Artificial intelligence aided correlation analysis applied to air pollution influence on morbidity.

Prof. Stefka Fidanova, PhD

Petar Zhivkov

Institute of Information and Communication Technologies

Bulgarian Academy of Science

Air Pollution

- **Air pollution is a major environmental health problem affecting everyone.**

Air Pollution

- World Health Organization (WHO) states
- Close relationship between
- small particles (PM10 and PM2.5) and
- increased morbidity or mortality, both daily and over time.

Air Pollution

- The human health effects of exposure to outdoor air pollutants is considered a global health concern.

Air Pollution

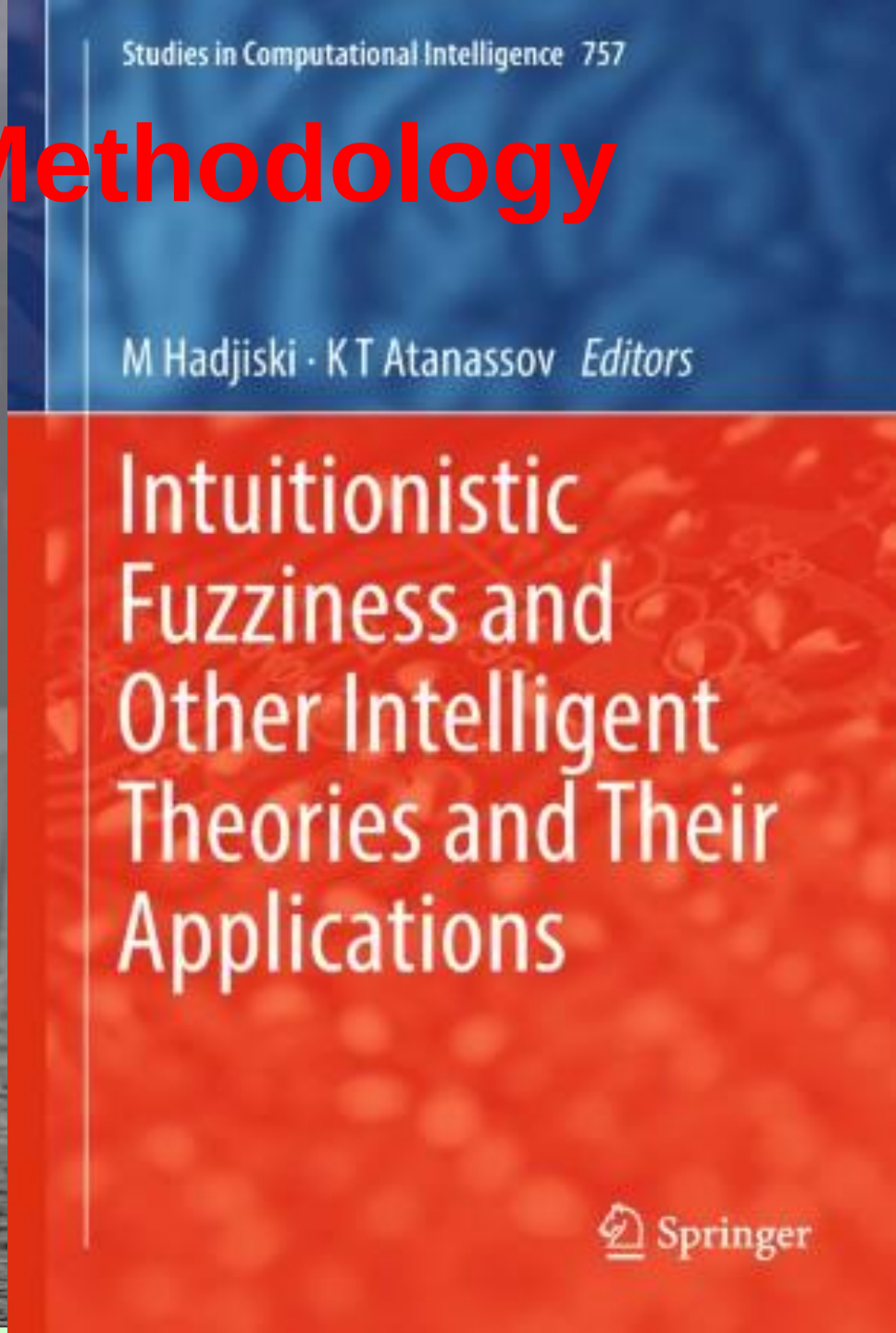
- The links between urban Air Pollution (AP) and human health are consistently and clearly established by many researchers

Air Pollution

- Around 25% of premature deaths associated with Air Pollution are respiratory by nature

Research Methodology

- **Method – InterCriteria Analysis**
- **Data Collection – January 2018 – March 2019**



InterCriteria Analysis

- Introduced criteria
- for “agreement” – μ and
- “disagreement” – ν

$$\mu + \nu \leq 1$$

InterCriteria Analysis

- Set of objects $O=\{O_1,O_2,\ldots,O_n\}$
- Set of criteria $C(O)=\{C(O_1),C(O_2),\ldots,C(O_n)\}$
- $C_{i,j}=<C(O_i),C(O_j)>$
- $C^*(O)=\{C_{i\ j}\}$

InterCriteria Analysis

All internal comparison of each criteria fulfill exactly one of three relations R, R*,R**

RUR*UR**=C*(O)

InterCriteria Analysis

$$V_k(C) = \begin{cases} 1 \; if \; V_k(C) \in R \\ -1 \; if \; V_k(C) \in R^* \\ 0 \quad otherwise \end{cases}$$

InterCriteria Analysis

$$V_k = V_k(C) - V_k(C')$$

$$\mu(C, C') = 0$$

$$for\ k = 0\ to\ \frac{n(n-1)}{2}\ do$$

$$if\ V_k = 0\ than\ \mu(C, C') = \mu(C, C') + 1$$

$$end\ \ for$$

$$\mu(C, C') = \frac{2}{n(n-1)}\mu(C, C')$$

InterCriteria Analysis

$$\nu(C,C') = 0$$

$$for\ k = 0\ to\ \frac{n(n-1)}{2}\ do$$

$$if\ |V_k| = 2\ than\ \nu(C,C') = \nu(C,C') + 1$$

$$end\ \ for$$

$$\nu(C,C') = \frac{2}{n(n-1)}\nu(C,C')$$

InterCriteria Analysis- agreement – 1 month

PM10	PM2.5	Diabet	ear	heart	Raspir	gastritis	hipert	astma
1	0.91	0.62	0.79	0.58	0.91	0.68	0.65	0.79
0.91	1	0.59	0.76	0.48	0.88	0.67	0.61	0.73
0.62	0.59	1	0.77	0.76	0.65	0.71	0.71	0.76
0.79	0.76	0.77	1	0.80	0.85	0.71	0.77	0.88
0.58	0.48	0.76	0.80	1	0.74	0.58	0.45	0.65
0.91	0.88	0.65	0.85	0.74	1	0.65	0.68	0.79
0.68	0.67	0.71	0.71	0.58	0.65	1	0.74	0.82
0.65	0.61	0.71	0.77	0.45	0.68	0.74	1	0.73
0.79	0.73	0.76	0.88	0.65	0.79	0.82	0.73	1

InterCriteria Analysis- agreement – 4 days

PM10	Diabet	ear	heart	Raspir	gastritis	hipert	astma
1	1	0.40	0.52	0.62	0.78	0.59	0.48
1	1	0.46	0.48	0.61	0.63	0.56	0.44
0.40	0.46	1	0.48	0.54	0.46	0.58	0.49
0.52	0.48	0.48	1	0.58	0.57	0.54	0.50
0.62	0.61	0.54	0.58	1	0.65	0.60	0.47
0.78	0.63	0.46	0.57	0.65	1	0.58	0.38
0.59	0.56	0.58	0.54	0.60	0.58	1	0.48
0.48	0.44	0.49	0.50	0.47	0.38	0.48	1

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Thank you for attention