# Lake water quality index prediction by sensitivity uncertainty analysis using deep learning algorithms

**Trevor Ford***

Department of Geomatics, Tshwane University of Technology, South Africa

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## Introduction

Water, the elixir of life, is a finite and invaluable resource essential for the survival and well-being of all living organisms on Earth. As our global population continues to rise and industrial activities expand, the demand for water intensifies, putting immense pressure on water sources. In the quest for meeting this demand, it becomes imperative to maintain and monitor water quality to ensure its suitability for consumption, agriculture, industrial processes, and sustaining ecosystems. This article delves into the multifaceted realm of water quality, exploring its components, factors influencing it, methods of assessment, and the crucial importance of safeguarding this precious resource. Water quality is a measure of the physical, chemical, biological, and radiological characteristics of water that determine its suitability for various uses. The parameters defining water quality can be broadly categorized into two groups: Primary indicators and secondary indicators. These include attributes like temperature, colour, turbidity, and odour. Temperature variations can impact the solubility of gases and influence aquatic ecosystems. Colour and turbidity can indicate the presence of impurities or suspended particles, affecting aesthetics and the ability of sunlight to penetrate water bodies [1,2]. Water chemistry is assessed through parameters such as pH, dissolved oxygen, nutrients (nitrogen and phosphorus), heavy metals, and various ions.

## Description

PH levels influence the solubility of minerals and the activity of aquatic organisms. Dissolved oxygen is vital for the survival of aquatic life, and excessive nutrients can lead to eutrophication, causing harmful algal blooms. The presence and abundance of living organisms, including bacteria, algae, and macroinvertebrates, serve as indicators of water quality. Monitoring these organisms can reveal the health and ecological balance of a water body. Radioactive substances present in water, such as radium and uranium, can pose serious health risks. Monitoring these parameters is crucial to ensure that water sources are free from harmful radiation. TDS measures the concentration of inorganic and organic substances dissolved in water. High TDS levels can affect the taste, odour, and appearance of water. TSS represents the concentration of suspended particles in water. Excessive TSS can reduce light penetration, affecting photosynthesis in aquatic plants, and lead to sedimentation. Several natural and anthropogenic factors can impact water quality. Understanding these factors is essential for implementing effective measures to safeguard water resources. Urban development, agriculture, and industrial activities can introduce pollutants such as fertilizers, pesticides, heavy metals, and chemicals into water bodies [3,4]. Storm water runoff from urban areas often carries contaminants into rivers and lakes, affecting water quality.

## Conclusion

The use of fertilizers and pesticides in agriculture can result in nutrient runoff and the presence of harmful chemicals in water bodies. Additionally, livestock farming may contribute to microbial contamination, affecting the safety of water for human consumption. Industrial processes often release pollutants, including heavy metals, chemicals, and wastewater, into nearby water sources. These discharges can have detrimental effects on aquatic ecosystems and human health if not properly treated. Alterations in climate patterns can influence precipitation, temperature, and the frequency of extreme weather events. These changes can impact water availability, distribution, and temperature, affecting the overall quality of water bodies. Point source pollution originates from identifiable and specific locations, such as industrial discharge pipes.

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## Conflict of Interest

The author declares there is no conflict of interest in

publishing this article.

## *Corresponding to

Trevor Ford

Department of Geomatics,

Tshwane University of Technology, South Africa

Email: trevor_ford@kku.edu.sa

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