Application Development through kivy, for report generation

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Abstract: **Physical storage of engineering drawings, terminal data, tools data, and other similar types of information is essential for any manufacturing company. Storing the data in SAP and later retrieving it when required to make unique reports is a common way many companies approach this issue. But this method is prone to many errors and is also tedious. A production planning application that stores all the required data in a database and does automatic report generation is an better alternative than the tedious method mentioned earlier. Technologies such as Kivy, Python, and its libraries (pandas, openpyxl, numpy, flask, jinja, etc), and MySQL can be utilized to build a suitable application. This paper focuses on the challenge of building such an application, by taking the example of a cable manufacturing company as a user of the application. The output report is generated using HTML in the form of a webpage.**

Keywords –Relational Database(RDBMS), Python, MySQL, Kivy, and Software Development Life Cycle(SDLC).

1. Introduction

The "Production Planning Software" generates standardized read-only reports for different processes after the required inputs. The software's user interface is built using Kivymd. Kivymd is a python framework for the development of cross-platform applications. This GUI allows the user to directly access, modify, and insert data to the MySQL database created on the company's server.

2. LITERATURE SURVEY

Data created is valuable for a variety of analyses, including forecasting data that may be utilized for future prediction analysis. Many organizations find it difficult to run analytics on such large amounts of data. The authors, Saurav Verma, Khushboo Jain, and Chetana Prakash, discussed machine learning algorithms such as support vector machines, k-nearest neighbors, Logistic and linear regression, and decision tree that are applied to such data and then placed into a structured form to help in future predictions, with the accuracy of each strategy being compared. [1]

Dr. Peter Ping Liu and at all emphasized based on of real-time databases, including their capabilities, critical technologies such as data storage techniques, and performance in comparison to relational databases, that are extensively used in the field.[2]

Charlie Custer has covered key concepts in pandas. It demonstrates about using Python to analyze survey data. It includes data cleaning, data extraction and data visualization.[3]

Azhar Susanto and Meiryani focused on data integrity, data storage, data security, ,data transformation and presentation, data dictionary, allowing many users access, and enabling backup and recovery procedures. [4]

Harrison John Bhat and Babak Bashari Ra explained the importance of cloud computing along with an explanation of its challenges (privacy, integrity and interface). The paper, Databases in Cloud Computing: A Literature Review also focussed on different types of databases, such as relational database (MySQL) and NoSQL database (MongoDB). It explains their benefits and drawbacks. [5]

Kodrat Iman Satoto and at all discussed on optimizing the database system so that when the data is accessible, it does not impair the performance of server systems. The database system's architecture is optimized for process. Database design is critical in determining system performance. [6]

This author Andreas Schreiber, summarized all the basics of kivy framework and how one can package kivy-based apps to distribute via app stores. It also discussed about using kivy to develop prototypes and products for different real world apps. [7]

Brian D. Bissetts discusses analysis of data in Excel, including how to perform a variety of data and analysis tasks and processes such as completely automated linear and non-linear curves fitting, mapping, charting, sorting, including filtering the data. [8]

3. BACKGROUND OVERVIEW

Existing System:
Repetitive task consumes employee's time and often times causes reduction in performance. To increase productive time it is imperative to automate these repetitive tasks.
Every company requires a database to store their data. This ensures easy data modification, access and data reliability. This also standardised data gathering and accessibility of storage. Combining these two processes standardized report generation can take place across multiple locations. This addresses both of the above concerns.
 In figure 1 block diagram of the application's working is shown.
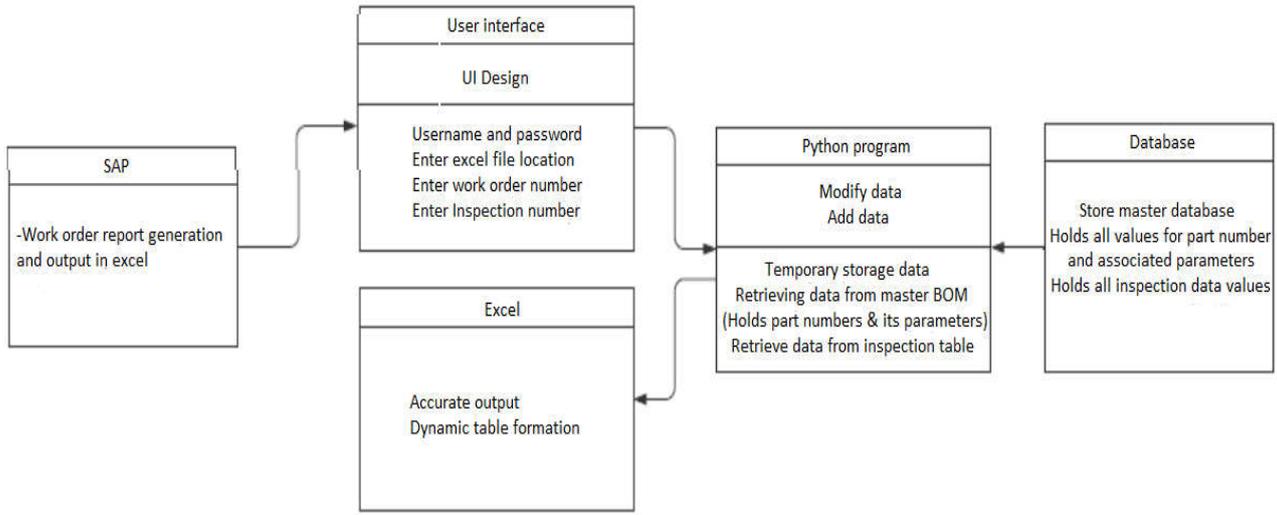
Figure 1 – Production Planning Software Working Block Diagram

4. Software Workflow

The figure 2 shows the process behind the login screen. The user enters their email id and password. This is validated by the database. If the user details are incorrect, an error is shown in the login screen. Otherwise, the user can access the app features based on their access level.
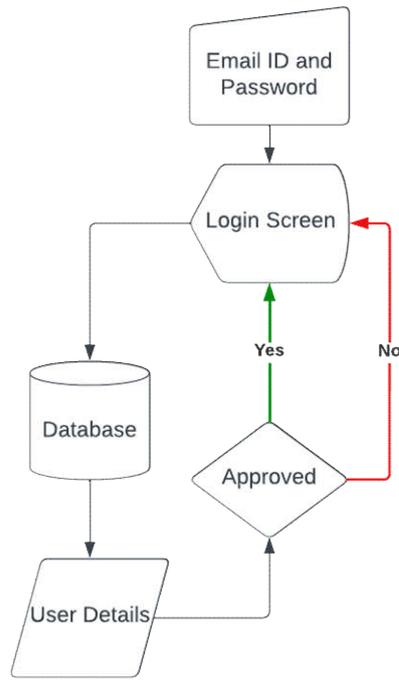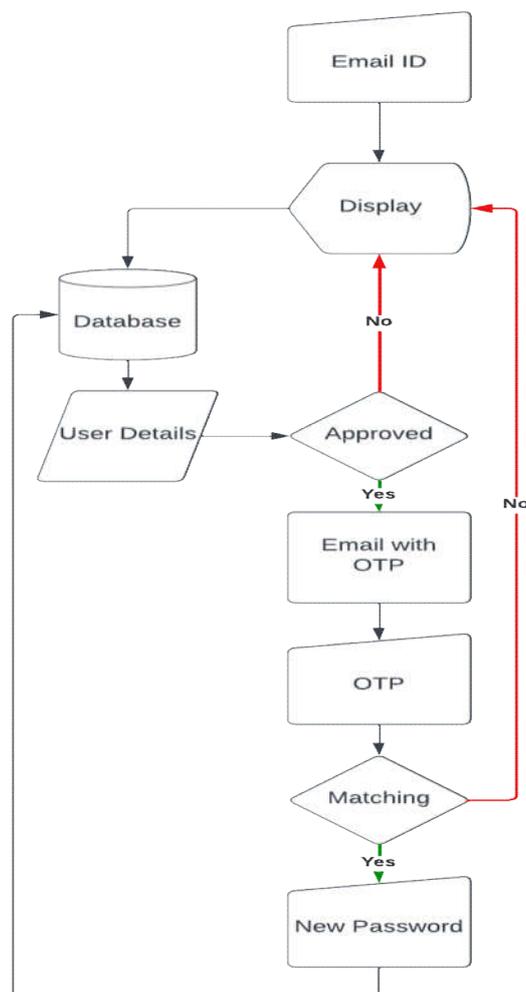

Figure. 2. User Details

The figure 3 shows the process behind the forgot password feature of the login screen.

The user enters their email id, if the email id is available an OTP is randomly generated and sent to the user's email. The user then enters the OTP and if correct, can change their password.

Fig. 3. Forgot Password

Figure 4 shows the procedure of inserting SAP work order details into the database. The user downloads an excel file that holds relevant work order details. The excel file is then imported into the app. The SAP data is then compared to the work order table in the database. All data that is not matching is inserted into the database. All matching data is compared and if the quantity is lower than the database value, that data is updated in the database.
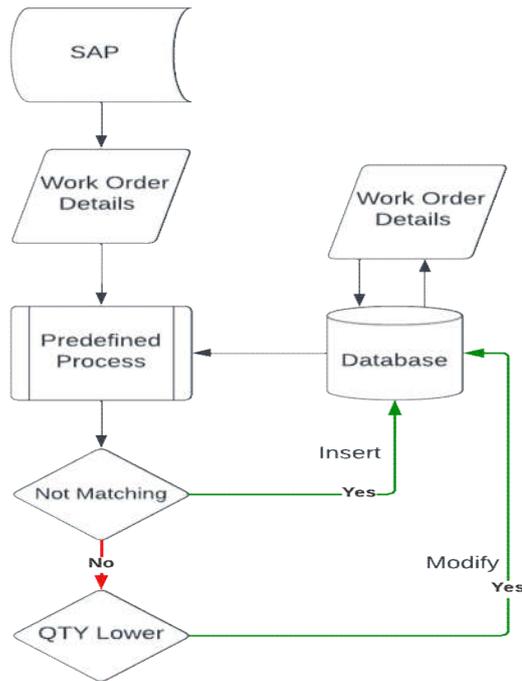
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Fig. 4. Work Order Details

Figure 3.5 shows the block diagram for report generation. The user inputs work order, the database checks if the work order is available and if its quantity is greater than zero. If true, then the user enters the job ticket quantity, if the job ticket quantity is equal to or less than remaining quantity then the report is generated for the associated FG part number.
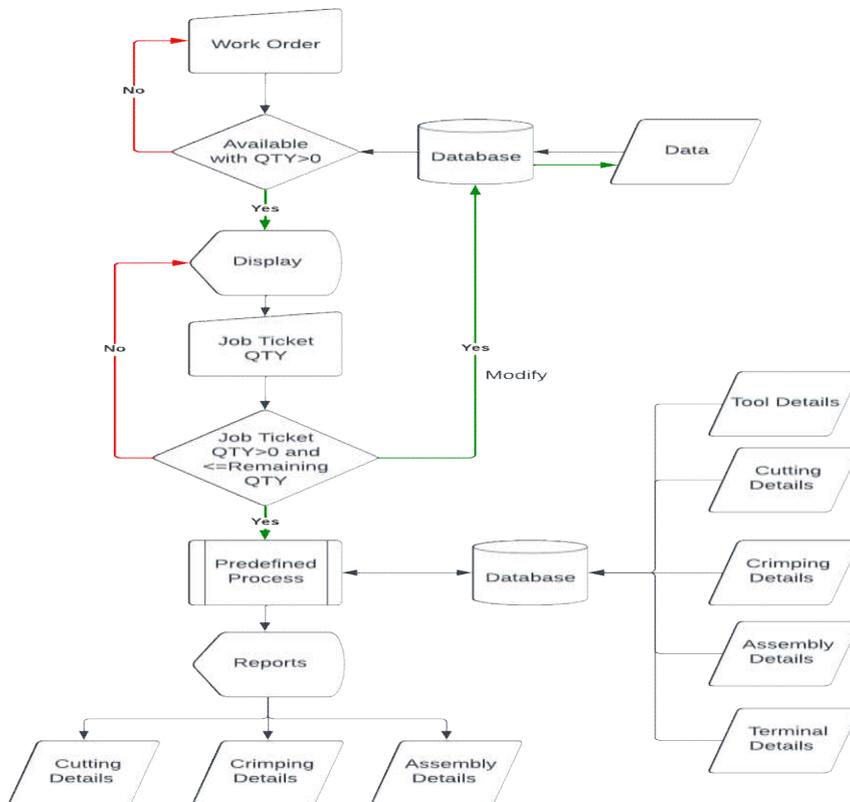
Fig 5. Report generation
5. IMPLEMENTATION

The steps to create application for production planning are as follows -
- Creating a Graphical User Interface.
- Creating a dashboard to panel display the data updates.
- Importing excel file by browsing the files in PC.
- Entering required data through GUI.
- Establishing a database server
- Establishing a connection with database server
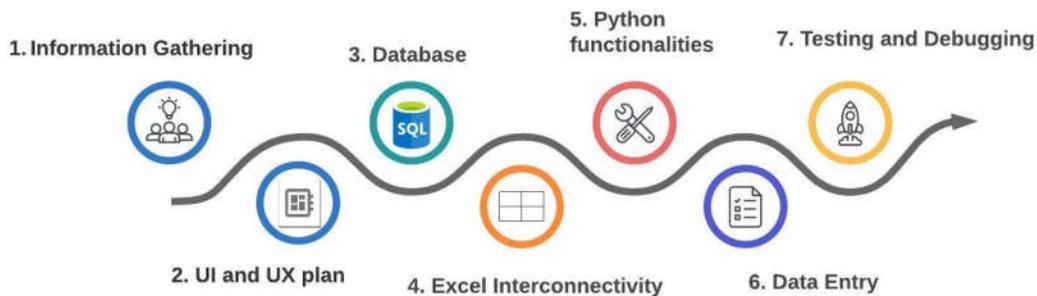
Fig. 5. Methodology

The following steps are required in order to create, deploy, and invoke a software:
- Gather all the required information for app's features.
- Design and implement UI and UX.
- Creation of a relational database.
- Excel interconnectivity to the software code.
- Creation of python functionalities.
- Importation of data to the database.
- Testing and debugging of the application.

6. PERFORMANCE EVALUATION AND RESULTS

To retrieve the report output for production, the user has to go to the report export screen. Type in the relevant work order, once the system has verified that the work order exists and its quantity is greater than zero, the user can then type in the required job ticket quantity and press download.

Figure 6. Report Export Screen

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In figure 6, the application's report export screen is shown. Whenever the download button is pressed, a website opens that allows the user to access the cutting, crimping, and assembly reports. The portal for getting the appropriate reports is depicted in figure 7.

Figure 7. Report Output

User details include information about all users who have access to the application. This screen is only visible to those with access level 3. The user may use this to add, remove, and modify details with respect to all users. However, the root email ID cannot be modified or deleted. Figure 8 depicts the user information panel, as well as the root email ID.

Figure 8. User Details

7. CONCLUSION

Although dashboards have been common in software, relational databases have been used to store and access data, although report generation has been used to improve data visualization. All of these have not been used together for the unique data that is generated by LAPP OLFLEX Connect.

Solutions such as creating reports through excel could not account for the unique data formatting that is needed for production, where there was a need for making new tabular formats, that can be auto generated and can be instantaneous. HTML and Jinja was used, these formats are used for web application, this innovative approach to table generation, helped to meet all the requirements.

MySQL commands such as events and triggers allowed the software to automatically send emails and run python scripts on the server, thus reducing user side loading, all of this was only possible after a deep dive, into unique SQL commands.

Lastly using KIVY as a frontend, allowed much faster user side loading, since KIVY is a native python GUI that uses C scripting to reduce processing time. All this combined culminated in the software that was developed for LAPP.

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