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BELOW WATER



Life below Water

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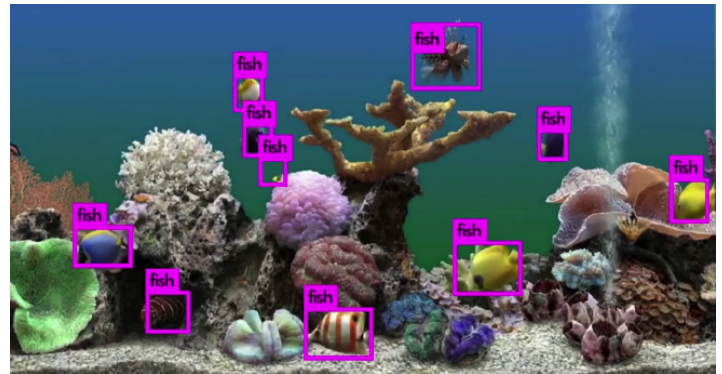
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Research
Projects

Fish Biodiversity Estimation by Low-Cost Non-Destructive Video-Based Sampling (FIBEVID)

Pakistani rivers are home to 34 endemic species of fish that are unique worldwide, multiple of them endangered. These habitats of these fishes are threatened by overfishing, polluted rivers, the introduction of more dominant species in the habitat and the construction of water dams in the area. The monitoring of these species, so far, has been done manually with experts deploying fishnets, capturing samples and counting them to get an estimate. This method is labor-intensive, time-consuming and most of all destructive to the already endangered species.

FIBEVID proposes a non-destructive, video sampling-based solution to fish population estimation. The project has run over the last two years, in collaboration with Rhein-Main University of Applied Sciences (HSRM), Germany. Algorithms and tools for fish detection, classification and tracking have been developed for fish fauna estimation in Pakistani rivers.



Autonomous Underwater Vehicle (AUV)

Autonomous Underwater Vehicles (AUVs) have broad applications in preservation of under-water species as they assist in large area underwater detection, relay communication, navigation, and large area ocean environment observation. However, the uncertainty of the underwater environment and the uniqueness of acoustic measurement are the great challenges. To solve this problem, NUST developed a project that takes improvement of AUV cooperative navigation performance under distributed acoustic sensing measurement network as the main line. This project has enabled high precision of information in harsh underwater conditions through acoustic channel high precision multi-AUV cooperative localization.

Evaluation of chemical-induced toxicity and quorum quenching potential using fish as a model organism

Agrochemicals have become a leading cause of health problems in countries throughout the world. Pakistan, being an agricultural country, relies greatly on pesticides to achieve higher crop yields with better quality. Lambda-cyhalothrin, a synthetic parathyroid low-cost pesticide, is very popular in Pakistan due to its proven efficacy against crop however, WHO has prohibited its use due to its acute toxicity. Similarly, a higher concentration of pharmaceuticals active ingredients like sulfamethoxazole has also been detected in surface waters of Pakistan due to untreated wastewater and run-off from agricultural usage.

In order to reduce the impact of commonly used pesticides on aquatic life and humans, it's necessary to assess their toxicity potential. In this project, fish was selected as a model organism and exposed to different concentrations of potential contaminants to identify the sub-lethal levels. During this study, isolation of pathogens from the surrounding water and various organs of fish was also performed to measure their quorum sensing ability.

