Holo: Gestured Controlled Generative-AI Painting Application

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Project Holo is a multimodal artificial intelligence (AI) system that integrates multiple AI technologies into a dynamic, hand-gesture-controlled canvas painting and image generation application. With the increasing integration of AI in consumer applications, Holo provides users with an intuitive and interactive platform for AI-driven image creation. Holo is written in python but can be compiled down to C code for slightly increased performance. The graphical user interface (GUI) utilizes a library called “tkinter” with a custom theme wrapper called “custom tkinter.” Holo users can create a sketch using drawing tools such as a pen brush, fill tool, transform, and rectangle tool, and/or enter a text-based image generation prompt. Upon initiating the "Generate AI Image" function, Holo processes the provided inputs via an API call, using a variety of selectable AI models which convert the sketch and/or prompt into an image that appears in the designated output tab.

Holo supports standard interaction methods, including keyboard, mouse, and tablet pen input. Additionally, it enhances user engagement by incorporating a projector-interface and in-app hand tracking using MediaPipe – a Google solution suite enabling hand tracking and pose estimation in real time video feeds. The local hand position of a user in frame, derived from the MediaPipe hand solution, is mapped to screen space to control the on-screen cursor, while gesture-based controls — such as pinching the index finger and thumb to emulate a mouse press — enable a seamless, touch-free interaction experience. This innovative approach makes Holo a versatile tool for AI-assisted digital art creation, expanding the possibilities of human-computer interaction in creative applications.