AI-Driven Real-Time Coral Reef Health Monitoring Using Underwater Imaging

Almansouri, Khalid (School: Qatar Science and Technology Secondary School for Boys)
Almeraikhi, Mohammed (School: Qatar Science and Technology Secondary School for Boys)

Coral reefs around the Qatari peninsula are increasingly threatened by rising sea temperatures, pollution, and desalination brine discharge. This project proposes an AI-driven system for real-time coral reef health monitoring using underwater imaging and environmental data analysis. Building on a previously developed 3D-printed underwater rover, the current work shifts focus toward artificial intelligence–based image processing to classify coral health states and identify early signs of ecosystem stress. The system integrates computer vision models with synchronized environmental parameters such as weather patterns and wind direction to support informed decision-making that minimizes ecological impact. The project provides high school students with hands-on research experience in AI and environmental science while addressing a nationally relevant sustainability challenge.

Awards Won: