, universities, and investors alike. Clients can use Valuer to dive headfirst into identifying relevant companies and technologies.

The company organizes +20 mio data points to spot trends, discover new technologies, and map industries. They use AI and machine learning to analyze, cluster, and identify data, and human researchers to enrich that data. Clients can start at the macro level by exploring industries and technologies and then move on to identifying relevant companies. Or start at the micro, company level and from there understand the industry and how it associates.

Valuer is a one-stop shop for innovation and opportunity discovery. Visit valuer.ai to find new technologies and collaboration opportunities, uncover strategic suppliers or find and follow acquisition targets.

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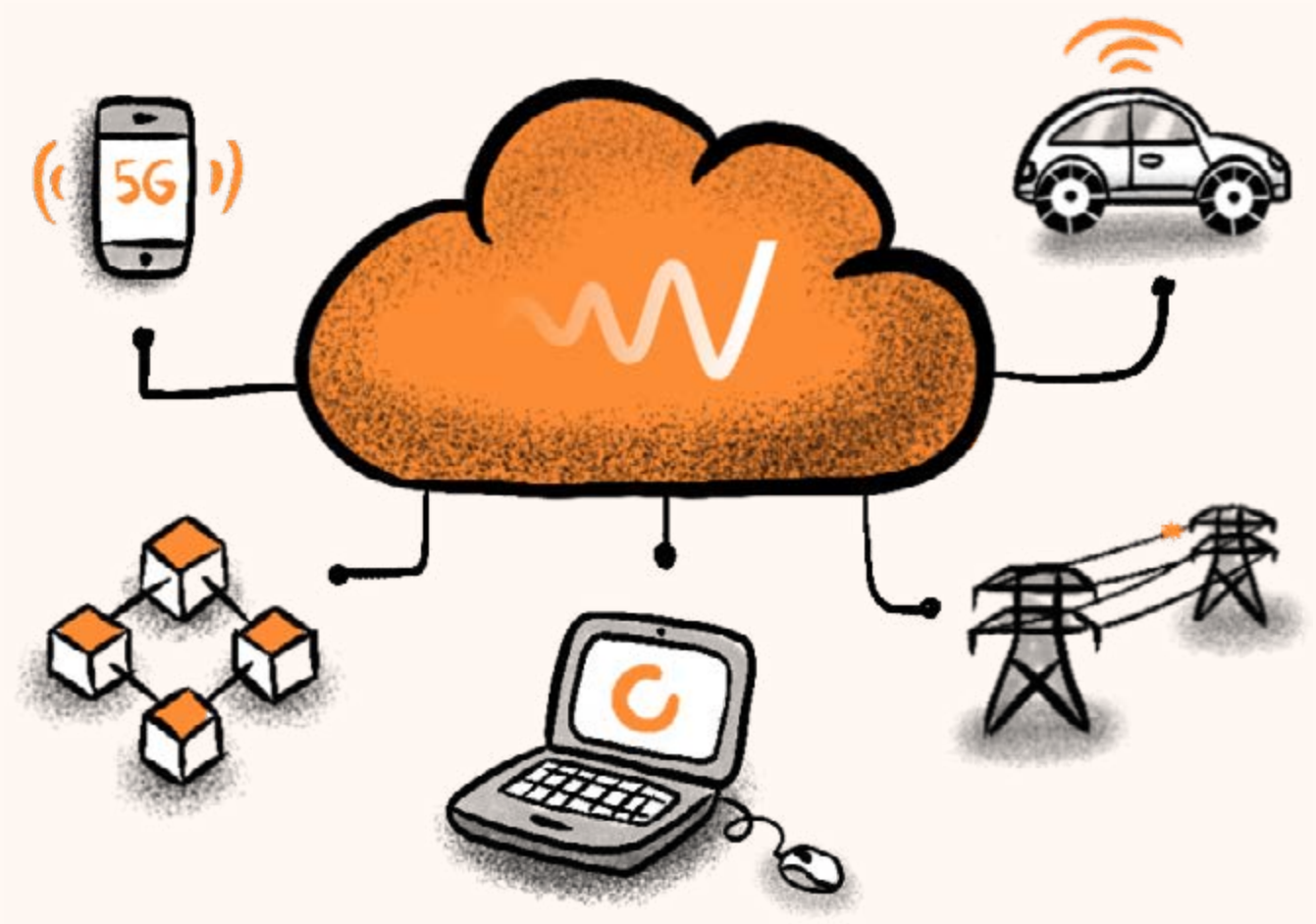

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