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Applicability Evaluation and Reflection on Artificial Intelligence-based "Image to Image" Generation of Landscape Architecture Masterplans

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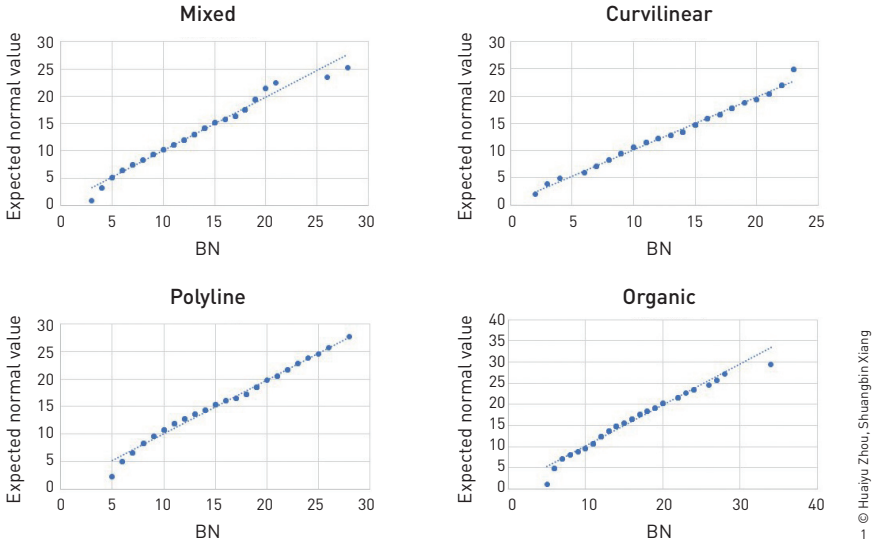
Normality Test for the Land Use Block Number of GAN-Generated Layouts

1 Quantile–Quantile Plot and Shapiro–Wilk Test Results

To intuitively reflect the diversity of the land use block number (BN) generated by generative adversarial network (GAN), this research conducted a statistical analysis on the BN of five of land use types 340 Pix2Pix-generated layouts and assessed the differences between GAN-generated layouts and human-designed layouts with block number distance (BND). To ensure the reliability of the statistical results, normality tests on the BN data were performed using the IBM SPSS, including Quantile–Quantile (Q–Q) plots and the Shapiro–Wilk test. The Q–Q plot results (Fig. 1) showed that the distribution of BN—whether mixed, curvilinear, polyline, or organic style—exhibits a linear trend, suggesting the data is normally distributed. In the Shapiro–Wilk test, the significance values for the four styles were 0.160, 0.105, 0.068, and 0.058, respectively, all greater than 0.05, indicating that the BN data do not violate the assumption of normal distribution. Therefore, the BN for the five land use types in the 340 GAN-generated layouts followed a normal distribution, supporting the analysis of BND between GAN-generated layouts and human-designed layouts.



1. Results of Q–Q plots

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人工智能“图生图”式景观平面生成技术的适用性评价与反思

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GAN生成布局用地地块数量的正态性检验

1 Quantile–Quantile图及Shapiro–Wilk检验结果

在本研究中，为了直观反映由生成对抗网络（GAN）输出的布局用地数量（BN）多样性，对340张Pix2Pix生成布局中的五类用地BN进行统计分析，并通过地块数量距离（BND）评估GAN生成布局与真实布局之间的差异。为了确保统计结果的可靠性，研究利用IBM SPSS对BN数据进行了正态性检验，包括Quantile－Quantile图（Q－Q图）和Shapiro－Wilk检验。Q－Q图结果显示（图1），无论是混合、曲线、直线，还是有机风格的地块，其分布均呈现线性趋势，这显示数据符合正态分布。在Shapiro－Wilk检验中，四种风格的显著性值分别为0.160、0.105、0.068和0.058，均大于0.05，表明BN数据未违背正态分布假设。因此，这340张GAN生成的布局中五类用地的BN均符合正态分布，可支撑GAN生成布局与真实布局之间BND的分析。

图 1. Q－Q 图检验结果