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Using Air Quality Monitoring in Ulaanbaatar Mongolia as Teaching Case Study

TREO Talk Paper

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Abstract

Environmental issues are increasingly a concern in developing countries as populations grow and the need to supply cities with enough electricity, food, and water increases. Air pollution is a unique problem because it affects almost everyone, particularly those who are in “at risk” populations, such as the very young, the very old, and those with lung or heart disease. Ulaanbaatar, Mongolia (UB), is one such city in Central Asia with air pollution problems. Surrounded by high hills, pollution is often trapped within the city during winter, when temperatures can fall below -30 degrees Celsius, and most of the city is heated by coal. Since 2015, the U.S. State Department has been monitoring the air quality hourly at the US Embassy in Mongolia, and that data is available online through the Internet of Things (IoT).

In UB, the PM_{2.5} particulate matter pollution levels can reach above “687 micrograms per cubic meter, or 27 times the level WHO recommends as safe” (UNICEF, 2022). This level of pollution has been estimated to cause up to 40% of lung cancer deaths and 30% of cardiopulmonary deaths in the city, as well as a 3.6-fold increase in spontaneous miscarriages every year (Dashnyam et al. 2015, Enkhmaa et al., 2014).

The data collected is particularly useful as a teaching case in an introductory IT class, because it involves clearly seasonal non-normal data. That is, average pollution levels are not nearly as important as maximum pollution levels during the winter months. The resulting class discussions can involve using IoT to monitor everyday life, drive government policy, inform people about health-related issues, and also exposes undergraduate students to problems facing developing countries as well as non-normal distributions for data analysis.

References

Dashnyam, U., Warburton, N., Brugha, R., Tserenkh, I., Davaasambuu, E., Enkhtur, S., Munkhuu, B., Lodoysamba, S., Dashdendev, B., Grigg, J. and Warburton, D., 2015. “Personal exposure to fine-particle black carbon air pollution among schoolchildren living in Ulaanbaatar, Mongolia,” *Central Asian Journal of Medical Sciences*, (1:1), pp. 67-74.

Enkhmaa, D., Warburton, N., Javzandulam, B., Uyanga, J., Khishigsuren, Y., Lodoysamba, S., Enkhtur, S. and Warburton, D., 2014. “Seasonal ambient air pollution correlates strongly with spontaneous abortion in Mongolia,” *BMC pregnancy and childbirth*, (14:1), pp. 1-7.

Environment & air pollution. UNICEF Mongolia. (n.d.). Retrieved April 5, 2022, from <https://www.unicef.org/mongolia/environment-air-pollution>