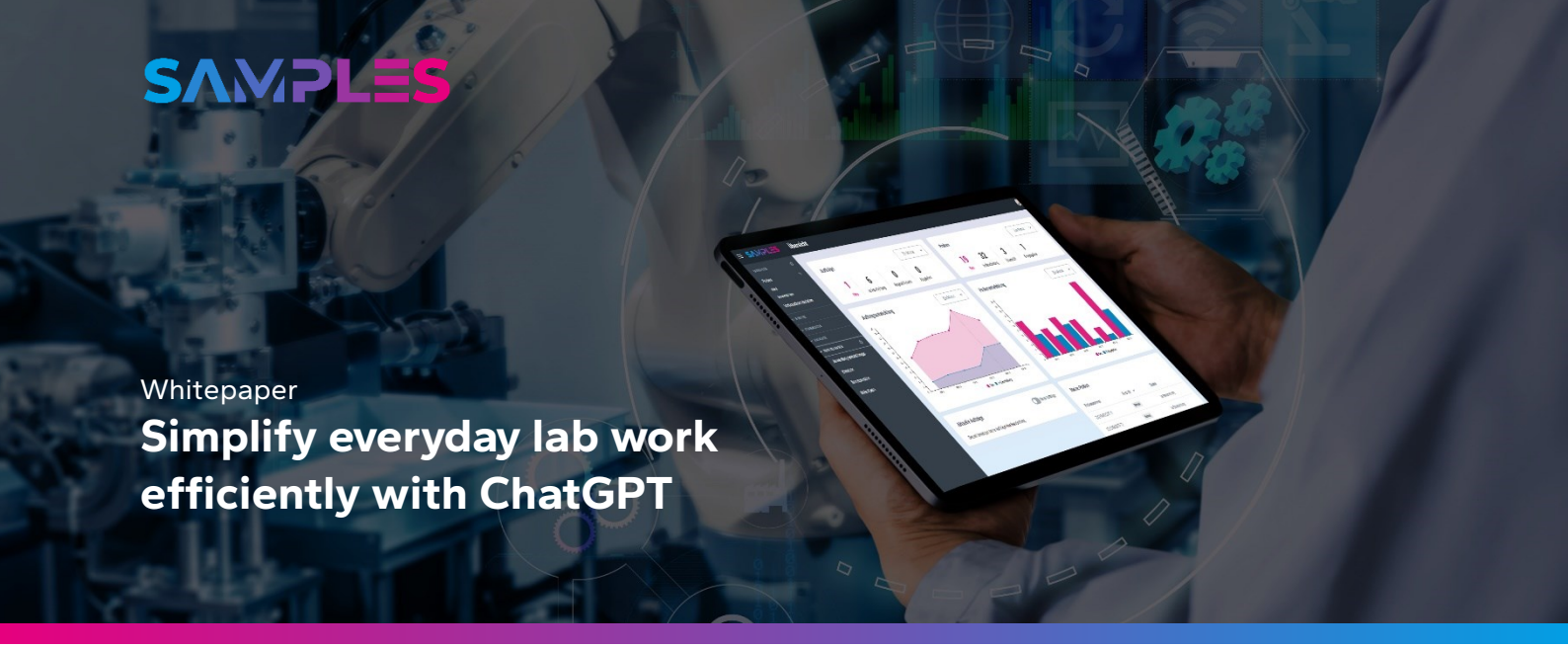

Whitepaper

Simplify everyday lab work efficiently with ChatGPT

Simpler, faster, more efficient: Integrating an AI chat into a Laboratory Information Management System (LIMS) simplifies interaction, speeds up the search for desired content, and significantly increases overall efficiency.

The AI Solution and Its Application Area

Traditional Laboratory Information Management Systems (LIMS) are often highly complex and require specific technical knowledge as well as extensive training for effective use. Employee acceptance and the onboarding of new staff are also crucial success factors that should not be underestimated. The answer to these common challenges in everyday lab operations can be the integration of an AI chat system such as ChatGPT. It allows LIMS users to access complex data structures easily and directly, perform sample analyses through natural language interaction, and interact with the LIMS from anywhere in the lab using mobile devices. This innovation is particularly relevant for laboratories facing growing demands for efficiency and digitalization, as well as those for which the shortage of skilled personnel is expected to become a central challenge.

Efficiency gains and additional benefits

The integration of AI chat functionality improves the accessibility, usability, and acceptance of a LIMS by creating an intuitive communication bridge between the user and the system. In addition, it minimizes sources of error, optimizes onboarding time for staff, and increases overall laboratory productivity. Moreover, the general use of AI chats like ChatGPT is currently growing across a wide range of professional applications. The tangible benefits in terms of time savings for research, knowledge transfer, and decision-making also apply to working with a LIMS — resulting in greater effectiveness in the lab and enhanced employer attractiveness.

The technology in detail

Integrating an AI chat requires a LIMS with a modern software architecture. An essential prerequisite is an open web interface that allows data to be queried, created, and modified. One example of such a modern and highly flexible LIMS is SAMPLES, developed by qualitype GmbH. Among other features, it includes an innovative GraphQL interface that enables secure data exchange.

For the solution described here, the large language model ChatGPT was integrated directly into the SAMPLES laboratory information management system via an intuitive chat interface. The chat application has two interfaces: one to the LLM and one to the LIMS. The LLM can generally be used just like the familiar ChatGPT.

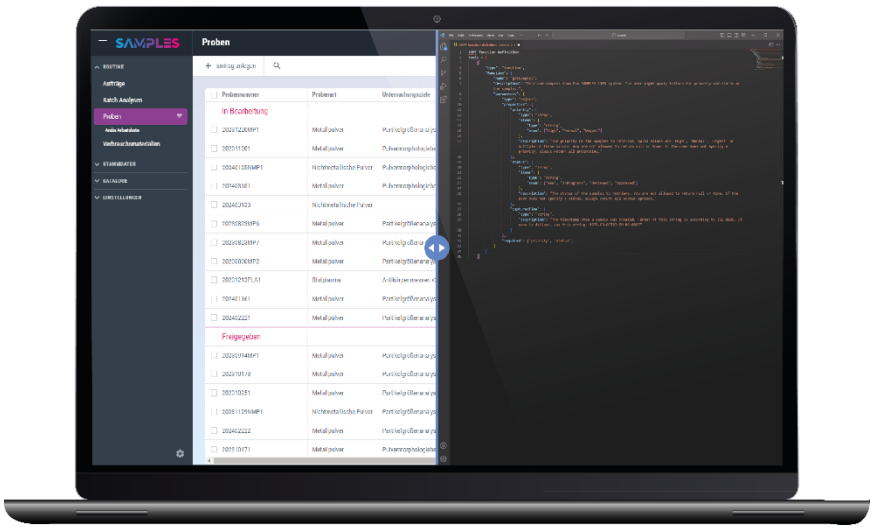

Fig. 1: Secure data exchange between SAMPLES and GraphQL

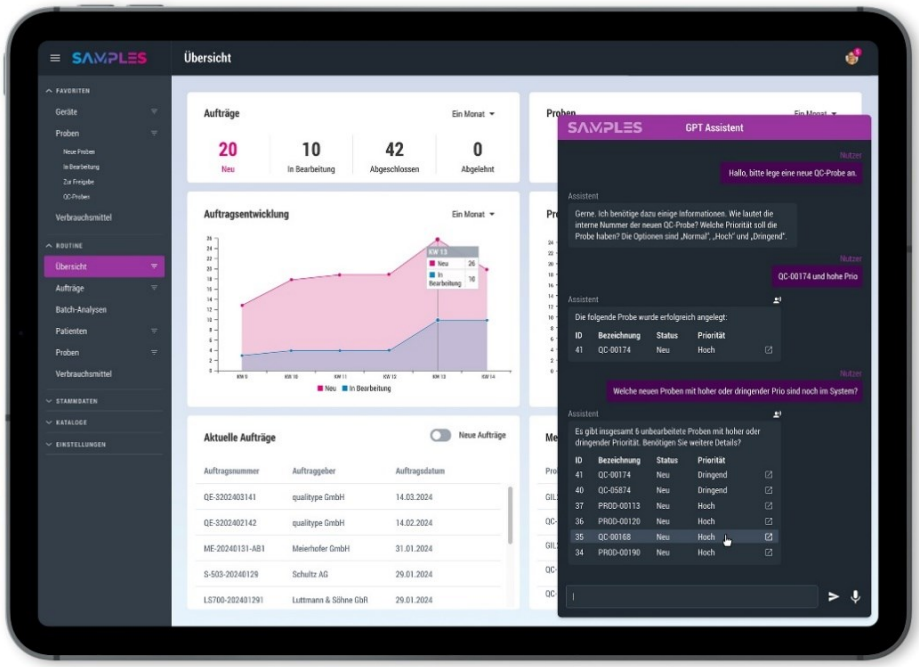

Fig. 2: Integrated AI chat using the example of the modern laboratory management system SAMPLES

In addition, the application detects specific user requests related to the LIMS during the conversation. For this purpose, corresponding functions are embedded in the application, which are then executed. Depending on how these are defined, users receive the requested information from the LIMS via the interface — for example, by retrieving samples or results based on certain filter criteria ("in which samples was batch XY used?"). Actions can also be carried out directly via the application, such as creating new samples in the LIMS (see figure). As a result, the application can be used as an equivalent additional interface — with a wide range of added benefits and application possibilities.

The solution is currently in a prototype implementation phase. Development as a feature is planned. Looking ahead, extended AI functionalities are also being considered to support forecasting and decision-making — through data mining and business intelligence (BI) approaches — based on the data available in the LIMS and previous interactions with the AI.

Do you have any questions or would you like to learn more about SAMPLES?

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