



INNOVATION

FOR THE FUTURE CONNECT



#CONNECTIVITY FOR CONTINUITY



Sensordrops Networks: Vision Statement

We aim to address basic societal needs by means of integrated IoT-based sensing, monitoring, and control solutions. Initially, we are focusing on the medicare and the power sectors for providing IoT-based sensing and monitoring of various field-related parameters by individually addressing the challenges specific to both of these domains. As both of these domains are clearly gaining momentum not only in India but world-over, in terms of the use of connected and automated solutions, we have identified multiple challenges and opportunities in which our company can step-in to provide economical and sustainable solutions for specific challenges, which are yet to be addressed in these technological realms.

About us:

SensorDrops Networks is an Indian Department of Industrial Planning and Policy (DIPP) recognized startup and is also registered with MSME. Currently, we are incubated at the Science and Technology Entrepreneur's Park (STEP) at IIT Kharagpur, W. Bengal, India

SensorDrops Networks is a newfangled company dedicated to addressing basic social needs by utilizing advanced Internet of Things (IoT) based sensing, monitoring, and control solutions. With IIT Kharagpur professionals and a team of bright and dedicated researchers at the reins, we design and deploy contemporary solutions to overcome domain-specific challenges using economical and sustainable means. The team has already won several awards including the recent Gandhian Young Technological Innovation Award for the system of battery-less IoT sensing from the President of India in Mar 2018.

www.sensordropsnetworks.com





Motivation for IndustryEdge

The Industry 4.0 revolution is driven primarily by IoT. IoT in industries extends the features of automation through data collection and analytics. This introduction of IoT enables workflow and process optimization. Smart devices powered by IoT can be added to assembly lines, warehouses, infrastructures, and others to provide a wide range of technical and functional upgrades, without the need for replacing old infrastructure or introducing new ones. Industrial IoT solutions can provide intelligence to age-old machines and workflows, as well as add fail-safes through proactive maintenance and automated recovery after failures.

The introduction of IoT in industries has led to the wide adoption of the concept of "smart factories." Here smart IoT-enabled devices can exchange data amongst themselves and make use of analytics to influence the production line, supply chain, plant floor, process execution, and infrastructure maintenance to function optimally. This enables extended lifetimes of machines, higher economic returns, and better manageability of factories and warehouses. As reported by "The Atlantic," almost 67% of global industrial manufacturing companies have an active smart factory initiative as of 2019.

The impact of industrial IoT has been widely documented for a massive variety of industries such as manufacturing, pharmaceuticals, mining, oil and gas, logistics, storage houses, and others. In all cases, the introduction of IoT has led to better plant manageability, increased worker outputs, enhanced economic benefits, a better quality of products, and excellent ROIs. The use of analytics has also enabled the managers and planners to envision better and highly cost-effective routines, procedures, and expansion strategies – all of which are attributed to the use of Industrial IoT and shifting the focus of traditional factory infrastructure to Industry 4.0 grade. This trend is forecasted to continue for the next two decades.





Industrial IoT Market Scenario

The global Industrial IoT market is forecasted to attain a value of approximately USD 751.3 billion by 2023, growing at a CAGR of 23.88% from 2017 to 2023. The driving force behind this surge is the inclusion of cloud computing and associated technologies. Additionally, the use of IoT has proven lucrative in terms of higher economic benefits, better yields, and enhanced degree of automation, especially for heavy industries. The present-day IoT market is further segmented on the basis of end-users, components, deployments, and connectivity requirements.

Based on the components, the global IoT market is divided into hardware, software, and services. The software includes both standalone enterprise resource planning software as well as the ones dealing with data analytics, control, and intelligent actuation of sensors/actuators in factories. The massive requirements and controllability of software in industrial ecosystems is undeniable. This segment is forecasted to be the fastest-growing IoT segment globally, with a CAGR of 25.65%. This growth is attributed to the irreplaceable necessity of software components in every IoT installation for every ecosystem.

www.sensordropsnetworks.com





Industrial IoT Market Scenario

The hardware segment is forecasted to be the one holding the highest market share during the forecast period from 2017 to 2023. As IoT is a complex matrix of networked sensors, actuators, hardware, and software, it can be exploited for repetitive and manually exhaustive tasks efficiently and profitably. The growth in the IoT hardware market is driven by the factors of an increasing number of connected devices, increasing capabilities of hardware components, and the maximum utilization of available resources. Systems such as industrial sensors, robots, RFID, camera systems, 3D printing, flow control systems, application control systems, and others are the sub-components of the hardware segment of the IoT market. The general dependence of almost every IoT solution in the market on sensing and connectivity makes these the strongest and irreplaceable contenders in the hardware segment of the IoT market.





Industrial IoT Market Scenario

The IoT connectivity market is primarily divided into wired and wireless segments. Although the traditional wired connectivity holds the highest market share and would continue to do so till 2025, the surge in wireless solutions indicates the changing trends in industrial requirements and enhanced operational capabilities of wireless solutions. Although most of the wired connectivity is limited to backbone networks for plants and industrial ecosystems, these are significantly cumbersome to manage, and their upkeep is a mandatory requirement. In contrast, the wireless connectivity solutions are more suited for cluttered factory floors and can be easily installed-reinstalled at will or depending on production requirements, without any changes in the location/positioning of equipment or making provisions for newer installations. The demand for wired connectivity is majorly driven by the need for reliable, fast, and secure connections. Wired connectivity is also essential whenever the company deals with large-scale operation centers. The wireless segment is expected to grow at the most rapid rate during the forecast period at a CAGR of 26.12%. The high degree of flexibility and portability are the significant drivers of the growth of the wireless segment in the global IoT market.

The major end-users of the industrial IoT solutions include IT, manufacturing, oil and gas, power, automotive, healthcare, retail, and others. Among these, the manufacturing sector is forecasted to achieve the highest growth by 2025 with a CAGR of 27.94 % globally.



Global Key Players of Industrial IoT

The key players of the industrial IoT market include:

- General Electric Company (US),
- Siemens AG (Germany),
- Cisco Systems (US),
- IBM Corporation (US),
- Rockwell Automation, Inc. (US),
- AT and T Inc. (US),
- Accenture Plc. (Ireland),
- Huawei Technologies Co. Ltd. (China),
- Robert Bosch GmbH (Germany),
- Intel Corporation (US).



What is Edge Computing?

The Edge computing paradigm arose due to the need for improving response times of IoT devices and networks, and freeing-up network bandwidth from unnecessary data load. Edge computing is a distributed computing framework. It brings decision-making and computing closer to the source of data collection, such as onto the IoT devices themselves or edge servers. The use of Cloud computing, especially for large-scale industrial scenarios, mandates dedicated private cloud infrastructures or very high operational costs for public clouds. By bringing the computation closer to the source of data collection, not only the savings in network bandwidth, but the reduction of latency and decrease in recurring operational costs can be achieved.

What is the IndustryEdge?

The IndustryEdge is our revolutionary new platform, which builds upon the Edge computing paradigm for enabling hassle-free and wireless industrial sensing solutions. The low form-factor and `pick and place` nature of our IndustryEdge devices makes them portable and quite versatile for use in a variety of industrial scenarios. The revolutionary new connectivity system eliminates the need for wireless repeaters or wireless access-points throughout the region to be monitored. The ability of this platform to integrate a host of sensors and its ability to be easily customized as per client requirements makes this a game-changer in the industrial IoT market. The ability to remotely view data from various sensors spread over the deployment zone through web-browsers as well as on smartphones, make this a beneficial and handy system for industrial monitoring. Combined with the power of robust visualization techniques and advanced analytics, this platform has the potential to revolutionize industrial control.

www.sensordropsnetworks.com





IndustryEdge Suite of Products

Our IndustryEdge suite of products is comprised of two groups - 1) Mandatory units, and 2) Customizable Sensing units. The mandatory units are typically associated with the backend infrastructure and require only a few units (depending on application scenario and requirements). The customizable sensing units are deployed in bulk and can communicate with the mandatory units. The customizable units can be selected in any quantities or of any type, or combination of different types, as per requirements.

Mandatory units:

- ▶ Server and control/visualization software
- ▶ Android application for smartphones
- ▶ IoT gateway

Customizable Sensing units:

Each sensing unit has a self-contained processor, battery, charging circuit, wireless connectivity, and power-on/off capabilities.

- ▶ Ambient temperature and humidity
- ▶ Machine vibration
- ▶ Non-contact temperature sensing
- ▶ Ambient temperature
- ▶ Humidity
- ▶ Ethanol
- ▶ Combustible gas
- ▶ Methane and natural gas
- ▶ LPG, natural gas, and coal gas
- ▶ Carbon Monoxide





Competitors

We are the first company globally to provide an end-to-end wireless mesh-based sensing solution for IoT-based monitoring of industrial conditions along with smart analytics and robust visualization.

Existing Clients of IndustryEdge

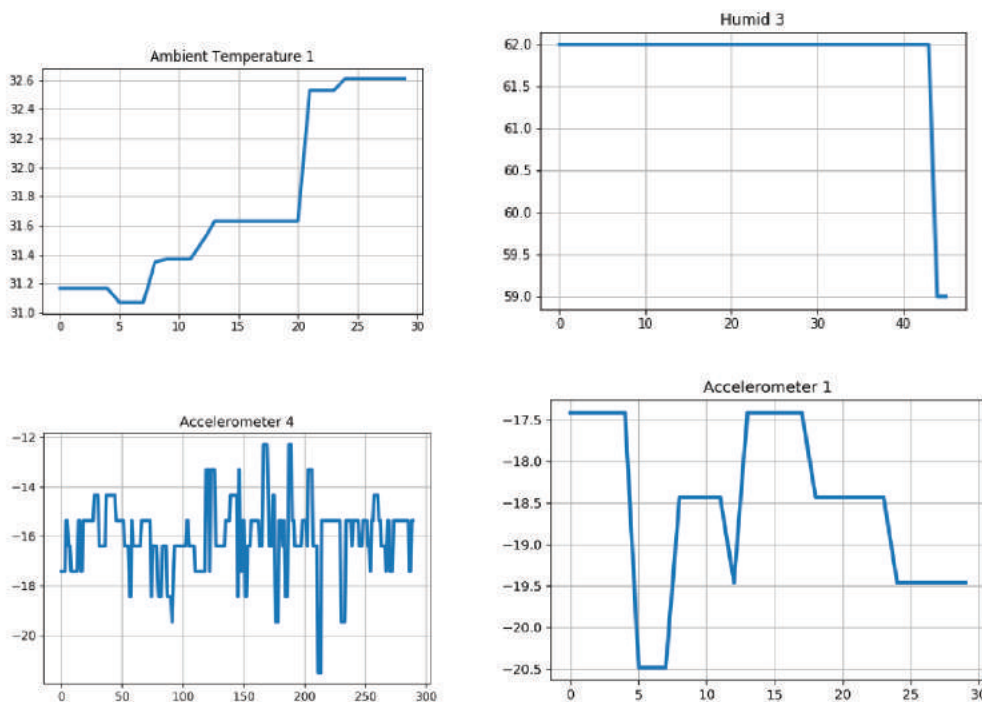
As of late 2019, we have provided/sold some of our prototypes to the TCS innovation lab at Kolkata for testing and integration with their in-house IoT-based industrial monitoring system.

Features:

- IoT-enabled data communication for low network usage
- Wireless connectivity
- Low form factor of sensing units
- Pick and place sensing units
- A wide variety of sensor integration capabilities
- Low-power mesh network for seamless and access-point-free connectivity
- Reliable end-to-end sensor data delivery
- Robust visualization
- Selective visualization
- Smart analytics at the remote control server
- Smart IoT gateway for local data accumulation and forwarding
- Android application-based portable visualization on smartphones

Application Scope

1. Machine health monitoring - Vibration, Temperature, Non-contact temperature
2. Warehouse condition monitoring - Temperature, Humidity, Gases
3. Industrial plant ambient condition monitoring - Temperature, Humidity, Gases, Non-contact temperature
4. Vehicle health monitoring - Vibration, Temperature, Gases



Visualization of various sensed data and parameters varying over time at the remote control server



Application Scope



a. Vibration sensing unit



b. Gas sensing unit



c. Temperature and Humidity sensing unit



d. Non-contact temperature sensing unit



e. Android application for data visualization



AN IIT KHARAGPUR
INCUBATED COMPANY

Registered Office

SensorDrops Networks Private Limited

1A/2, Science & Technology Entrepreneurs' Park (STEP),
Indian Institute of Technology Kharagpur, Kharagpur-721302,
West Bengal, India

Contacts :

Prof. Sudip Misra
Call +91 9734880277
smisra.editor@gmail.com

Arijit Roy
Call +91 9475364212
arijitroy.net@gmail.com

Anandarup Mukherjee
Call +91 8373841445
anandarupmukherjee@gmail.com

www.sensordropsnetworks.com