Innoqua Company Profile

Innoqua inc. CEO Yota Takakura

Vision/Mission

Our vision is "**The world where nature and humans live together 100 years later**". In these 20 years, various ecosystems will collapse because of climate change. It is said that 80~90% of corals will die and many livings/creatures dependent on them will be extinct. We are eager to solve this big issue.

Therefore, we raise the mission "**To be the doctor of Earth**" and research about treatment techniques of ecosystems. For that mission, we are now **trying to establish the method to assess ecosystems**. Based on our "environment transportation technology", which consists of **AI/IoT/Bio technologies and transport any natural ecosystem into aquarium tanks, we simulate various situations and formularize ecosystems** to realize medical examination of ecosystems and to predict the **future of ecosystems.** We believe this assessment technology brings stronger treatment techniques of ecosystems.

Figure 1 : We are successful in breeding coral in a closed artificial environment. Not relying on the sea we breed coral for about ten years.

Our technologies

Our core system ***Moniqua*** **, that consists of sensors, actuators, databases, and AI systems** [Fig 1,2],implements "environment transportation technologies". In this system, we **formulate ecosystems and improve it's algorithms by AI**.

In addition to that system, we research **various sensing technologies with bio researchers**. For example, we research environmental DNA and proteomics. We describe the details of each research below.

Environmental DNA is DNA that is collected from a variety of environmental samples such as soil, seawater rather than directly sampled from an individual organism. **We try to derive the correlation between eDNA and environmental conditions by getting these data from various closed environments.**

Proteomics is the study of proteins. Proteins are vital parts of living organisms and the number of **proteins varies with time and distinct requirements, or stresses, that a cell or organism undergoes**. **We assume that we can grasp the health condition of ecosystems by monitoring proteins in seawater.**

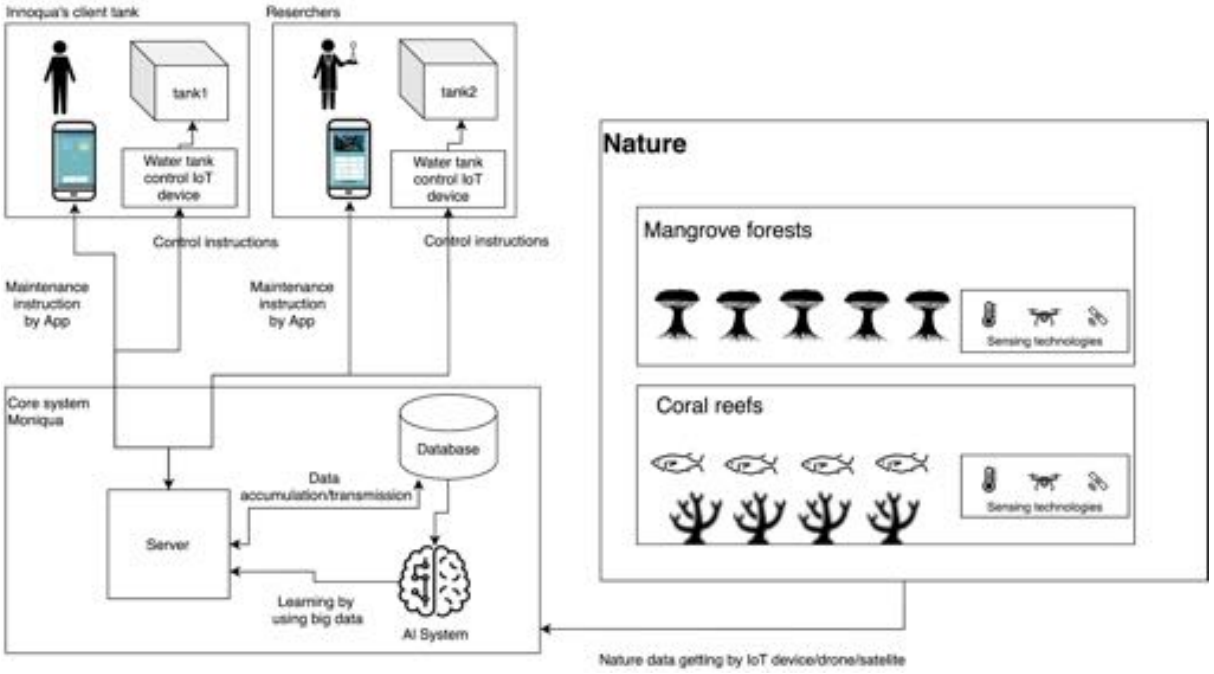

Figure2：Our core system “Moniqua”

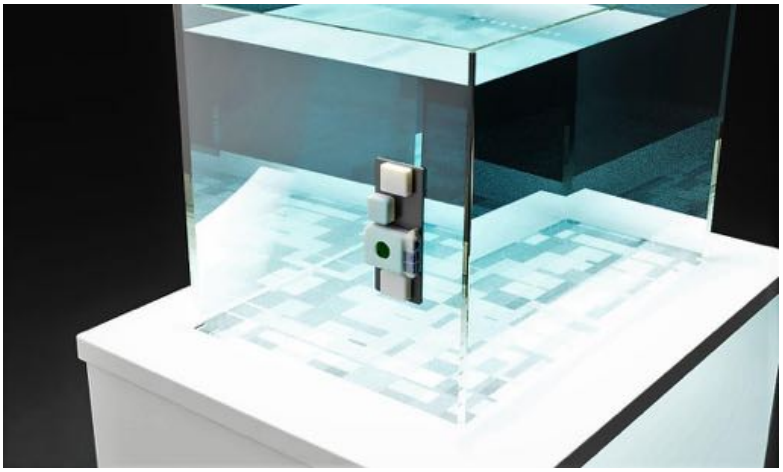

Figure3：Water tank control IoT Device

Track Record

Coral spawning in a closed system

Corals spawn once a year on a full moon night in June. However, there are still just three cases of successful spawning in an artificial environment. As a result, there are so many studies that can only be performed in regions where a large number of natural corals are living and this is the bottleneck when researching corals.

We succeeded in having our coral mature spawn in a closed environment May 2020 for the first time in Japan. However, coral didn't spawn. Therefore, we are trying again for the success coral spawning next June.

Figure4 : The appearance of coral spawning experiment. We broadcast our challenge on YouTube.

Coral reefs conservation project utilizing by-product generated in the steelmaking process

We do research with one of the major steel companies in the world about using by-products generated in the steelmaking process for coral reefs conservation. **We support companies' initiatives for the circular economy.** *No detail can be written because of confidentiality.

Mangrove forest conservation project utilizing exhaust heat of the building

We make a research with one of the major air conditioner companies in the world about using the waste heat of the building for mangrove forest conservation. *No detail can be written because of confidentiality.

Endangered water plants conservation project

We made a research with a general contractor company about conservation of certain endangered water plants in a closed artificial ecosystem. We achieved success in breeding that water plants. *No detail ca be written because of confidentiality.

Active learning aquarium at commercial facility

For increasing the fellow who preserve the earth environment, we educate people of all ages. In this project, with children, we put empty tanks at a commercial facility and build up an artificial ecosystem. They plant coral and choose livings/creatures.[Fig 3] We provide not only those valuable experiences but also several methods of the ecosystem research for conservation of the ocean.

Figure5：Children plant coral in the empty tank.

Active learning aquarium at corporate office

In this project, same as above, we put an empty tank in the corporate office and built up a coral reef ecosystem in that tank.[Fig 4] At first, we design our ecosystem as if it were a city, and decide the concept and we choose livings/creatures. In the process of maintaining that ecosystem, we can promote communication between employees and give them a lot of deep knowledge of the ecosystem/environment. Lastly, we believe this project leads to thinking future design of the city/earth.

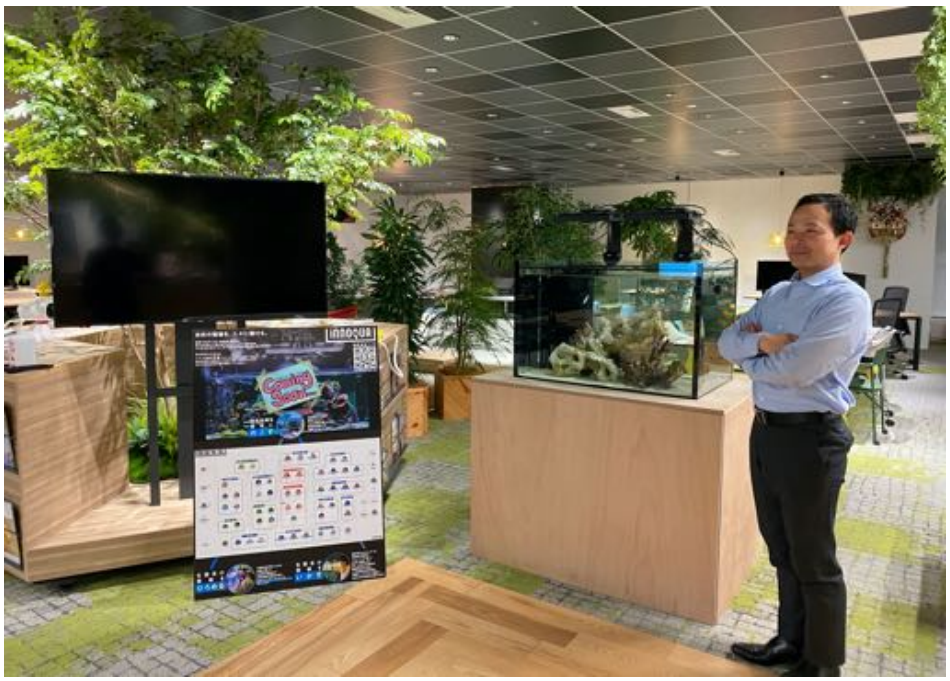

Figure6：First “empty” tank at corprate office.