

Chapter 9


Integrating Content– Based Image Retrieval to Assess the Medical Effects of Environmental Pollution on Human Health

K. Anitha

 <https://orcid.org/0000-0002-9569-4206>


Department of Computing Technologies, SRM Institute of Science and Technology, Kattankulathur, India

D. Shiny Irene

 <https://orcid.org/0000-0001-9636-7648>


Department of Computing Technologies, School of Computing, SRM Institute of Science and Technology, Kattankulathur, India

D. Vinod

 <https://orcid.org/0000-0003-2020-680X>


Department of Computing Technologies, SRM Institute of Science and Technology, Kattankulathur, India

P. Nancy

 <https://orcid.org/0000-0002-4879-9080>

Department of Computing Technologies, SRM Institute of Science and Technology, Kattankulathur, India

S. Radhika

 <https://orcid.org/0000-0002-9569-4206>

SIMATS Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India

ABSTRACT

The medical impact of environmental pollution is profound, linked to respiratory and cardiovascular

DOI: 10.4018/979-8-3693-8532-6.ch009

diseases and cancer. Traditional studies rely on correlating environmental and health data, but Content-Based Image Retrieval (CBIR) offers a new level of precision by analyzing medical and environmental images such as lung scans and pollution maps. CBIR, especially when combined with neural networks and machine learning, enhances automated pattern recognition, revealing links between pollution exposure and health outcomes. For instance, satellite images of polluted areas can be matched with medical scans from local populations, providing evidence of pollution's health impact. In clinical settings, CBIR supports diagnosis by comparing patient scans with pollution-related image markers, enabling early detection and personalized care. Integrating CBIR into this research improves risk assessment, prevention, and public health strategies, advancing our understanding of pollution's role in disease and fostering healthier communities globally.

1. INTRODUCTION

Environmental pollution has emerged as one of the most pressing global health challenges of our time, significantly impacting ecosystems and human well-being. With the rapid pace of industrialization, urbanization, and population growth, the earth's natural balance is under severe strain, facing unprecedented levels of contamination from pollutants that pervade the air, water, and soil. These pollutants originate from various sources, including industrial emissions, vehicular exhaust, agricultural runoff, and improper waste disposal, each contributing to the complex web of environmental degradation. Airborne pollutants such as particulate matter, nitrogen oxides, sulfur dioxide, and volatile organic compounds pose a significant risk to respiratory health, with exposure leading to conditions such as asthma, chronic obstructive pulmonary disease, and even lung cancer.

Water pollution, on the other hand, stems from the discharge of industrial effluents, agricultural chemicals, and untreated sewage, contaminating vital water sources with hazardous substances such as heavy metals, pesticides, and pathogenic microorganisms, which contribute to gastrointestinal diseases, developmental disorders, and long-term health complications. Soil pollution, often an overlooked aspect, results from the accumulation of toxic substances that infiltrate the food chain, causing detrimental effects on both human health and agricultural productivity. Studies conducted across the globe have increasingly demonstrated the far-reaching impacts of these environmental pollutants, highlighting their link to a wide range of health complications, including respiratory ailments, cardiovascular diseases, neurological disorders, and severe forms of cancer. The long-term exposure to such pollutants not only reduces life expectancy but also imposes a significant burden on healthcare systems, particularly in developing nations where pollution control measures and healthcare infrastructure are often inadequate.

According to the World Health Organization (WHO), air pollution alone is responsible for approximately seven million premature deaths annually, making it one of the leading environmental causes of mortality worldwide. This alarming statistic underscores the critical need for immediate and sustained interventions to mitigate pollution levels and protect public health. Governments, research institutions, and environmental organizations must work collaboratively to develop and implement effective policies, leveraging advancements in technology and scientific research to monitor, control, and ultimately reduce environmental pollution. The urgency of addressing this crisis cannot be overstated, as continued exposure to pollutants threatens not only current generations but also the well-being of future populations, making it imperative to adopt a holistic and sustainable approach to environmental management.

24 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/integrating-content-based-image-retrieval-to-assess-the-medical-effects-of-environmental-pollution-on-human-health/376405

Related Content

Designing Effective Crowdsourcing Systems for the Healthcare Industry

Kabir Senand Kaushik Ghosh (2018). *International Journal of Public Health Management and Ethics* (pp. 57-62).

www.irma-international.org/article/designing-effective-crowdsourcing-systems-for-the-healthcare-industry/204409

A Primer for Beginners in Pharmaceutical Care: A Call-to-Action to Pharmacists

Marcus Vinícius Dias-Souza (2018). *International Journal of Public Health Management and Ethics* (pp. 13-38).

www.irma-international.org/article/a-primer-for-beginners-in-pharmaceutical-care/204407

Kiswahili Video Messaging on COVID-19 Awareness in Kenya: The Peaks and Valleys

Wendo Nabea (2024). *Public Health Communication Challenges to Minority and Indigenous Communities* (pp. 47-59).

www.irma-international.org/chapter/kiswahili-video-messaging-on-covid-19-awareness-in-kenya/345946

Parameter Analysis of Electronic Gadgets During Homa: Smart City Healthcare Perspective With CPS and IoT

Rohit Rastogi, Mamta Saxena, Sheelu Sagar, T. Rajeshwari, Neeti Tandon, Mukund Rastogi and Mayank Sharma (2022). *International Journal of Applied Research on Public Health Management* (pp. 1-14).

www.irma-international.org/article/parameter-analysis-electronic-gadgets-during/290381

Exacerbating Health Risks in India due to Climate Change: Rethinking Approach to Health Service Provision

Joyashree Roy, Duke Ghosh, Kuheli Mukhopadhyay and Anupa Ghosh (2017). *Public Health and Welfare: Concepts, Methodologies, Tools, and Applications* (pp. 1102-1127).

www.irma-international.org/chapter/exacerbating-health-risks-in-india-due-to-climate-change/165857