2025 11 21

FORUM8デザインフェスティバル

特別講演
「米国におけるAI拡張型建築デザインの最新動向：生成モデルによる創造性とワークフローの強化」

ニュージャージー工科大学 芸術デザイン学科 准教授
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SAPIENZA
UNIVERSITÀ DI ROMA

FORUM 8

設計フェーズに即したAIツールの選択・利用が重要

-- Effective AI Solutions for the Appropriate Phases --

コンセプト創案フェーズ

Ideation phase

txt2img

基本設計フェーズ

Schematic design | Design development

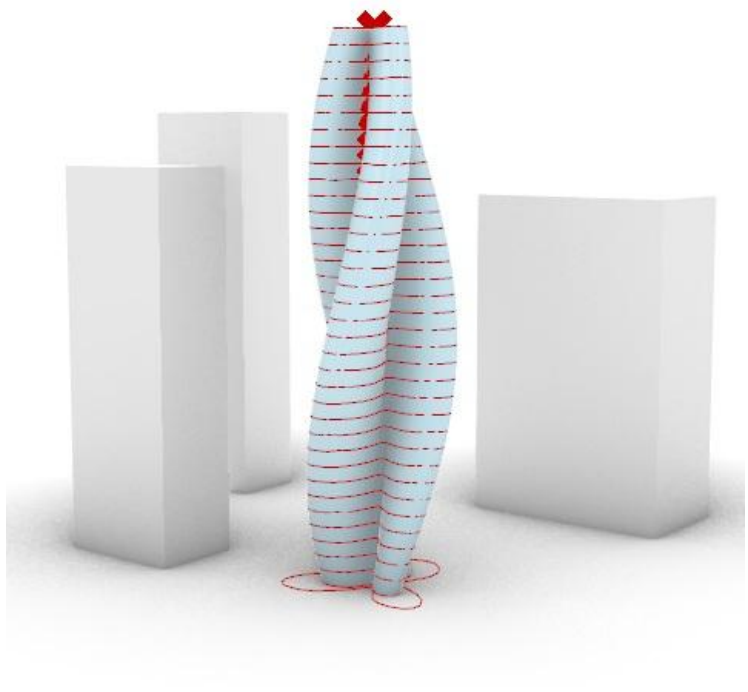
プレゼンテーション

Representations

CAD化 実施フェーズ

Manufacturable outcomes

Img2 3d



Parametric Design
Optioneering

img2img

Img2vid
vid2vid

2010 ~

SECCONDRO
O REEL 2020

VR / Games

Associate Professor, NJIT

VR, AR, Interaction Design

SIGGRAPH 2024
DENVER+ 28 JUL — 1 AUG

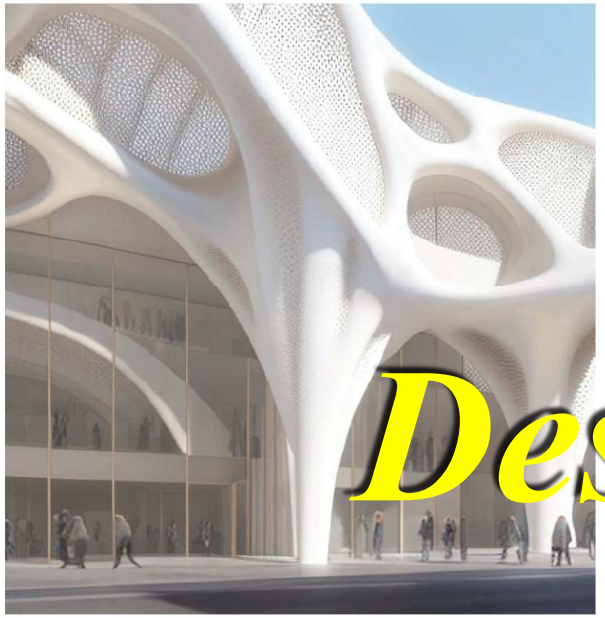
IMMERSIVE PAVILION

ACMSIGGRAPH EDUCATION COMMITTEE

2020 ~ 2023

Generative AI

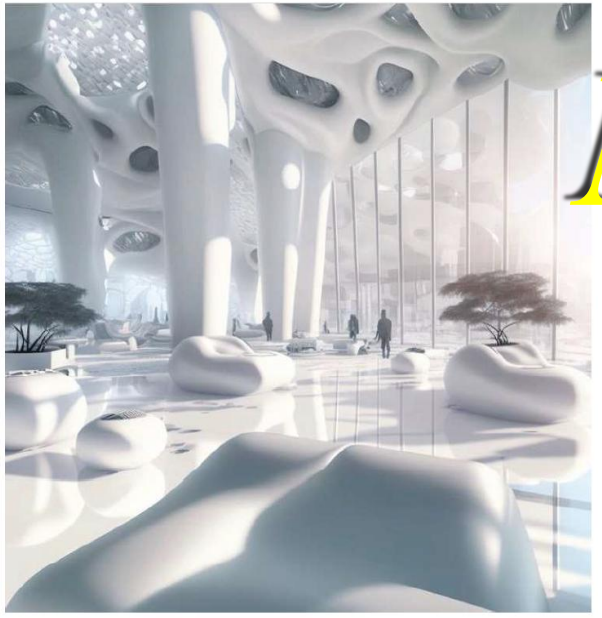
AI MIDJOURNEY STUDIES (**Inspirations**)



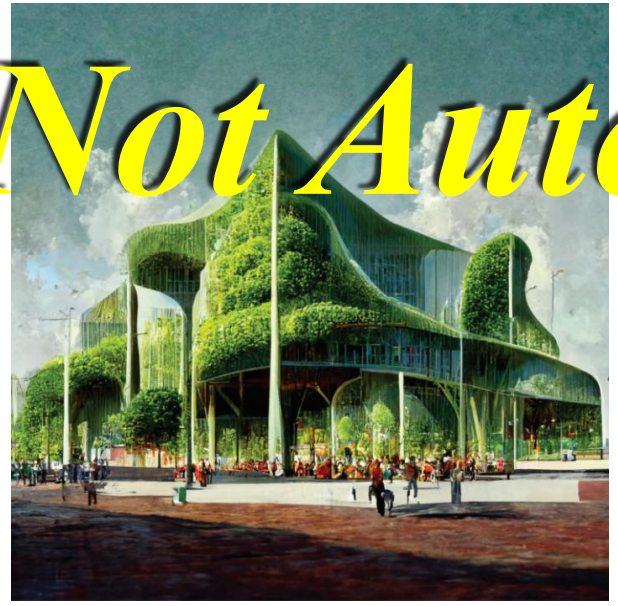
"CURVED ARCHITECTURE"

Design Augmentation

Not Automation



"MONOCHROMATIC BUILDING"



"GREEN BUILDING"

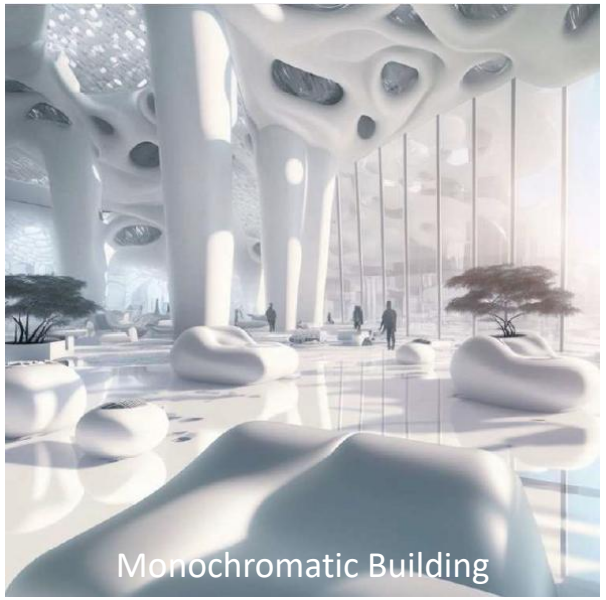
Human Students' Projects (**Outcomes**)

Student Visions using AI

Sustainable Public parks with architecture

Developed Building meeting Professional Requirements

2022

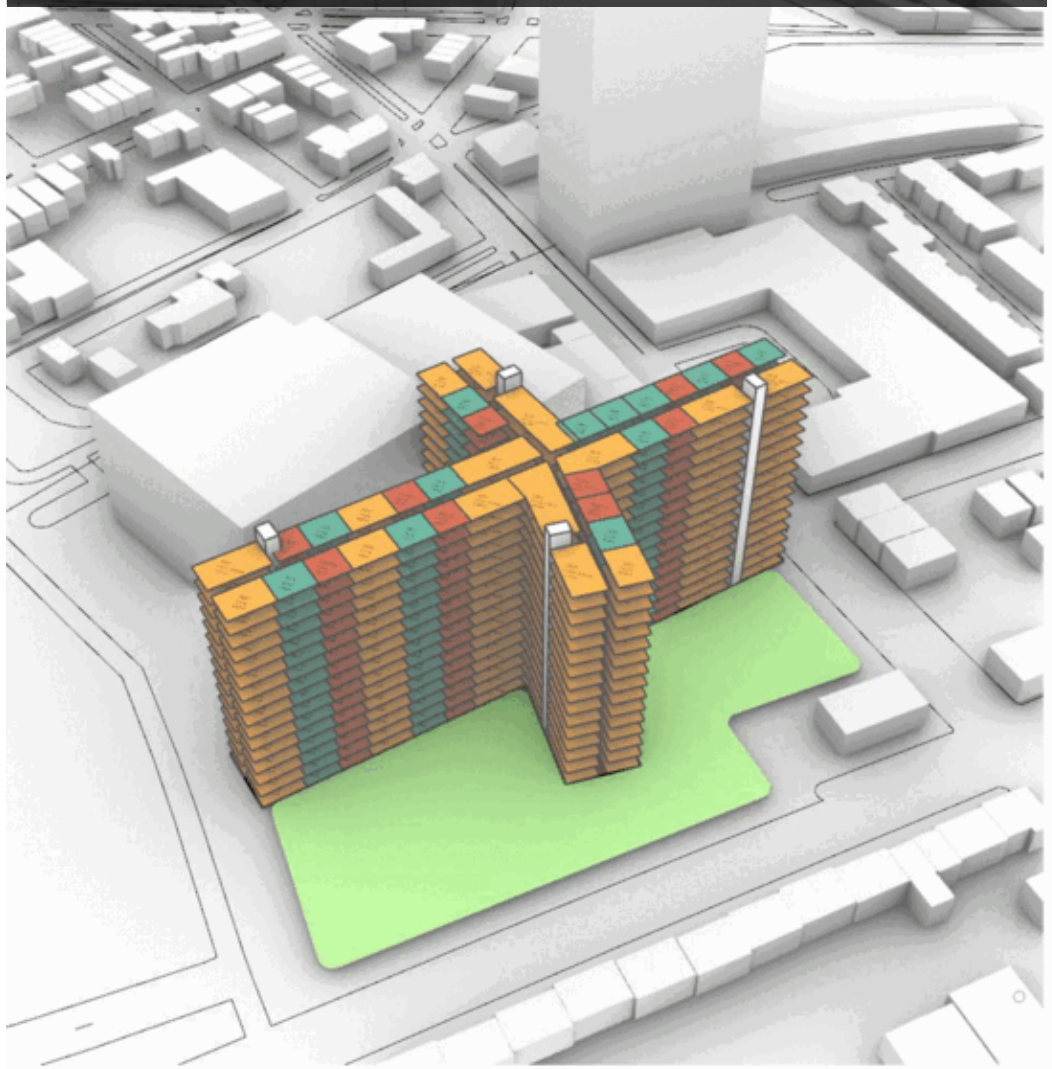


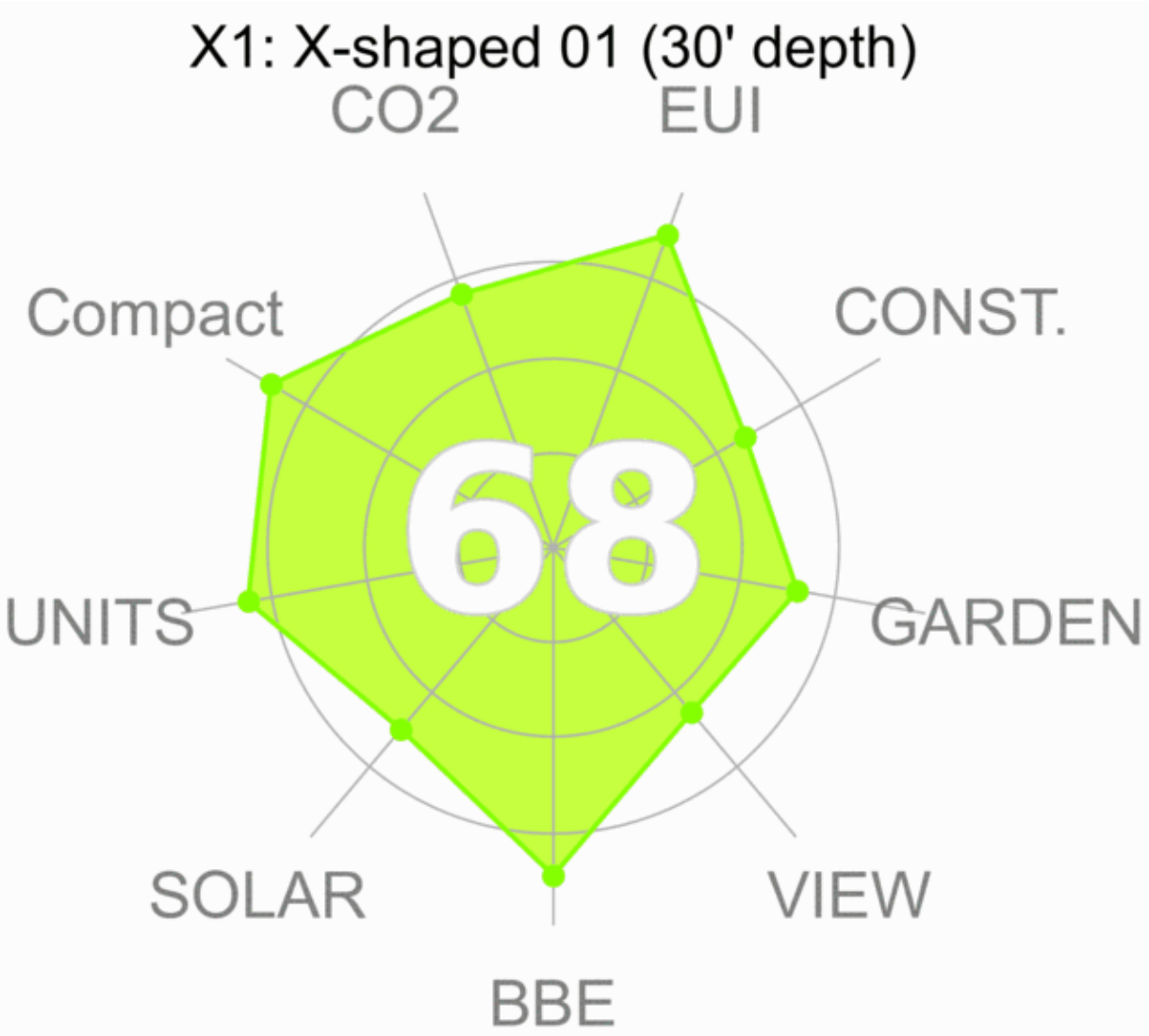
Monochromatic Building

Curved Architecture

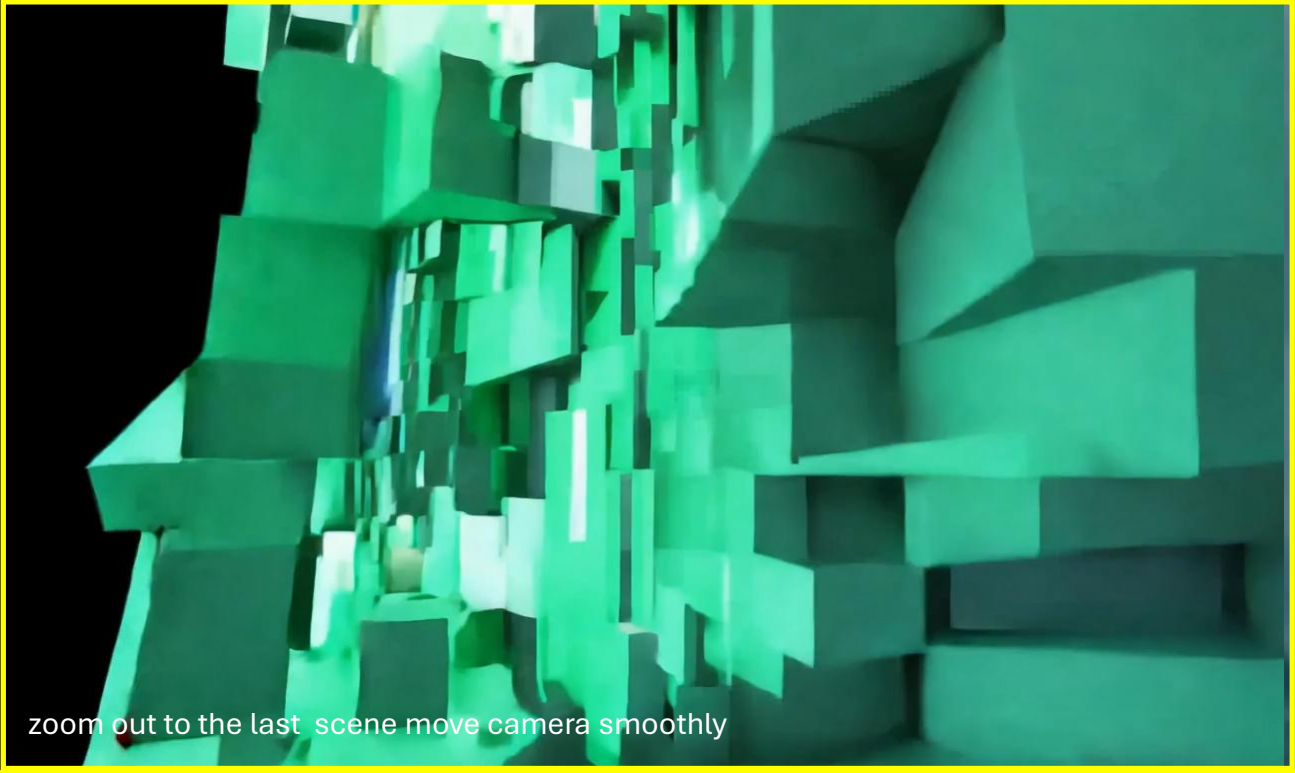
SKETCH TO BUILD: An Intuitive Design Platform for Sustainable Multifamily Residential Buildings

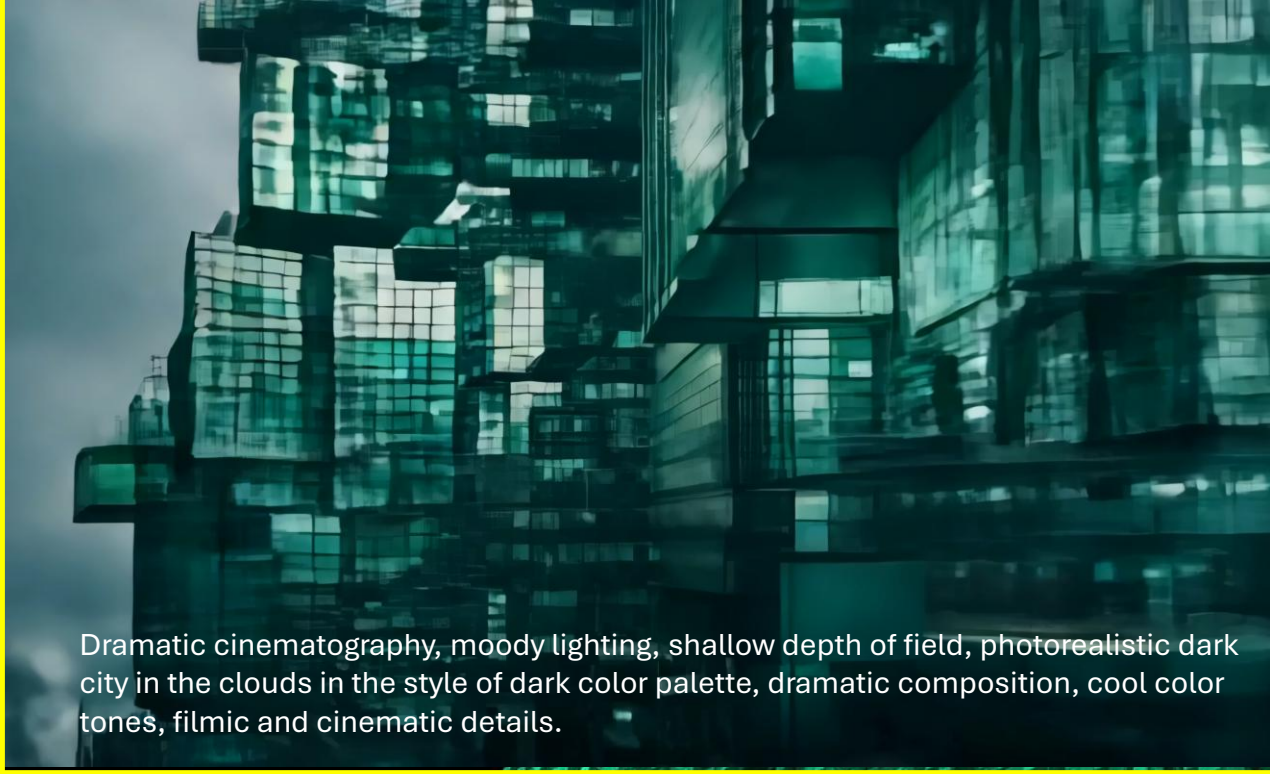
- **NSF I-Corps Grant Award** (2022-2023)



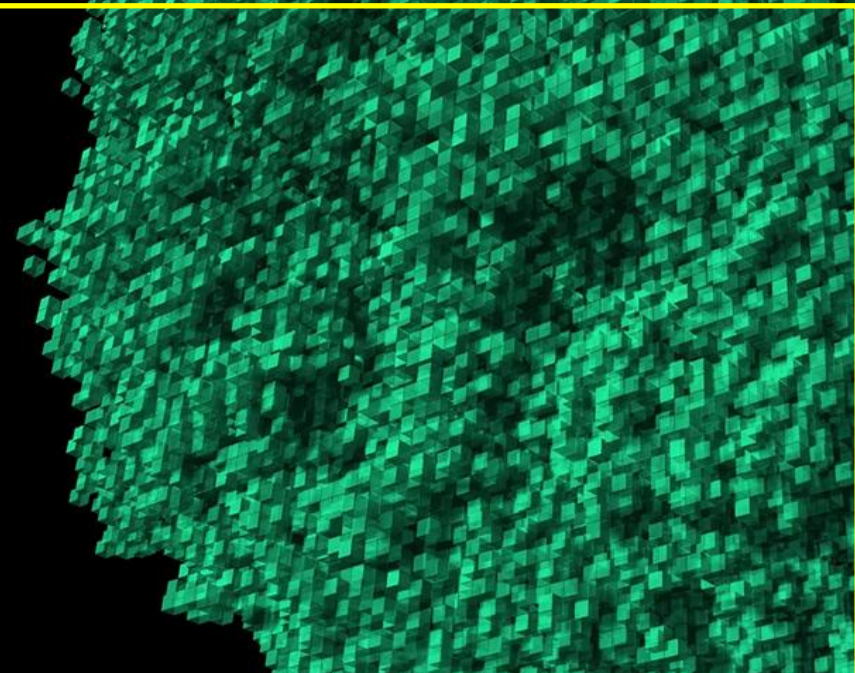


X1	124.9	43.9	7.6	$705M	608K	14FL.	588	86.7%
X-shaped 01 30' depth	Site EUI (kWh/m^2)	CO^2 Emissions (kCO^2/m^2)	Energy Cost ($/m^2$)	Construction Cost ($)	Total Gross Area (ft^2)	Levels	Total Units Target=600	Base Building Efficiency (%)





Procedurally Generated 3D Clusters in Rhinoceros



“Japanese”


“Oriental Wood”


“Renaissance”


“Green Sustainable”


“Green Sustainable”


“Green Sustainable”


“Green Sustainable”

“Italian Garden”

“Rococo”


“Extravagant”


“Minimalism”


“Minimalism”

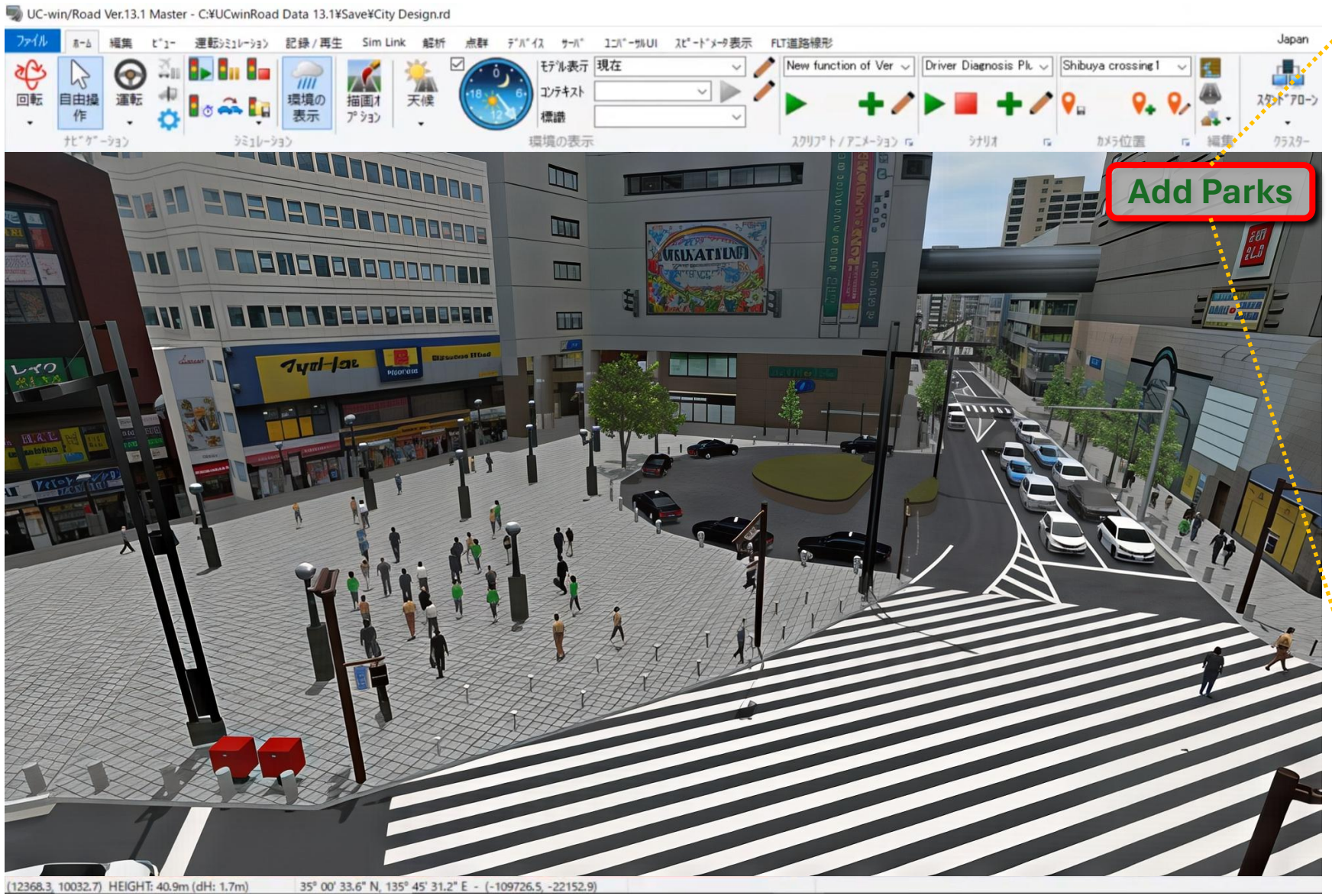

“Minimalism”

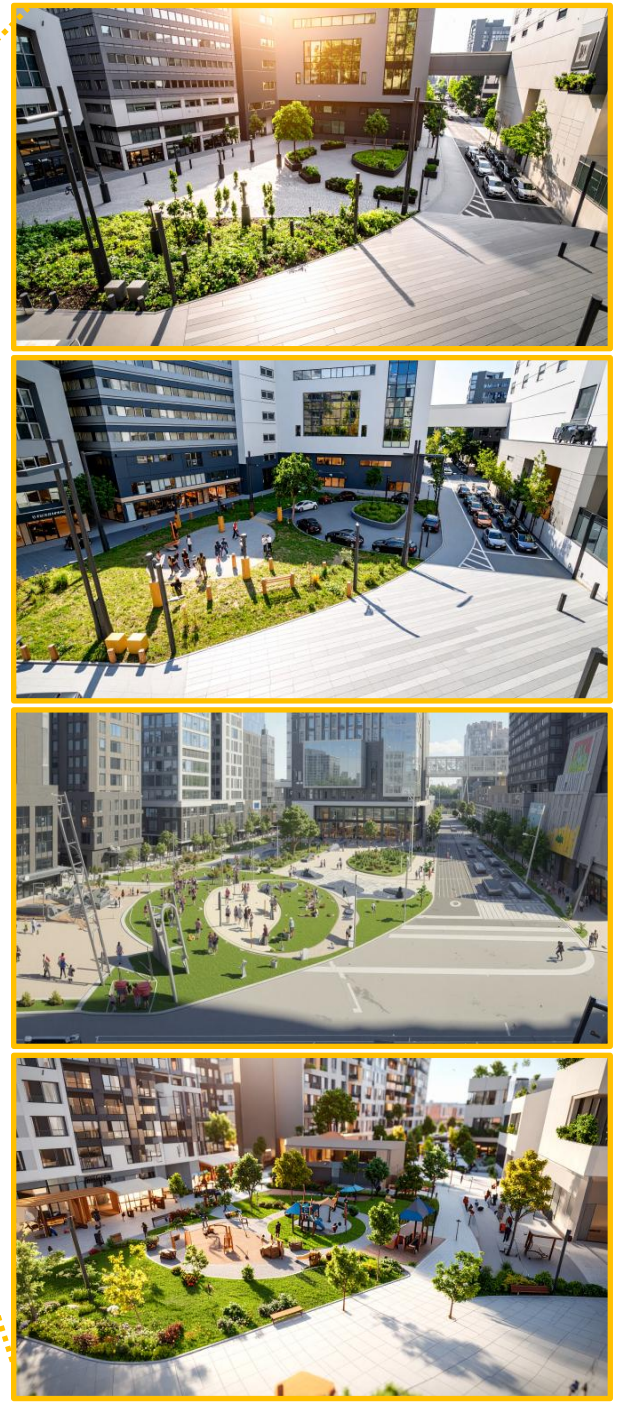

“Minimalism”

“Cyberpunk”

“Cyberpunk”

“Add Sustainable, Green areas” ?



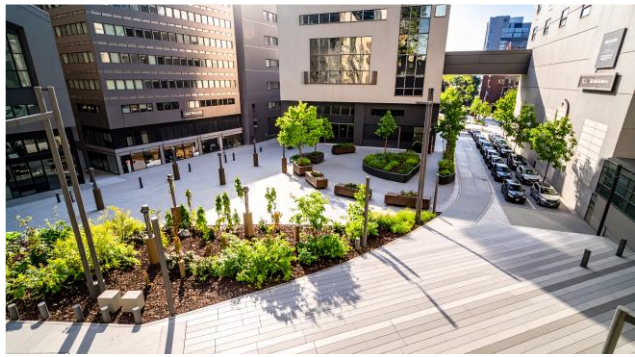


A typical screenshot from a 3D VR city model.
(produced in UC/WinRoad, Forum8, co. Ltd.)













Instant AI animation viewing from different directions

Users can get a sense of place quickly

Instant AI animation viewing from different directions

Users can get a sense of place quickly

Pedestrians:

Dense

High

Crowd 183

0 200

Sparse

Low

Crowd 15

0 200

Summary:

- Outputs usable at the early stages of ideation and verification can already be generated using current AI tools.
- We aim to provide AI-generated outputs tailored to functions specifically needed by UC users.
- Where necessary, fine-tuning with domain-specific training data will be applied.
- Currently limited to 2D, but through MCP integration with various modeling software and AI, 3D output in conjunction with UC will be possible in the near future.

提案手法のサマリー:

初期段階の創案、検証作業レベルで使えるアウトプットは現況のAIツール利用でも出力可能

UC ユーザーの作業に必要な機能に特化したAIアウトプットを提供。

特定の学習データでFinetuningが必要な物はする。

現在は2Dだが、MCPを介して各種モデリングソフト、AIとUC の連携で3Dのアウトプットも近い将来可能です。