Environmental Intelligence

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We propose that coupled human and environmental information processing can be applied to concomitantly increase the scope and penetration of surveillance, leading to new opportunities to detect, track, quantify, predict and influence events and interactions across a wide range of operations. Academia and non-governmental organizations, state actors, and commercial interests are expected to utilize and benefit from environmental intelligence in differentiated manners.

Keywords: artificial intelligence ; internet of things ; environment ; climate change ; situational awareness ; decision support system

1. Introduction

The central tenet of environmental intelligence is that the integration of environmental data and human-generated content can provide a predictable, pervasive, dynamic and operationally superior overview of human-ecosystem interaction. To achieve this, extensive real-time local and remote sensing capabilities must be integrated into multidisciplinary nested networks [1].

The goal of environmental intelligence is to develop, integrate and expand information processing methods into a multilateral global communication network for observation, forecasting, maintenance and control. It can be conceptualized as a “network of cyber-eco interactivity”.

In order to highlight the emergent nature of the paradigm, we would like to call attention to the evolution in environmental intelligence via the coupling of geoscience data, disaster relief coordination and social media [2][3]. We anticipate the ability to predict and anticipate the outcome of conflicts between different uses and users. This ability will lie predominantly in the differentiation of applications for environmental intelligence between academic and non-governmental, governmental, and commercial users.

The development framework underlying environmental intelligence should be self-generating and sustainable [4]. This is because the underlying technologies and their applications required for environmental intelligence are designed, maintained and expanded via the constant juxtaposition of human and environmental influences based on multiscale energetic and material balances. Human influences can be conceptualized along a spectrum of systematic and cumulative impacts [5]. Environmental influences are conceptualized along a spectrum of stable ecological networks vs. the changes imposed on them by extreme events. The overlap between these influences is anticipated to create self-sustaining, locally viable and globally interacting cyber-ecological technologies.

Finally, it is claimed that ecological intelligence is the global manifestation of an emerging cyber physical evolution, and that it will be accomplished without the need for, and independently of, any central regulatory or guiding authority.

2. Anticipated Academic and Non-governmental Uses

- Long-term studies on ecological change
- Investigation of human-ecosystem interactions
- Development of independent NGO-based environmental monitoring

3. Anticipated State Uses

- Human health and safety, livestock management and agricultural production
- Ecological surveillance as a human intelligence surrogate

- Leveraging environmental change in military and diplomatic strategy

4. Anticipated Commercial Uses

- Predictive management in the insurance and health sectors
- Transitioning social networks to environmental networks
- Long-term studies on environmental conditions to guide consumer behavior

References

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