Computational and Data-Driven Approaches to Estimate Missing Data in Life Cycle Assessment for Environmental Footprint Analysis

Life cycle assessment (LCA) has become a mainstream method in evaluating environmental impacts of product systems for policy making. One of the challenges facing LCA research and practice is missing data. To address this challenge, we have developed new computational methods using data science tools to estimate missing data in LCA solely relying on limited known data, as illustrated in two examples: (i) estimation of missing unit process data using a similarity-based approach, and (ii) application of artificial neural network models to estimate ecotoxicity characterization factors for chemicals. These studies provide a new direction to obtain data for LCA and demonstrates a promising potential of using data science approaches for LCA data compilation.