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Forecasting the weather
- ensemble techniques
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The relationship between urban street geometry and thermal environment in a tropical city, Taichung.

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As urbanization progresses, the “urban warming” problem is mainly aggravated because of the reduced density of green vegetation and increased building in the urban environment. Therefore, how to diminish the heat island effect and to keep the urban area cool could be a very important issue for urban environment researchers. To estimate the impact of street characteristics on the thermal environment in an urban street canyon in a hot and humid region, fix station data were used to analyze the relation between three factors (urban green ratio, building ratio, and height-to-width ratio) and air temperature in two streets in Taichung City, Taiwan.

In this study, air temperature data were collected by 8 sample stations at 2 meter height in two streets; meanwhile, the use of three street characteristics data calculated by geographic information system (GIS) data which can represent the environment conditions of 8 measured locations. The analysis results shows that the air temperature significantly correlated with height-to-width ratio, green ratio, and building ratio, respectively, at night. According to the results of this study, increased vegetation and decreased building density in an urban street canyon could be an effective policy for mitigating urban warming, improving the street thermal environment during summer and creating a sustainable urbanity.

In addition, a judicious combination of appropriate aspect ratios and orientation, arranging galleries, planting trees, greening the façades or using other shading devices on the walls are a few possible solutions for solving the same problems. In conclusion, this study demonstrates that increasing the green ratio and decreasing the building density are important strategies to mitigate urban warming and to create a comfortable thermal environment in hot and humid region.