



Cloud Labs

Accessible Hardware Lab Experiments

Technology Description

Cloud Lab enables professors, research engineers, lab engineers and students to perform the various hardware based experiments on the actual hardware online by means of its Platform developed by integrating these hardware with their custom device and software. Cloud Lab platform facilitates high end experiment on various FPGA Boards easy primarily for the students and researches of areas Embedded System, Digital System, Robotics and Mechatronics. It facilitates management of resources with optimal utilization of these hardware device among the large pool of students in a classroom.

Cloud Lab is, an innovative platform at the forefront of reshaping hands-on learning for the digital era. It facilitates unparalleled remote access to hardware resources, mitigating the need for physical presence within traditional laboratories. Through an integrated web application, users engage in real-time experimentation with FPGA boards and diverse hardware components. It offers versatility across a multitude of domains, including Embedded Systems, Digital System Design, IoT, Robotics, Mechatronics, AI Accelerators, and more.

Theme

Based upon the theme of "Virtualizing Labs, Advancing Education", Cloud Labs emerges as a transformative solution, employing live board-streaming, real-time controls, and automated hardware configuration processes.

The technology described is primarily based on **IoT (Internet of Things)**. It involves real-time controls, live board-streaming, and remote hardware management, which are key components of IoT systems, enabling users to interact with physical devices through a virtual platform.

Applications

- Facilitates real-time collaboration for students and researchers working remotely on shared hardware.
- Customizable integration with specific hardware and software to meet institutional needs.
- Scalable platform capable of handling large student pools without resource bottlenecks.
- Centralized dashboard for administrators to manage courses, hardware, and bookings efficiently.
- Reduces the need for physical lab infrastructure, lowering operational costs.
- Enhances the learning experience by providing hands-on experimentation with advanced technology remotely.

Use Cases

Considering The surging demand for innovative, remote learning solutions in technical education. Cloud lab aligns seamlessly with the widespread adoption of online and remote learning, providing an opportunity to serve learners and institutions worldwide. As educational budgets tighten, Cloud Labs stands out as a cost-efficient alternative to traditional labs, offering a streamlined and accessible experience without compromising the quality of hands-on learning. The scalability of Cloud Labs, combined with its diverse applications in areas such as Embedded Systems, IoT, Robotics, and AI, aligns perfectly with the market's demand for comprehensive and adaptable solutions.

Target Users

- **Primary users:** Students pursuing technical disciplines at both undergraduate and graduate levels
 - Benefit: Access to dynamic and hands-on learning.
- **Additional user base:**
 - **Corporate training programs:** Leveraging the platform for upskilling and professional development.
 - **Individual enthusiasts:** Engaging in technical learning for personal growth.
- **Key feature:** Provides a versatile and accessible solution for hands-on technical learning in a remote and collaborative environment.
- **Strategic focus:** Designed to meet the diverse needs of the academic and research communities.

List of Features:

- Cloud Labs enables users to remotely access and interact with physical hardware resources, such as FPGA boards, providing a seamless virtualized environment for experimentation.
- It provides real-time control interfaces for selected board switches and push buttons, allowing users to manipulate hardware components in real-time through virtual interfaces on the web application.
- It features a booking system where users can reserve time slots to access specific hardware resources, ensuring organized and scheduled usage, particularly in educational environments.
- Supporting a diverse range of hardware domains, including Embedded Systems, Digital System Design, IoT, Robotics, Mechatronics, AI Accelerators, and more, providing a comprehensive solution for various technical disciplines.
- Developed to scale effortlessly, accommodating a growing user base and evolving hardware requirements
- Streamlines the hardware configuration process, automating the setup of connected boards, ensuring a quick and efficient transition between experiments.

