Tropical Water Quality Hub

Project 2.3.2 'Human sensors' for monitoring Great Barrier Reef environmental changes and quality of marine waters through harnessing Big Data analysis

Project Summary

This project will take a novel approach to improving monitoring of environmental and aesthetic conditions in real time by capitalising on information provided through micro-blogs from visitors to the Great Barrier Reef. The data mining will integrate visitor-generated data (e.g. twitter) with other monitoring data, including meteorological data, Eye-on-the Reef sightings, tourism statistics, and other dispersed data sources. Data will be integrated and human sensor data will be verified to test the development of a cost-effective real-time monitoring tool for aspects of Great Barrier Reef health. All Great Barrier Reef stakeholders will benefit greatly from this innovative monitoring system.

Photo: Susanne Becken

Visitors to a Great Barrier Reef island off the coast of Cairns

Problem

The Great Barrier Reef (GBR) is at risk and environmental monitoring of water quality and other environmental conditions is critical. Traditional monitoring of the environment is costly and faces enormous logistical challenges, and innovative approaches are needed to credibly complement biophysical monitoring. In response, the GBRMPA has developed the beginnings of citizen science through its 'Eye on the Reef' program. The Eye on the Reef is highly successful but can be further enhanced and complemented by tapping into information provided through micro-blogs (e.g. Twitter and other social media) and integrating citizen-supplied data with other monitoring data.

How Research Addresses Problem

Every year, a minimum of 2 million people visit the GBR on commercial tours. The phenomenon of sharing tourist experiences via social media is well researched, and it is likely that visitors to the Reef describe their experiences (good and bad) through their subscribed channels. The number of micro-blog users is considerable. It is estimated that about 2.8 million or 12% of Australians use Twitter. In addition, about 85,000 international visitors reportedly used Twitter before or during their visit to Australia. Visitors to the Great Barrier Reef use a wide range of social media to communicate their experience. By verifying this type of information with biophysical monitoring data, this research will examine the credibility and usefulness of human sensors for monitoring Reef health. In addition, this research will explore how Indigenous residents in the GBR region can contribute information via their mobile devices, for example by feeding targeted tweets (recognizable through agreed hashtags) into the monitoring system.

Researchers from Griffith's Big Data Lab and the Griffith Institute for Tourism

Photo: Susanne Becken

To use 'human sensors' of environmental conditions is the next logical step in environmental monitoring of the GBR. As part of an integrated 'Big Data' approach, these new data can be integrated with existing data (e.g. Marine Water Quality Dashboard, AIMS long-term monitoring) to provide a cost-effective tool that records change in real-time. This project offers a unique opportunity to greatly enhance the existing system and also offer a much needed demonstration project for developing analytical procedures for mining and integrating dispersed data sources into user-friendly monitoring tools. In summary, this project will demonstrate how citizen/visitor data can be integrated and calibrated with other relevant data to explore new ways of monitoring environmental change. The project will contribute to improved natural resource management of the GBR, in particular through its cost-effective integrative approach of considering human sensors as part of a monitoring system. The project will provide an online tool for enhanced monitoring that builds on information provided through twitter and other social media. The tool will help decision makers to identify areas of concern, critical incidents and explore opportunities for further exploiting the new concept of citizen science for enhancing traditional scientific monitoring.

Further information

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