AI in AEC: Zero To Power User
CHEAT SHEET

KEY TERMS

AI — Artificial Intelligence is, simply put, a way of making machines to solve problems in a more human-like way. Within AEC, frequent AI forms are ML, GenAI, and MO.

ML — Machine Learning focuses on understanding existing data and making accurate predictions. It also focuses on teaching the machine how to solve a problem.

GENAI — Generative AI is a type of AI that can create a wide variety of data, such as images, videos, and 3D models. It can create new data, unlike many traditional ML forms.

MO — Unlike GenAI, Mathematical Optimization (MO) works to select the best element (the best solution), with regard to some criterion, from a set of available alternatives.

THE IMPACT

Within AEC, AI's possible impact could be:
- Time to design is lowered substantially.
- The scope of design is increased considerably.
- Innovation and ideation are positively impacted.
- Current AEC processes are significantly changed due to AI automatization and possibilities.
- Reassessment of educational curriculums.
- Data-driven design, resulting in safer projects, better decisions, and less rote work.
- Lower risk, as AI can help find the best solution.

CONCEPT | USE CASES | KEY AI TOOLS

TEXT-TO-2D — Ideation, Art & Design Creation, Rendering, Inspiration, Realistic Edits, Scaling Images (Up or Down)

Key AI Tools: Adobe Firefly, Midjourney, Canva AI, Stable Diffusion, DALL-E 2

TEXT-TO-3D — Animation Creation, Gaming (Object Creation), Space Visualization, Video & 3D Point Cloud Creation

Key AI Tools: Shap-E & Point-E, Magic3D, DreamFusion, Spline AI

SKETCH-TO-3D — Create Artwork, Animate Characters, Build Products Quickly, Rough Sketches to Refined Images

Key AI Tools: AutoDraw, Animated Drawings, Plasmo, Scribble Diffusion

IMAGE EDITING — Rendering, Design Creation & Iteration, Digital Landscaping, Background Replacement & A Lot More

Key AI Tools: Super Resolution API, Mokker, Canvas, VERAS, Segment Anything

GENERATIVE MODELING — Site Analysis Automation, Building Data Assessment, Real Estate Feasibility, Sun & Wind Analyses, Parking Layouts, Urban Planning, Environmental & Financial Analysis, Walking Accessibility, Buyer/Seller Connection

Key AI Tools: Forma, TestFit, Parafin3D, Omrt, Digital Blue Foam, Architechtures, CityBldr, CITYPLAIN, Build Flow AI

BIM + AI — Automated Building Design or Generation of Floor Plans, Text-to-BIM, Construction Documentation Automation

Key AI Tools: Augmenta, Finch3D, Hypar, SWAPP, BricsCAD BIM

STRUCTURAL DESIGN — Low Carbon Design, Timber Design, Steel Structures, Automated & Optimized Concrete Design

Key AI Tools: AECforward, Daisy, Pathw.ai, PrePlan, Structure Plus

CONSTRUCTION — Building Site Data Capture, Construction Management, Language Barrier Elimination, Information Management, Procurement & Material Management

Key AI Tools: Disperse, Imerso, Need2Say, Sparkel, StructShare

DATA ANALYSIS (PLATFORMS) — Scan-to-BIM, Quantity Takeoffs, Auto-Annotation, Project & Resource Planning, Better Decision Making

Key AI Tools: Aurivus, Kreo, Archilyse, Slate AI, Buildots, Mosaic

CONCLUSION

We're still early in the AI revolution, but AI is promising a better future for AEC - there are many useful tools!
In the near term, I expect to see firms investing heavily in R&D, and companies starting to test AI tools on pilot projects.
In the medium term, I expect companies to start integrating AI into their existing workflows.
In the long term, I expect AI to change our current processes, and companies investing heavily in AI-related education.

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