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# TAICHI: Tangible Assisted Interfaces for Computer-Human Interactions

**TAICHI is a spatial input system that uses bodily actions and handheld objects to create, manipulate, and explore 3D shape designs in real-time for improved design prototyping and potential rapid fabrication.**

Advancements in computing hardware and display media have fostered numerous shape-modeling tools that allow users to interactively create, manipulate, and modify virtual 3D objects. These tools are extensively employed to support virtual design prototyping within engineering and architectural fields. Despite being widely used, these digital shape-modeling tools remain difficult to use and require significant training. This is primarily due to their reliance on 2D input devices that are inherently unsuitable for 3D modeling tasks. In addition, spontaneity is difficult with current processes, which, consequently, limits creativity and exploratory design.

Researchers at Purdue University have designed a set of frameworks, processes, and methods called Tangible Assisted Interfaces for Computer-Human Interactions "TAICHI" that allow for the expression and exploration of 3D shape designs. Users can provide TAICHI direct spatial inputs through bodily actions and handheld proxies, which are acquired by data capturing units to organize, reconstruct, and interpret the physical data. The visual feedback units provide real-time outputs to users' spatial inputs and intentional gestures. Furthermore, 3D objects created in virtual environments can be fabricated using rapid prototyping technologies.

**Advantages**:

-Intuitive 3D shape modeling operations

-Improved user focus on design task

**TRL:** 8

**Intellectual Property:**

**Technology ID**
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**Category**
Robotics & Automation/Simulation, Digital Twins, & Industrial Automation
Artificial Intelligence & Machine Learning/3D Optical Imaging & Industrial Metrology
Robotics & Automation/3D Perception & Modeling for Automation

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**Keywords:** 3D shape modeling, virtual design prototyping, tangible assisted interfaces, TAICHI, computer-human interaction, spatial inputs, bodily actions, handheld proxies, rapid prototyping technologies, intuitive 3D modeling, 3D Modeling, Computer Technology, Human Factors, Industrial Engineering, Mechanical Engineering