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Pycumbia: Bridging high-performance control logic and Python simplicity for modern UIs

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Pycumbia is a Python binding to the high-performance C++ cumbia framework, designed to simplify the development of control system applications without sacrificing responsiveness or scalability. It offers a user-friendly interface while maintaining the speed, concurrency, and low memory footprint of its C++ backend. By releasing Python's GIL, pycumbia ensures that GUI applications and data workflows remain smooth and responsive even under heavy load, a key requirement in control system environments.

From a user experience perspective, pycumbia significantly reduces the complexity typically associated with integrating control systems into custom applications. Developers can build advanced data visualization tools and synoptic panels with just a few lines of Python code, without dealing with polling logic, event dispatching, or thread management. Pycumbia also ships with PYI stubs for full IDE code completion.

A key architectural advantage is its flexibility in deployment: pycumbia can run inside an isolated *miniconda* environment, allowing developers to use up-to-date Qt and Python packages independently of the operating system, or system-wide, provided the base OS supports a recent enough software stack. This enables modern Qt-based graphical applications to be developed and run consistently across platforms, bypassing limitations of outdated system packages.

Pycumbia in real-world control system applications improves both the developer experience and application performance.

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Footnotes

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