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AI as a Partner for Children's Bouldering

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The Challenge

Bouldering requires specific sequences of moves, known as “bouldering problems.” Children often boulder in self-directed sessions where they, and peers/supporting adults, must choose what to try next and how to adapt. Many problems assume adult reach and skills, making route choice guesswork and shifting decisions away from the child.

Main obstacles for children approaching bouldering:

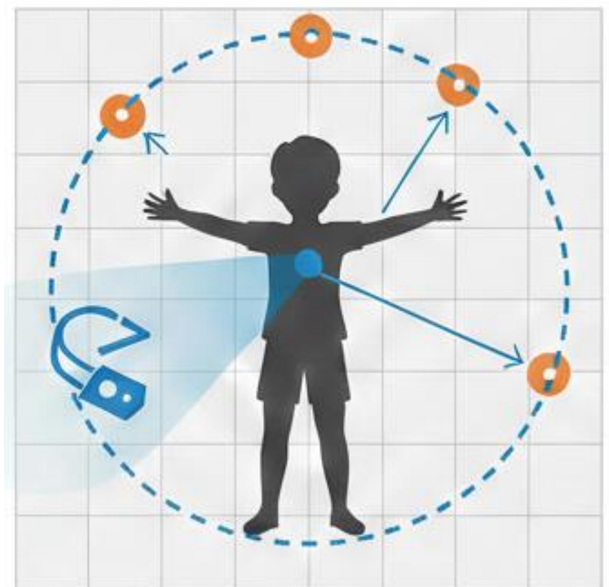
- ***Physical incompatibility***: Some sequences are simply unreachable for smaller bodies.
- ***Safety and skill gaps***: Without guidance, children can pick risky moves or hit “dead ends,” leading to unsafe improvisation or quitting.

Our Solution

We propose a Generative AI Recommender System as a digital scaffolding partner for bouldering. Instead of changing the wall, it will select a subset of existing holds to suggest safe, reachable route options for children.

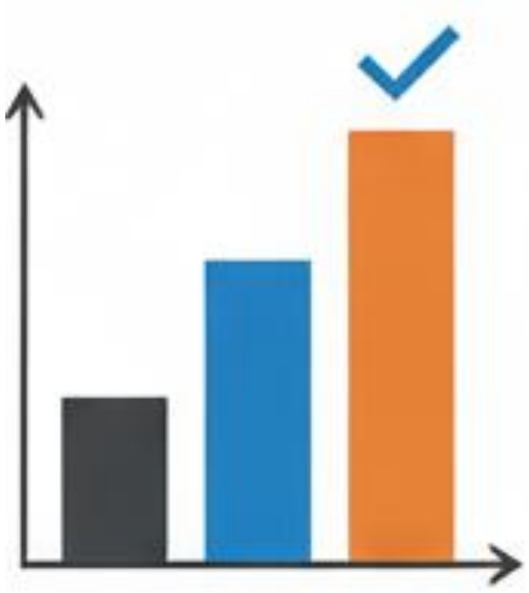
Figure 1 illustrates the proposed AI recommender system, highlighting the anthropometric mapping, adaptive difficulty, and co-agency components for personalized route suggestions.

1. Anthropometric Mapping



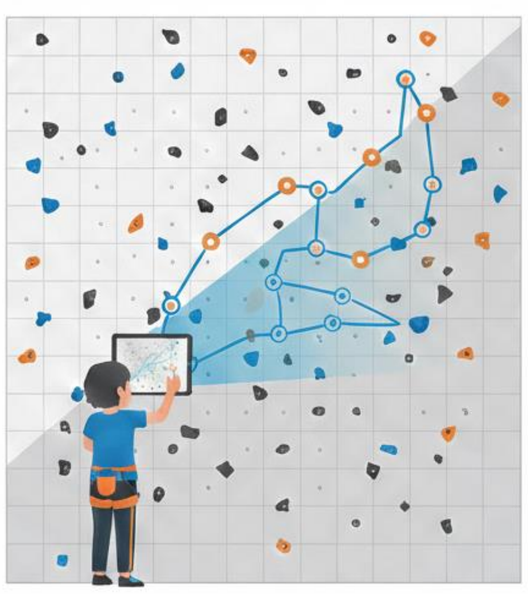
Use child’s specific anthropometric to select a reachable subset of holds.

2. Skill-adaptive Difficulty



Recommend easier/harder routes based on recent performance, preventing frustration and boredom.

3. Fostering Co-Agency



The child critically evaluates suggestions while maintaining full physical autonomy.

Figure 1. Overview of the Generative AI Recommender System for adaptive bouldering. Visuals generated via Nano Banana (Google AI) based on author instructions.

Gamification & Interface

We plan to develop a gamified interface that translates sensor signals (e.g., heart rate, grip/contact forces on the holds, body position/orientation) into child-friendly feedback (XP, badges, challenges). It will also support pacing by flagging high effort and suggesting breaks or an easier route option to help reduce over-exertion.

Child-Centred AI-Mediated Collaborative Agency by Design workshop at CHI 2026
Barcelona, 13-17 April, 2026

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