Overtourism, water protection and HAB:

A citizen science project to foster awareness

UIC UNIVERSITY OF ILLINOIS CHICAGO

UNIVERSITY OF WISCONSIN PARKSIDE

Ostfalia
Hochschule für angewandte Wissenschaften

ZWIRN

Hydroguard

https://hydroguard-iot.de/

Algae App LLC

The Joys of Travel

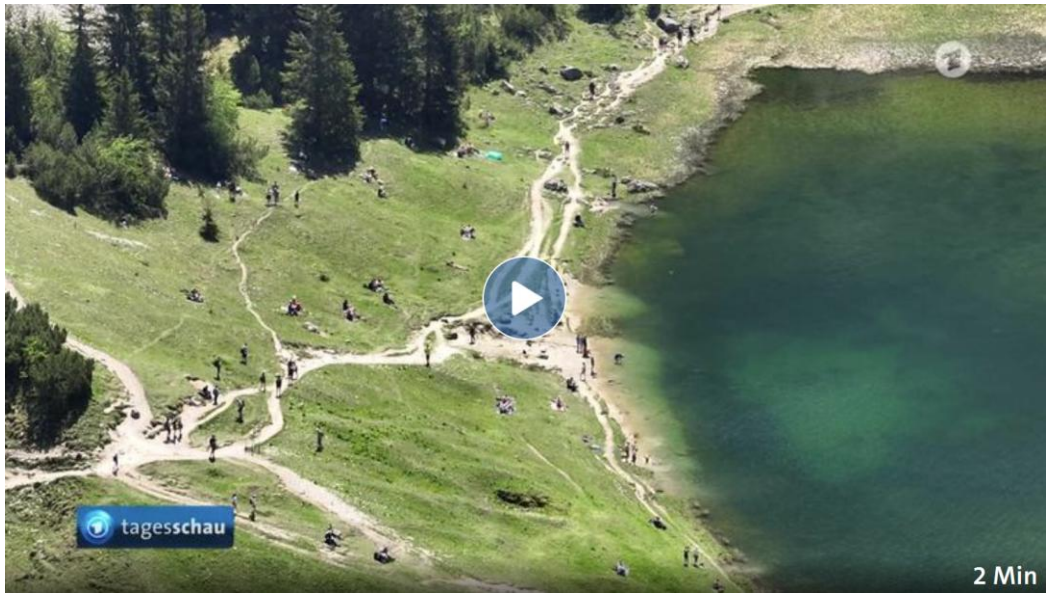
Overtourism is … when too many visitors crowd a travel spot. It harms local nature, breaks down public spaces, and hurts the daily life of people who live there.

Key Causes	Main Impacts
Cheap long flights	Crowded streets
Social media hype	High living costs
Travel motivated by religion (pilgrimage)	Nature and site damage
Short-term rental homes	Bad visitor experiences
Large cruise ships	
Climate change: Coolcation	

Consequences in the Western World

Environmental Destruction	Infrastructure Strains	Community Displacement
Water Pollution: Millions of visitors trigger failing sewage systems, untreated discharges, and chemical pollution from heavy motorboat traffic.	Severe **Traffic Jams**: Fragile lakeside roads become entirely gridlocked by day-trippers arriving in cars	Skyrocketing **Living Costs**: Short-term rentals like Airbnb push housing prices up, displacing local families.
Loss of Biodiversity: Paved concrete roads and hotel construction replace green shorelines, leaving little space for native animal species to survive.	Overwhelmed **Public Transit**: Local buses and ferries face massive queues, forcing residents to compete with tourists just to commute.	Loss of **Cultural Identity**: Historic lakeside properties and local traditions are often heavily commercialized to build hotel brands.
Litter and Waste: Trash bins constantly overflow, and tourists regularly leave plastic trash and vapes directly in the surrounding nature.	**Parking** Shortages: Severe lack of spaces leads to drivers blocking emergency lanes and ignoring parking rules.	

Use Case: Gaisalp



tagesschau

Overtourism at Mountain Lakes

When Recreation Becomes a Burden on Nature

Updated: August 16, 2026 | 8:02 a.m.

By nine in the morning, the parking lot—the starting point for the hike to Gaisalpsee near Oberstdorf, **Bavaria** —is already quite full. Bernhard Kirchbihler has been working as a hunter in the area for 20 years. Not only is it much busier now than it used to be, but visitors' behavior has also changed. "Wild drinking binges, wild camping, building fires. There's a lot of trash lying around. It really hurts to see what's happening there," says Kirchbihler. Even break-ins at cabins and acts of vandalism occur time and again.

A Worldwide Issue

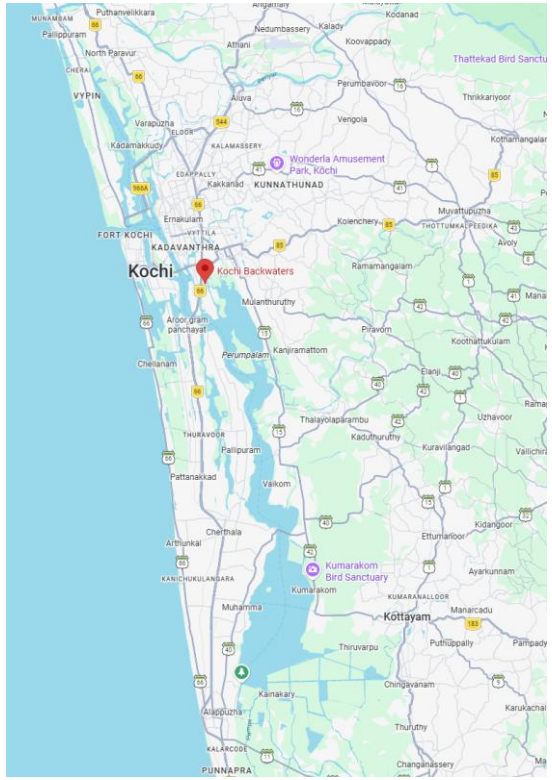
In **India**, overtourism manifests not only, but primarily as religious tourism (**pilgrimage**), which places immense ecological strain on holy waters and temple ponds.

While the ancient, man-made reservoirs were once engineered to harvest rainwater, recharge groundwater table levels, and support local biodiversity, massive spikes in "floating populations" (temporary visitors) during festival seasons heavily degrade them.

A Worldwide Issue

Severe Water Pollution	Failure of Local Infrastructure	Loss of Vital Ecological Roles
Chemical Contamination: Devotees use soaps, shampoos, detergents directly in sacred ponds for ritual bathing, releasing phosphates and oil into enclosed ecosystems.	**Sewage Overflow**: When masses of pilgrims visit a historic temple town, local sewage lines and public toilets fail. Wastewater and solid waste often leak into low-lying temple ponds.	**Groundwater Depletion**: Concrete construction for hotels, shops, parking blocks traditional channels that fed rainwater into ponds: No natural inflow, silt clogging, ponds dry up.
Organic Debris Overload: Ritual offerings (floral garlands, food, milk) are put on pond surfaces. Decay is depleting diss.O_2: Smell, sludge, HAB.	**Plastic & Toxic Litter**: Overflowing trash bins mean plastic water bottles, snack packets, and modern garbage end up floating in the sacred water.	**Destruction of Aquatic Life**: Water quality drop kills off fish, frogs, aquatic plants that naturally clean the water: Ecosystems turn into dead zones.
Toxic Festival Residues: During major festivals mass immersion of festival idols coated in plaster of Paris, chemical paints, heavy metals (lead, chrome), and pesticide-laden flowers poisons the water beds.		 

Use Case Kerala: “God’s own Country”



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Lack of oxygen: Vicious circle in the lake

Stand: 02.02.2024 10:25 Uhr

Once lakes have too little oxygen, it is hard to bring them back to a good condition. This is often caused by nutrients from agricultural runofff during increasingly vicious rainfall events due to climate change effects.

Monitoring with Auto-X

Autonomous biomonitoring - A joint buoy and citizen science project to monitor water quality under the influence of climate change

Climate Change,
Extreme Weather Conditions

Warming of Lake Water

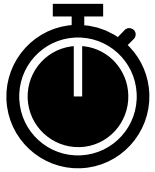
Overtourism

Toxic algal blooms,
fish kills,
habitat alteration,
food poisoning

Human health
and well-being

AUTO-X: We watch and learn

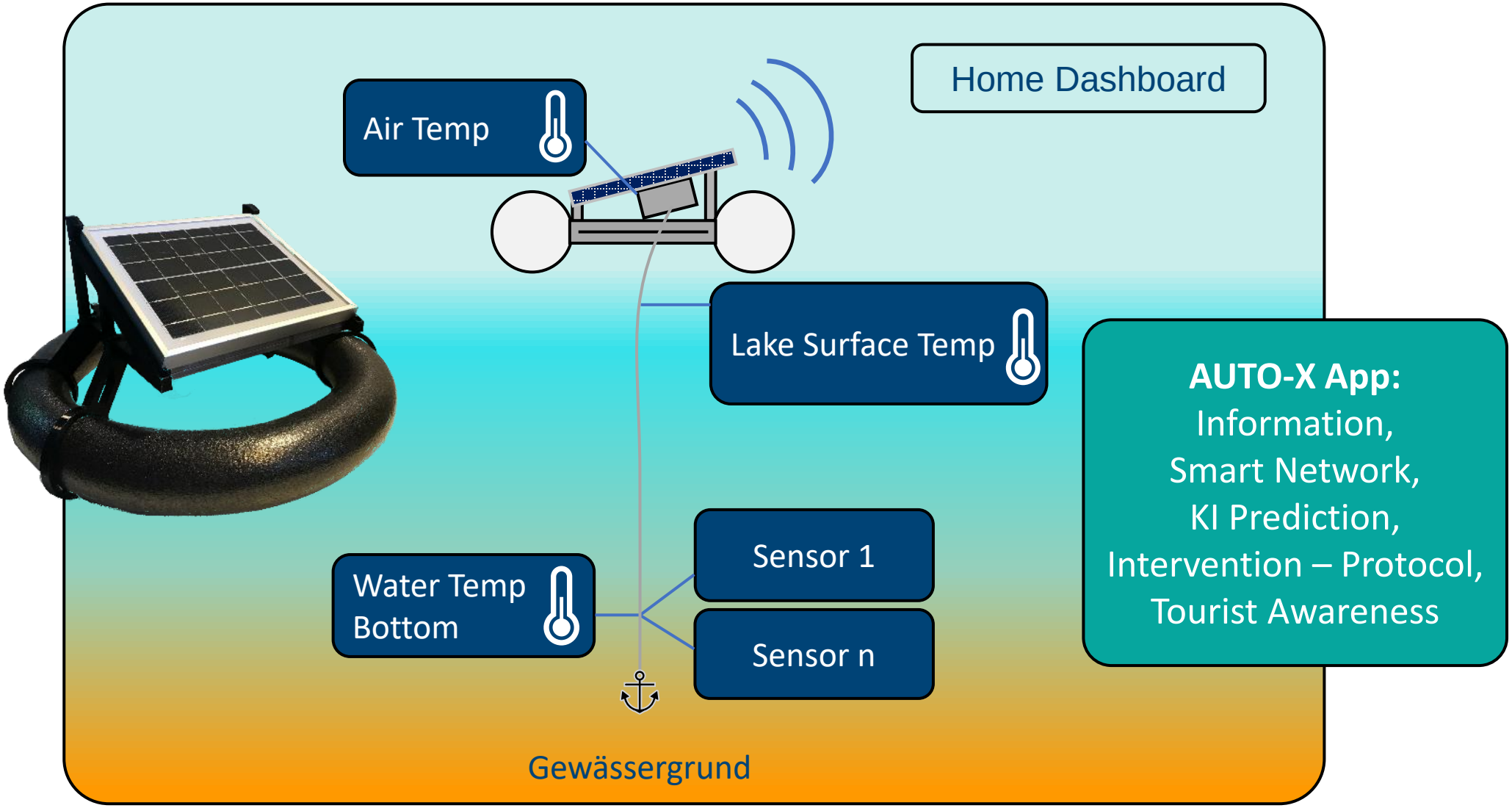
Traditional Monitoring



- Labor-intensive Manual Sampling
- Time allowance for Onsite Sampling
- Laboratory Analysis
- Expert Evaluation
- Cost-intensive Equipment
- Status Assessment

Autonomous Real Time Monitoring: HYDROGUARD

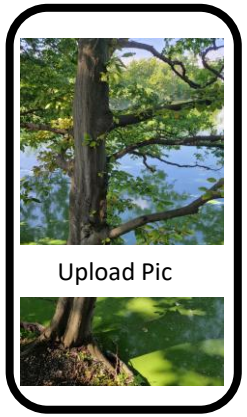
- Autonomous Automated Data Acquisition
- Efficient LoRaWAN Transmission
- Dashboard and Real-Time Information
- Detection: Manipulation, Damage
- Design: Cost-efficient, Environmentally-friendly
- KI: Prediction
- Crisis Intervention Protocol
- **Citizen Sciences: Awareness**


Home Dashboard
Air Temp
Lake Surface Temp
Water Temp Bottom
Sensor 1
Sensor n
Gewässergrund
AUTO-X App:
Information,
Smart Network,
KI Prediction,
Intervention – Protocol,
Tourist Awareness

AUTO-X: Join the Tec

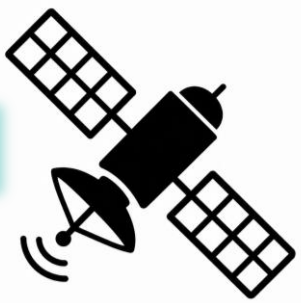
Tourist Awareness App:

- Attractive
- Interactive



Institutions
Home Dashboard

Information,
Smart Network,
KI Prediction,
Intervention - Protocol



AUTO-X App: What we got

AUTO-X App: What we need

AUTO-X: What you start with

- Getting into the Spirit: Information on the App predecessors, buoy, sensors and AI
- Joining the Team: Learn more about the previous AUTO-X Project
- Sipping the Science: Project Publications
- Depicting the Scene: Image Library
- Diving into the Web:
  - Latest App – Design: currently being implemented
  - Social Media / Video Link: https://youtu.be/Ac6tzjYrraQ
  - SME: https://hydroguard-iot.de/
- Creative Mind: How to raise awareness preserving nature in touristic hot spots
- Asking Questions: We are out there – contact us!

Are you up to a challenge?

GLOBAL PRIZE FOR INNOVATION IN WATER

- **Environmental Sustainability and Water Resource Conservation**: Solutions that protect water resources and ecosystems through sustainable practices and nature-based approaches. Includes watershed protection, groundwater preservation, pollution reduction, ecosystem restoration, climate resilience, and sustainable resource management.
- Demonstrate genuine innovation, technical merit, and potential impact on global water challenges.
- Show a credible path toward piloting, scaling, or deployment appropriate to its readiness level.
- The Challenge requires a written proposal, a pitch video, and supporting documentation to be submitted (TRL 1-3 or 4-7)

https://www.innocentive.com/challenges/global-prize-for-innovation-in-water-gpiw-2026/

Raising tourist awareness:
Embark on a new journey!