Smart Hand Gesture Controlled Robot Using AI and ESP32 for Next-Gen Human-Robot Interaction

Problem Statement:

Conventional robot control systems, which primarily rely on physical input devices such as joysticks, remote modules, and wired controllers, face significant limitations in modern applications. These traditional methods, while functional in controlled settings, are often unintuitive, particularly for non-technical users, and restrict operator mobility by requiring direct physical access to the control hardware. Furthermore, their use is impractical in sterile environments like hospitals and cleanrooms, where touchless interaction is critical. Most importantly, these systems pose significant accessibility challenges for individuals with physical impairments who may find it difficult or impossible to operate standard input devices.As the demand for more intelligent, contactless, and user-friendly interfaces grows, there is a clear and pressing need for an advanced robotic control system that overcomes these obstacles. The development of an AI-driven, real-time, and natural control system that eliminates the dependency on traditional hardware is essential to unlock the full potential of human-robot interaction. Such a system would not only enhance user experience and accessibility but also enable the deployment of robotic technologies in a wider range of applications, from healthcare to manufacturing, where seamless and intuitive control is paramount.