Welcome to Session By Technical Education and Skilling on
Empowering Bengal: Nurturing Future Ready Skills For A High Precision Work Force

BENGAL GLOBAL BUSINESS SUMMIT
5-6 February '25

Dr. Jyoti Gautam

Done B.E. from NSUT in 1997, M.E. from DTU in 1998 and PhD in Computer Science and Engineering from Gautam Buddha University under the guidance of Dr. Ela Kumar in 2015. Working as associate professor CSE department, Sharda University, Knowledge Park III, Greater Noida, Uttar Pradesh. Prior to this, she was working as associate professor at NSUT-EAST Delhi Campus, India and JSSATE NOIDA.

Working as the Digital Water Program Steering Committee Member of the International Water Association since 2022. Had been Member of the IWA India National Executive Committee. Representing as State President Delhi Artificial Intelligence Council, WICCI. Published white paper on the Digitalisation Journey of Urban Climate Resilience with the IWA. Patent granted along with Prof. Amlan Chakrabarti in the domain of water conservation. Received the Award of Exceptional Women of Excellence at the 84th Edition of the Women Economic Forum. Keynote Speaker at various forums like Lincoln University College, Sunway, Malaysia, IEEE Conference at Tecnologico De Monterrey, Mexico, WWCE, Copenhagen etc.

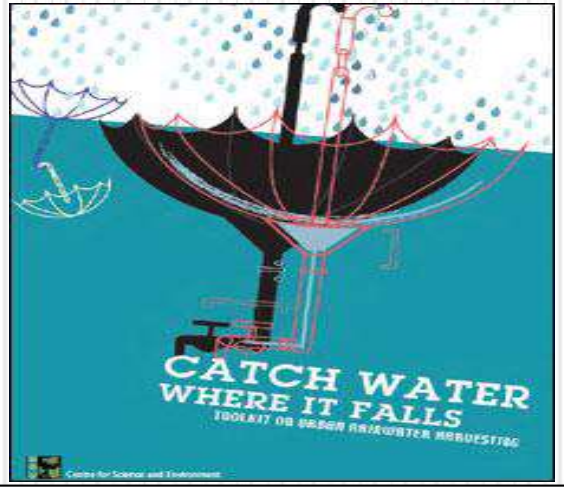
BGBS 2025

Precision Engineering Driving Digital Water Innovation

Prof. Jyoti Gautam(Chair - DWI)

Digital Water Program Steering Committee Member of the IWA (since 2022)

Asso. Prof.(CSE Department, SHARDA UNIVERSITY)



OUTLINE

- Introduction to Digital Water
- Precision Engineering and Digital Water
  - Health Monitoring of Water Systems
  - Real-Time Monitoring & Leakage
  - Digital Twin
- IWA DWP & Digital Water Sub-group India (DWI)
- Collaboration with Govt. of West Bengal - Center of Excellence (CoE) on Digital Water Technology
- Call to Action
- Activities Held(Screenshots)

DIGITAL WATER

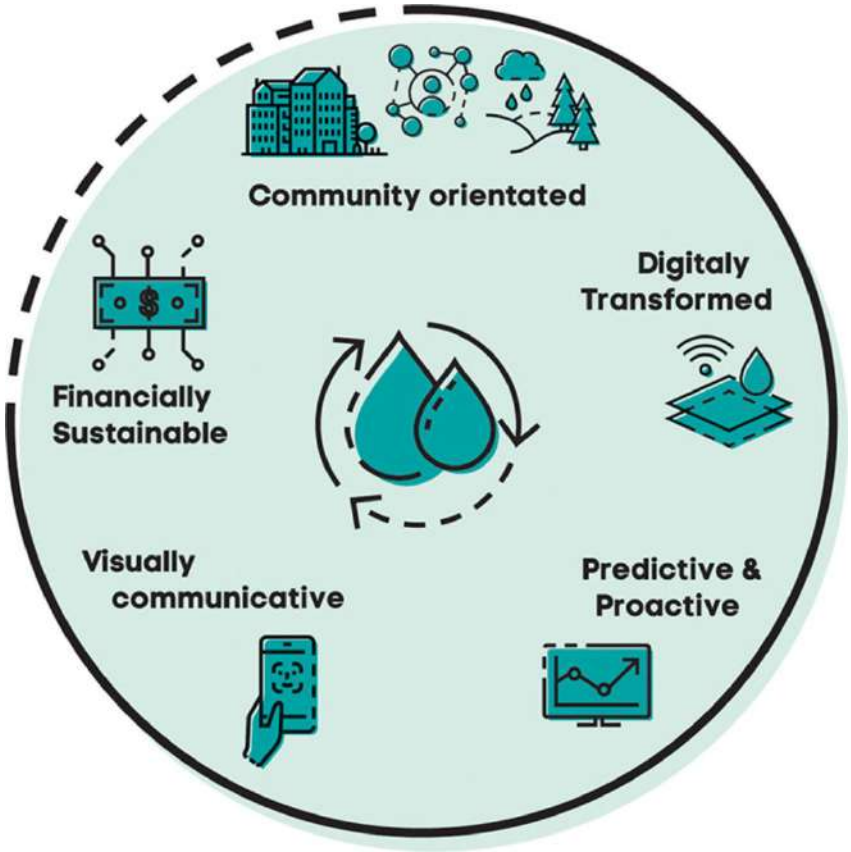
Digital Transformation of the water sector:

- Starts from the sensors that capture the data, transfers the data to the cloud and finally performing analytics to arrive at the best decision results to solve some of the daunting problems.

- It applies the principles of the Instrumentation, electronics and computer science/IT, at the same time water resource engineering.

- It requires the knowledge of various streams to arrive the best results.

- **How does it help?**



Courtesy: Magnus et al.: https://doi.org/10.1016/j.wroa.2023.100170

Precision Engineering and Digital Water

- **Precision Engineering**: Focuses on designing and creating highly accurate systems and technologies.
- **Digital Water**: Refers to the application of digital tools, data, and technology in managing water resources efficiently.
- **Intersection of Both**: Precision engineering enhances the effectiveness of digital water solutions in addressing critical challenges in water management.

Precision Engineering and Digital Water

Warranium manufactures a Membrane Bioreactor

Indian startup Warranium manufactures *WarraniumMBR*, a membrane bioreactor for efficient ultra- and microfiltration. *WarraniumMBR* also acts as a disinfector for bacteria, coliform, cryptosporidium, and viruses. By additionally applying reverse osmosis, it makes water quality suitable not only for both irrigation and drinking. This way, the startup achieves better effluent quality, reduces footprint requirements, and automates processes in water utilities.

SPHERAG provides Agricultural Water Management

Spanish startup SPHERAG develops an intelligent agricultural water management solution that combines IoT and cloud services. Its *ATLAS* devices provide wireless connectivity based on 5G, LTE, and GPRS that allows real-time monitoring. The built-in solar panel also enhances battery durability.

This approach helps farmers to install sensors regardless of geographical location and type of communication network. Besides that, the startup's cloud platform manages information from satellites and weather stations in real-time. By doing this, SPHERAG adapts farms to the current needs of crops, downsizing energy and hydraulic consumption.

Algaesys enables Algae-based Wastewater Treatment

Italian startup Algaesys enables algae-based wastewater treatment. Its patented technology uses naturally occurring algae and other phototrophic organisms that derive solar energy through photosynthesis. The *Algaesys* system removes nitrogen, microplastics, and heavy metals in a safe and carbon-negative way. Moreover, the biomass product from algae substitutes for chemical-sources fertilizers. As a result, *Algaesys* reuses cleaned wastewater for irrigation and sustains horticulture, aquaculture, as well as industrial activities.

PipePredict delivers Digital Leakage Detection

PipePredict is a German startup that delivers digital leakage detection using AI, sensors, and digital twins. The startup employs existing sensors and signal transmissions to monitor the current status of different pipe materials. This reduces investment costs and leads to faster deployments.

Additionally, a digital twin virtualizes the piping networks to execute condition assessments and optimizes the asset performance. Further, machine learning analyzes the collected data to predict potential bursts in the system. This way PipePredict saves valuable water and prevents repair losses, improving resource efficiency in water networks.

ZoJacks manufactures a Flood Detector

Zojacks develops a wireless addressable flood detector that safeguards commercial properties from water damage. The detector provides real-time flood alerts and precise location data. The system instantly alerts property managers and relevant personnel through push notifications, reducing response time and enabling swift action. ZoJacks also makes water sensors that detect water leaks and a remotely controlled water shutoff valve, *WaterStop*, to amplify the efficiency of the flood detector.

INDUSTRY NEWS

Ancala-backed Leep Utilities secures 150,000th connection to its last-mile multi-utility network

January 31, 2025

Share

Leep Utilities (Leep), one of the UK's leading owners and operators of last-mile utility networks, recently contracted its 150,000th connection. The milestone was marked when the firm was appointed to own, maintain, and operate the clean and wastewater networks for Persimmon Homes' Long Lands View development, in Harrogate, North Yorkshire. The new build scheme comprises over 160 one, two, three, four-bedroom homes.

Smart Health-Monitoring of Roof Top Water Tanks

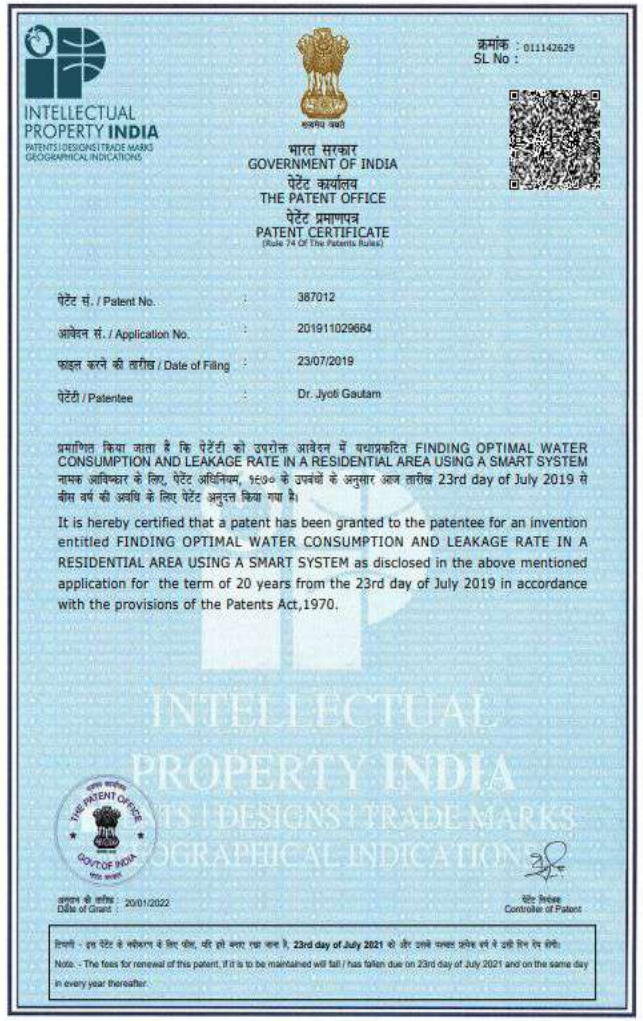
Product Concept: Deploy IoT-enabled water meters and smart solutions to monitor rooftop water tanks in real-time. The system will provide insights into water usage patterns, detect leaks, and estimate water quality. This technology aims to optimize water consumption, minimize waste, and enhance water management.

Objectives of the proposed system:

1. To develop smart solutions for providing **real-time monitoring** of **overhead household water tanks.**

(a.) Development of the Sensor Unit for fetching data and data communications network to the Server for **detecting water levels** and **leakage detection**, adding **water quality** sensors.

2. To analyze usage patterns.
3. Provide personalized insights/ recommendations to consumers through an Mobile App.
4. Adding insights/recommendations as per the peak/weak hours of the water supply, thereby making a check on the Intermittent Water Supply system. Reporting to the Mains supply for water shortages and overflows in the tank.
5. Detecting leakage and leakage rate under the controlled environment. Can be extended to the uncontrolled environment.
6. Testing of the Complete system.



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

क्रमांक : 011142629
SL No :

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

पेटेंट सं. / Patent No. : 387012

आवेदन सं. / Application No. : 201911029664

फाइल करने की तारीख / Date of Filing : 23/07/2019

पेटेंटी / Patentee : Dr. Jyoti Gautam

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित FINDING OPTIMAL WATER CONSUMPTION AND LEAKAGE RATE IN A RESIDENTIAL AREA USING A SMART SYSTEM नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 23rd day of July 2019 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled FINDING OPTIMAL WATER CONSUMPTION AND LEAKAGE RATE IN A RESIDENTIAL AREA USING A SMART SYSTEM as disclosed in the above mentioned application for the term of 20 years from the 23rd day of July 2019 in accordance with the provisions of the Patents Act,1970.

THE PATENT OFFICE GOVT OF INDIA

अनुदान की तारीख : 20/01/2022
Date of Grant :

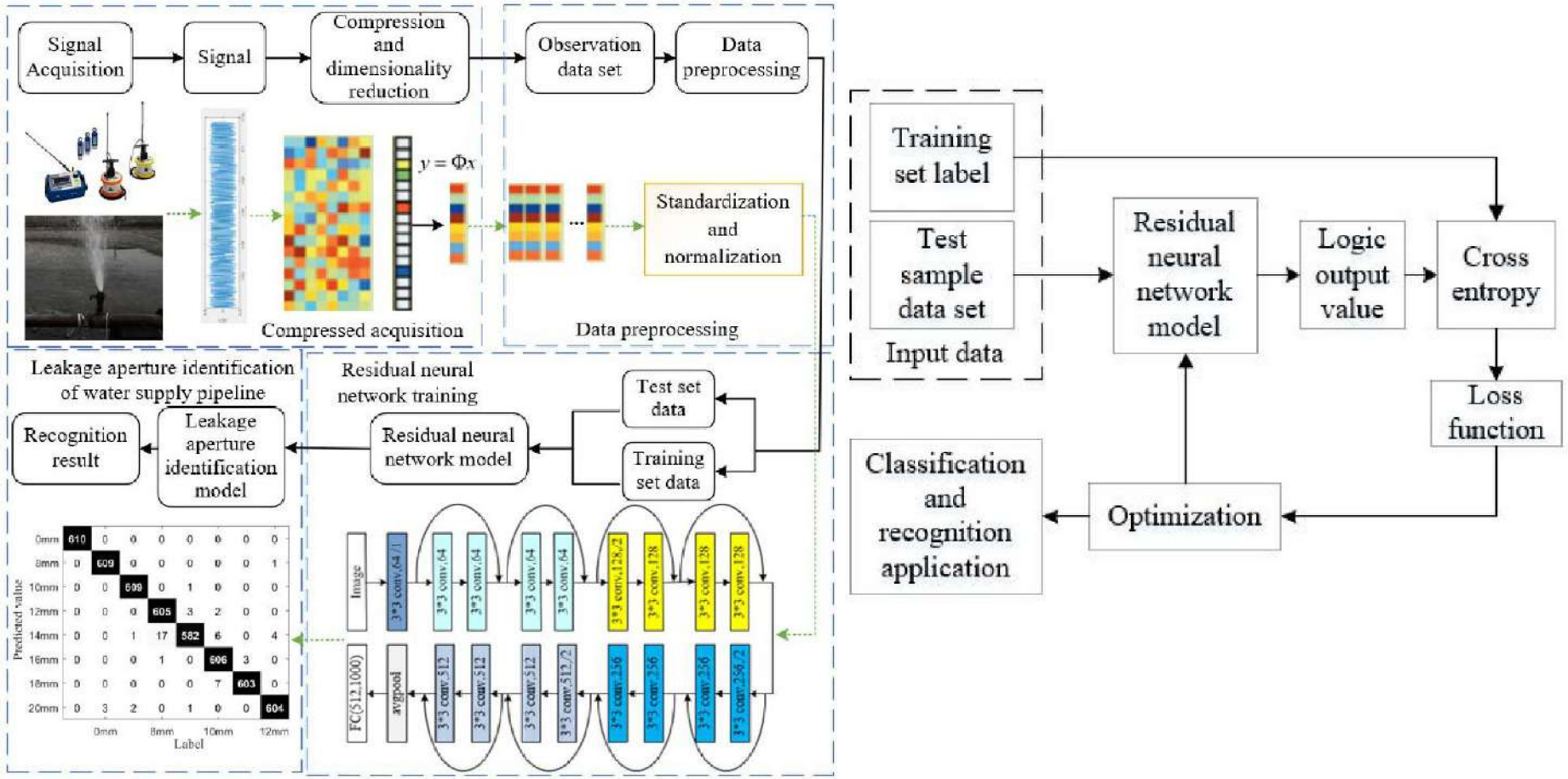
पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि हो अदा/ रखा जाना है, 23rd day of July 2021 को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 23rd day of July 2021 and on the same day in every year thereafter.

Leak Identification Based on CS-ResNet

LIN MEI et al., IEEE Acess 2022

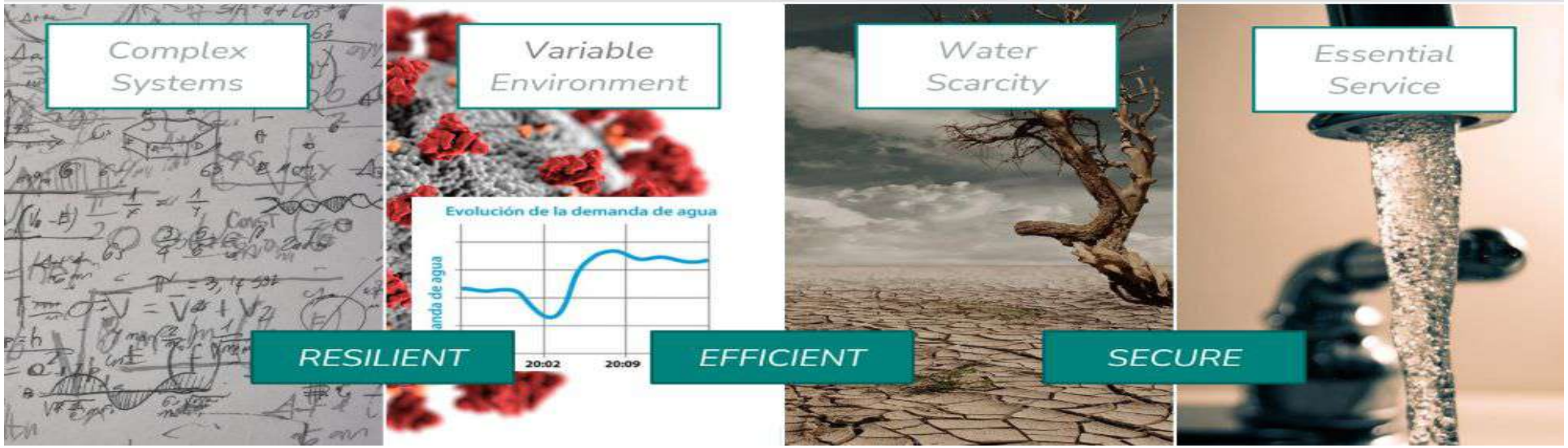


Digital Twins(Water Distribution Network)

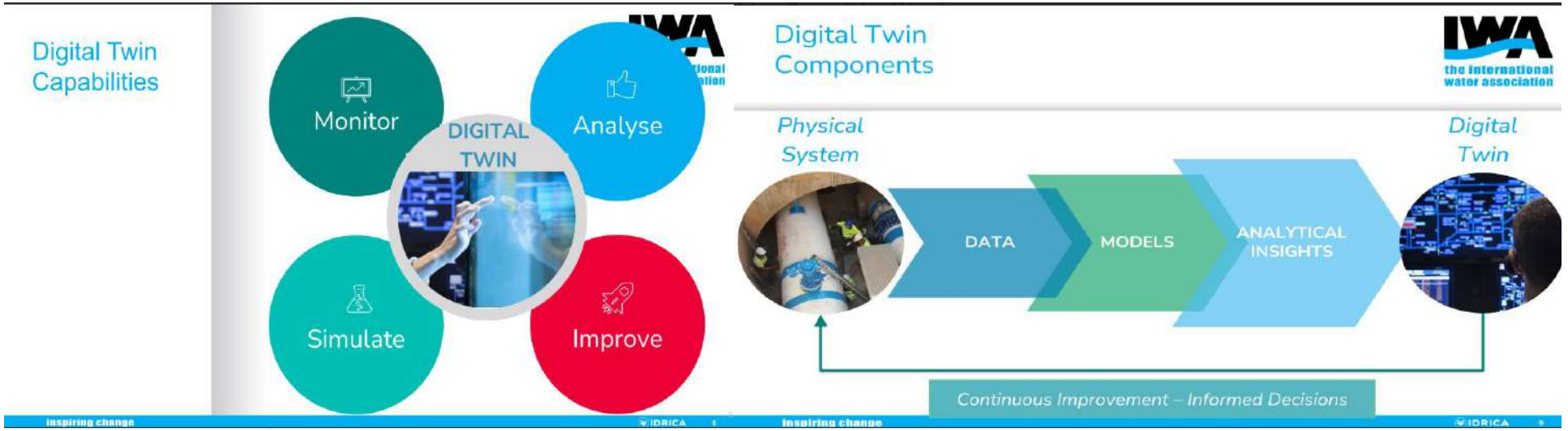
Digital Twins **REPLICATE** the real system **BEHAVIOR CONTINUOUSLY** in a **virtual model that serves as the basis for experimentation**

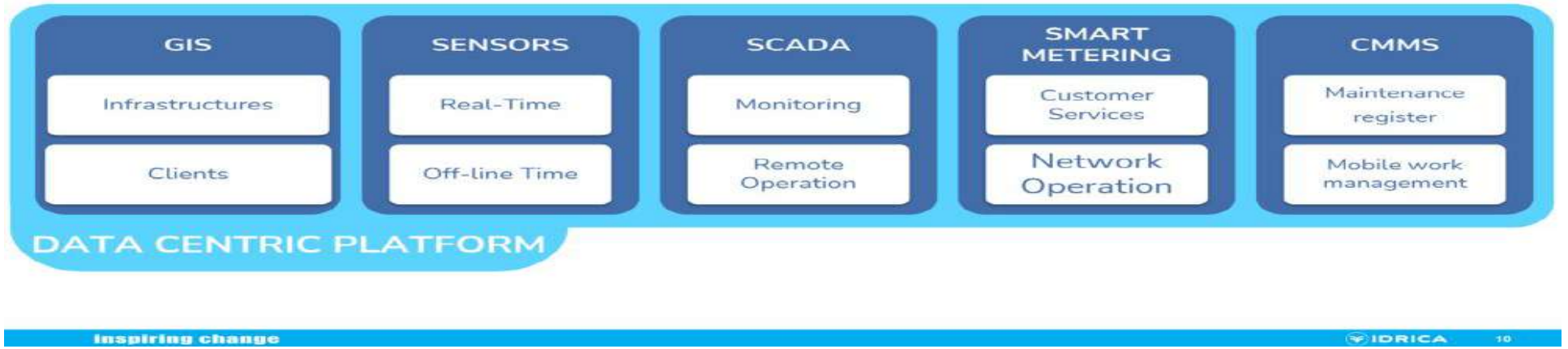
*The concept of DT has been used **traditionally in the industry field**, but it can also be developed and exploited in a **city management context**, and in particular in **water supply and distribution networks (WSDN)***

Why developing a DT for a water distribution network?



Digital Twins (Water Distribution Network)





IWA DWP & DIGITAL WATER SUB GROUP INDIA

The **International Water Association** is the network of water professionals striving for a world in which water is wisely, sustainably and equitably managed.

- **Digital Water Sub Group India** is a part of the Digital Water Program Steering Committee of the IWA. A specialized subgroup of IWA focused on accelerating digital transformation in water management in India.
- **Vision**: Enable smarter, efficient, and sustainable water systems through digital solutions.
- Link: https://iwa-network.org/projects/iwa-digital-water-india-subgroup/

DWI Charter of Activities/ Collaboration Plan with the Dept. of Technical Education, Government of West Bengal

- Promote **Digital Water Knowledge Development**:
- Organize workshops, seminars, and conferences to share global best practices.
- Publish research and case studies on IoT, AI, and analytics for water management.
- Problem-solving for the **Water Industry and Startups**:
- Provide a collaborative platform to address industry challenges.
- Incubate and mentor startups to develop cutting-edge digital water solutions.
- **Training and Capacity Building**:
- Develop specialized courses and certifications for students and professionals.

Plan

- Establish a **Center of Excellence in Sustainable Technologies**:
- Focus areas: Digital Water, IoT, AI, and Sustainable Practices.
- Serve as a hub for research, innovation, and policy-making.
- Collaborate with technical colleges to:

  Offer **Digital Water Courses** (undergraduate, postgraduate levels, PhD). Diploma courses as well.
- Conduct industry-relevant workshops and hackathons.
- Provide **internship opportunities** with leading water experts and startups.
- Facilitate workforce development for a sustainable future in water management.

Call to Action

- **Vision Alignment**:
- Partner with the Government of West Bengal to create a digital water revolution.
- Strengthen sustainable water management through digital innovation.
- Next Steps:
- Establish an MoU to initiate the Center of Excellence.
- Begin pilot programs for Digital Water courses in selected colleges.
- Launch internship programs with industry support.
- **Invitation to Collaborate**:
- Let’s co-create a future of sustainable and efficient water systems in West Bengal.

DWP and DWI Activities

Comments from the Chair DWP (Digital Water Program)

Oliver Grievson 1:01 AM (10 hours ago)

to me

Jyoti,

Sorry I've been all over the place this week. For me the natural thing would be how Digital Water can be used within the economic environment

So,

1) How Digital Water can be used to optimise the water use in the manufacturing space be it in data centres or other heavy water users

2) How it can be used for resillience be it in climate change extremes be it drought or flooding

3) Environmental Protection using Digital Twins and promoting a Digital River Basin approach.

These are all relatively generic and its important to understand the pain points and address them.

Hope that helps,

Oliver

Sent from Outlook for Android

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jyoti gautam <jyotijssaten@gmail.com> 7:02 AM (4 hours ago)

to Oliver

Contact Details:

DIGITAL WATER PROGRAMME
INDIA SUB-GROUP

Chair of Digital Water India Subgroup.
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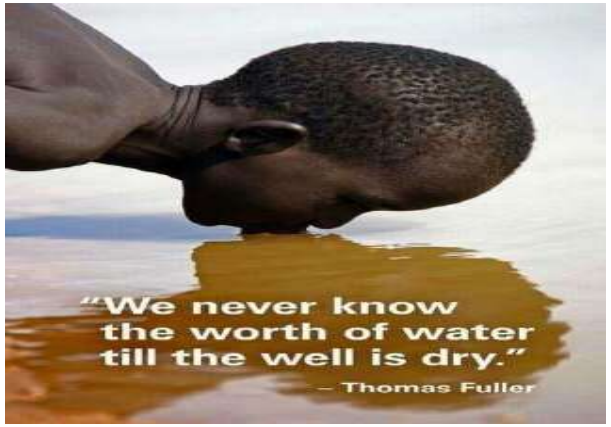
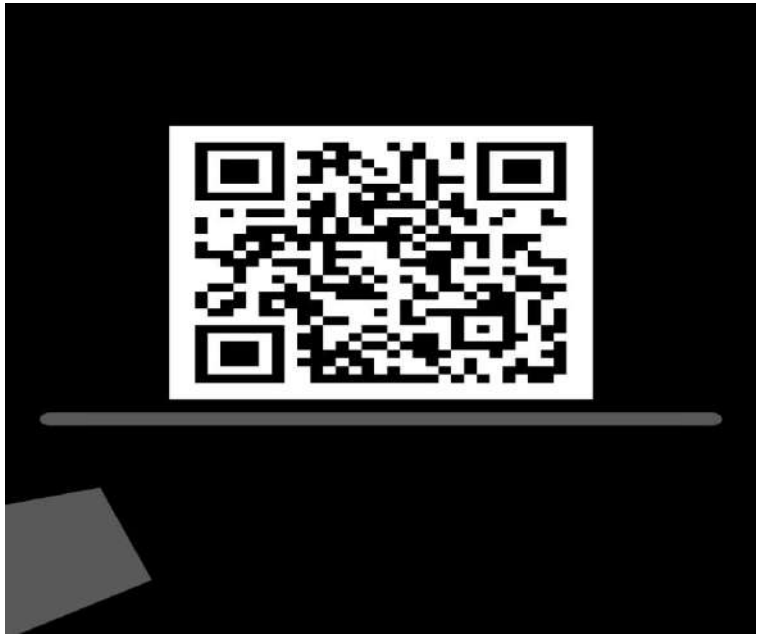
email: jyotijssaten@gmail.com
LinkedIn: https://www.linkedin.com/in/jyoti-gautam-69540b68/





THANK YOU !