A Study of Volumetric Variation and Kinetic Behavior of Gas Bubbles for Water and Air Quality Assessment

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Nowadays, water and air pollution is a crucial environmental issue. Qualitative measurement of water and air qualities plays a vital role in environmental preservation as it is used for planning and management. This report presents a novel method for measuring the quality of water and air by observing characteristics of bubbles in water. Characteristics of air bubble rise in water with different dissolved oxygen (DO) are investigated. It is found that air bubbles with different DO values move in water with different patterns, velocities, and volumetric changes. The velocity and movement patterns of bubbles are found to be correlated with the oxygen concentration in the bubbles. In addition, changes of oxygen's bubble volume at different height are found to be correlated with the level of DO in water. A model that predicts these quality indices based on these observations is established. This model is used for the development of a mobile application for simple measurement of the water and air quality.

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