ARCHITECTURE. HISTORY AND PROJECT

DM 629/PA - Towards New Urban Patterns. Rule-based Design with AI Deep Convolution Network

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]

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Context of the research activity	The aim of the PhD proposal is to define rules-based synthetic morphological typologies as data to train a neural network for morphological classification. The hypothesis states that new morphological patterns can be generated based on predefined rules with AI, within the context of "Transitional Morphologies" PoliTo Research Center and Joint Research Unit SEU-PoliTo. Progetto finanziato dal PNRR a valere sul DM 629/2024 - Pubblica Amministrazione - CUP E14D24002260006

Objectives	Within the investigation of urban forms and processes, qualitative description of morphological features and manually selected indicator are leaving their place for quantitative and data-driven description of methodological approaches (Evidence Based Design Planning). Data-driven morphological analysis has some limitations in defining the data structure for all cases. Deep learning algorithms provides automatic feature extraction and learning methods for morphological analysis and design (Li, B., 2012). The aim of the PhD proposal is to define rules-based synthetic morphological typologies as data to train a neural network for morphological classification (Liu, Y., Lin, W., Deng, Q., Liang, L., 2019). The hypothesis states that new morphological patterns can be generated based on predefined rules with AI (Chaillou, S., 2019). The proposal arises within the Transitional Morphologies Research Centre at DAD, for the development of strategies and methods to incrementally change human settlements an assembly buildings and space (see https://www.dad.polito.it/en/the_department/internal_structures/centri/centri_dad/transitional_morphologies). The proposal refers to Area 08 (Civil Engineer and Architecture), but with links to Area 09 and Area 14, in anyway strictly observing the contents and the ratio of Italian DM 629/2024 art. 9 (Criteri di ammissibilità dei dottorati per la Pubblica Amministrazione).

Skills and competencies for the development of the activity	Fields of competencies: urban morphology and form's generative processes