



Customer Relationship Management Tool Using LabVIEW

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ABSTRACT: In Silicon Validation Industries, the LabVIEW GUIs make data communication between devices and modules with use of CSV Files. This format of files help the GUI easily navigate through various properties of a device or any DUT. While this feature helps in Validation greatly, there are some new potential scope of the Same Technology in different fields like ERP and CRM. Customer Relationship Management is a tool that if properly used have potential growth of any business. Since in Earlier stages of CRM, the Firms used simple spreadsheets to manage the Customer Data. It is found that the LabVIEW GUIs with minor changes can be directly used to handle Customer Relationship Data as well as serve as a Customer Support Tool that can be used to handle Queries. The changes to be done are providing User Account Management, Security, Licensing, Mailer and Inboxes with Auto Response Features. A LabVIEW Application is developed based on the working of Device GUIs with modified modules to add, manipulate various customer data while allowing the Scope for many updates as the Architecture behind the Application is suitable for Extensive Scalability.

KEYWORDS: Auto Response, Popup, Prototype, CRM, LabVIEW GUI

I. INTRODUCTION

Then there arises a question, that LabVIEW is limited to purely Device Communication. The answer is LabVIEW can also find scope in Business Software and other domains. This is an understanding of how a Graphic User Interface model for Device can be utilized for handling Business Data and the modifications and features that are needed to be implemented to satisfy the criteria for the domain. It is found that they have some design similarities. CRM tools store data in Spreadsheet which is like Datasheet Reference. CRM tools provide different Views for User where Device GUIs provide various tabs for different functions. They provide different views for different users which is like User/Developer Accessibility feature of GUIs.

II. LITERATURE REVIEW

An article suggests that CRM is not merely a tool to enhance sales and marketing. This has a wide range of benefits like Prioritizing leads, Ensures Opportunities, promotes development of new plans and models. SMEs have limited resources to spend on investments. So, they will look for a simple easy to use tool rather than a complex tool with high costs.^[1]

Another article on CRM states that the greatest factor in success of a business is Customer Satisfaction. In recent years the trend is focused more on customer needs. Using a CRM provides businesses a Competitive advantage. CRM when combined with aspects of ERP provides a solution for management, business and marketing activities. This system is referred as Funnel Management. This provides new leads as well as prevent loss of customers.^[2]

A Paper on CRM provides different definitions for CRM on a Business scale CRM as Strategy This includes the functional plans for management and a business. This refers to the choices made by Managers for business. CRM as Technology This refers to the tool used for managing the data. They include all software related to handling Customer Information. CRM as Philosophy This refers to the concepts of Customer driven business. This includes the processes done in order to gather and hold customers^[3]

The article suggests that, the ticketing system will be mostly assisting in servicerequests from clients and maintaining track of issues and relationships, thushighly associated with CRM. Usually there will be an authorized person who willhandle the tickets.^[4]



This article promotes use of various techniques for a better user interface with implementation of various LabVIEW objects. Among those, one of the key features is the use of Tab Controls. These Tabs are pages that can be used to group controls and indicators. This helps in accommodating a wide range of controls in a short space.^[5]

A Paper on the encryption of text files using LabVIEW provides a method to encrypt and decrypt the strings. The paper suggests the reason for encryption and decryption for secured and lossless transmission. The algorithm makes use of Fast Fourier Transform and Inverse Fast Fourier Transform for the Encryption and Decryption.^[6]

III. METHODOLOGY

The methodology is classified into following sections based on the phase of Project Development. The initial phase of Project development is the software setup. A development PC should be equipped with the required software for building the application. The second phase involves the development of Prerequisite modules which will be used in future in development phase. These modules are mostly less complex in nature. They are built in LabVIEW and converted into Packages for migration requirements. They are referred as utilities or reusables. The third phase of Project development involves implementation of a base framework. This framework will be scalable and should adapt to increasing features. The framework will also act as the Frame or top-level Program for the application. The fourth phase involves the addition of different views for the application. These views will be having individual functionalities. Some new submodules also be developed to incorporate the code reusability. The fifth phase involves creation and installation of licensing, encryption facilities for User Credentials. The final phase includes the Development of Application and Installer. We use Queued State Machine Framework for Scalable Design Solution. The control flow in this architecture is followed in a procedural manner. Initially when executed, the program will run certain startup configurations. This is also known as Initialization. After the initialization is done, the Frame VI goes to a Polling State. In this polling state, the Program wait for any user event for a particular period. If no action is done, it will automatically execute a set of code. This code is also called as Timeout. The control flow in the architecture can be understood with the help of the following Figure 1.

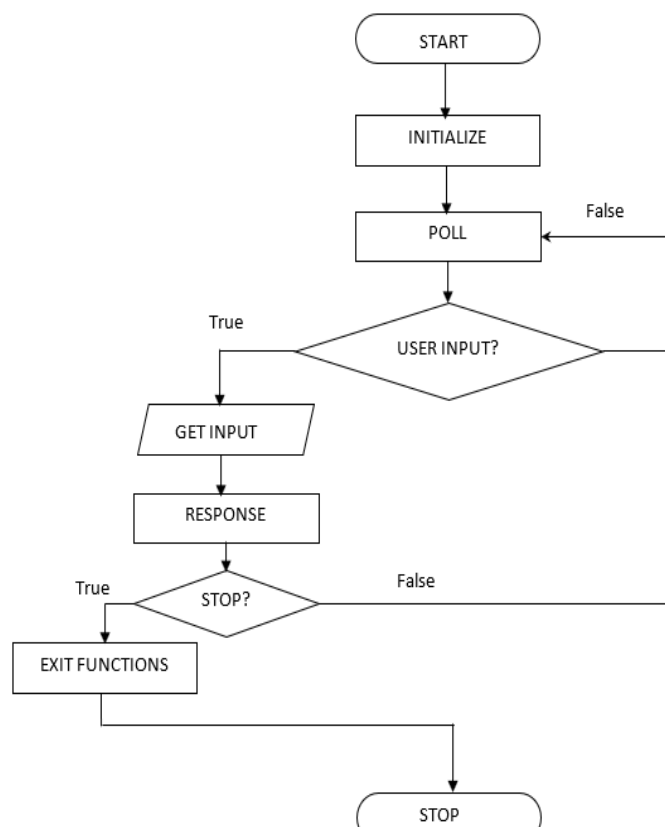


Figure 1 Flow Chart of State Machine



FUNCTIONAL VIEWS

After the framework is setup for the addition of modules, some UI modifications are made initially to accommodate the features. For the proof of concept some primary functional views are implemented.

TABLE VIEW

This is the primary view of the Application. This provides the Data of CSV file in a Table format. This proves very helpful for the User to check the format in which the data is stored in the CSV file. The Table also allows the User to manipulate the table. Undo and Redo facility is also implemented with limits.

DATA VIEW

This view is similar to Search tool where we can access all data of a particular field. This prove to be useful in checking all information about a person, modify the changes and update it in the file. This view provides a search box along with matched results.

MAILER VIEW

This feature is included in a separate view. The mailer feature is required for Customer Interaction. The Mailer should be intelligent to access data specific to individual customers as well as send some common news to all the Customers. The Mailer is further classified into Specific and broadcast mode. The reason for the classification is that, while including customer specific data in mail, while sending the mail the program will do data access, file access for individual and access the mailer for multiple iterations. There will be logical functions performed in each iteration. While in broadcast, here is no requirement for Individual logic. There can be only one iteration for sending the mail. The Specific Mode can manipulate the Entire Details, add new details, delete details, and use the data for some functionalities. The Mailer of this Application provides the User to send mail to selective participants with their respective details obtained from the CSV. Individual Attachments can also be attached. These mails are sent one by one instead of bulk to avoid storing bulk data thus reducing memory usage. The Broadcast mode of Mailer provides bulk mailing at faster rate. It will not provide Recipient Specific Attachments and Tags. This Mode will send only the Common Messages and Common Attachments. This Mode can be used to send Circulars, Notifications and Information.

QUERY MANAGER VIEW

This Query Manager is a Client Ticketing System combined with Customer Response. This uses an Official Application Email ID that can be accessed with only High Priority Admins. This Page uses the Official Email Id of the Application instead of the Admin or the Logged User Id.

APPLICATION SETTINGS VIEW

This view allows the User to setup configurations regarding the application defaults. The various settings include setting Default Email ID column, default Unique ID, Changing Theme of Application. This also provides an Undo Changes that will remove all the changes made in the UI during the current execution.

ADMIN SETTINGS

This view is a exclusive view available only for the Admins. This View allows the admin to add or remove the Accounts that can access the Application. The admin can also set the Access Level for each user. The admin can also set or change the Application Official Email ID used for ticketing and other Security Options.

LICENSING SUPPORT

Since the application needed to be standalone Offline application, the licensing should be developed in an offline manner. The Licensing support is offered by using System Registry. The Application when installed will create three registry keys called License ID, Expiry Date and Last Login Time. Every time at the Startup of the application, the License will be read from the Application and check for the expiry date. When the user changes the system time and enter the application, the current time will be before the last login time and will not be executed. This ensures that the Person did not change the System Time Settings to login after the License Period. The Renewal of License is done in a very light manner. The Renewal is done by a Small software that can be run one time in a PC. The License ID will be recorded for each customer initially by the Provider. The License Renewal is done in a password protected application that will be sent to Customer.



AUTHENTICATION SUPPORT

The Auth Support is done by a Pop up VI. This prompts the use conventional method of User ID and Password. This also allows the User for changing password in case of forgetting the Password using an Online Email OTP. So, the An Encrypted Credentials file will have stored information about Name, Email Id, Password, Security Question for support. The Admin also have access to create new account for new users with a temporary password. An additional addon is also provided to log the time of use of each accounts. The Credentials are stored offline in a Configuration File which require a secured storage.

ENCRYPTION SUPPORT

The encryption is done using a randomly generated key. Every time when the user closes the application, the application generates a new key and encrypt the Credential contents and then write the key in Registry and the contents in the Configuration file. This also avoided a possible error when the application is killed instead of closed. Then the key as well as the contents will be the same before the start of the execution and the key match with content. Then an alternate solution is developed. This resolved the issue by rewriting the Configuration file and registry once at the start. Only when the user modifies the credential details and prompt to save the changes, it will be saved.

IV. EXPERIMENTAL RESULTS

This chapter describes about the Experimental Results obtained in the Project as well as the Possible Use Cases. The End Windows Application was provided with the features that help a SME in managing the Data about Customers. The application offered multiple views for handling the User Data. The views available and important Front-end Windows are listed below.

TABLE VIEW:The table view acts as the Startup Page inside the Application which provides the User the view of the data arrangement in the CSV data file. The table view is shown in the figure 2.

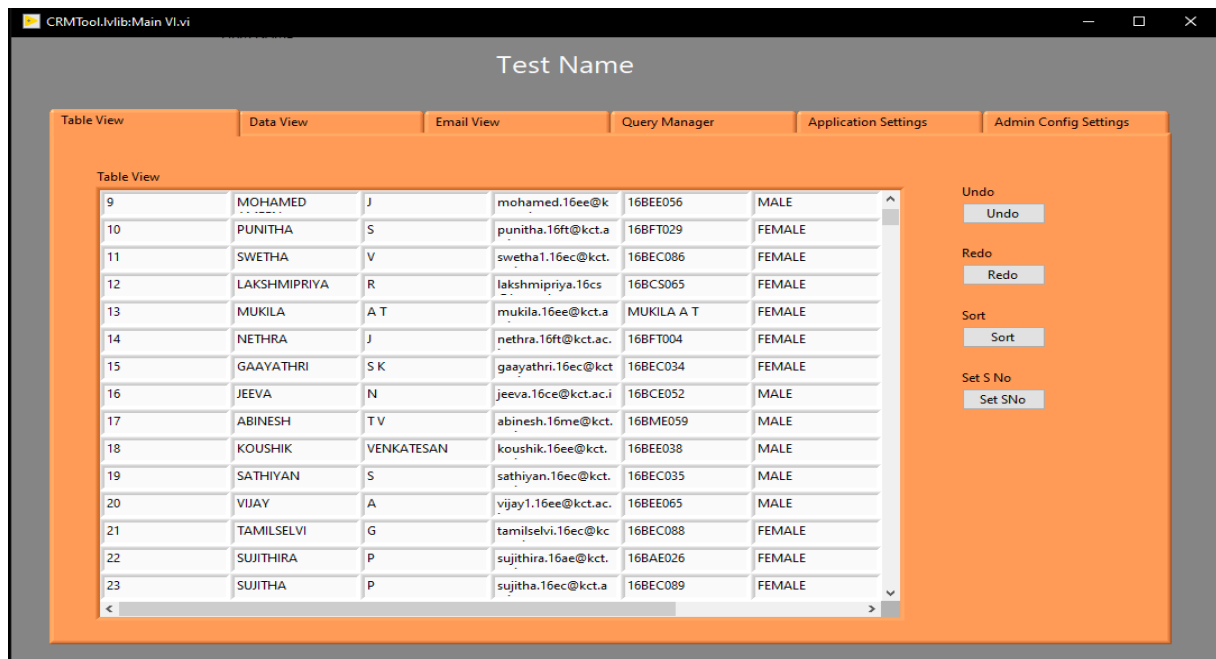


Figure 2 Table View

MAILER VIEW:The Mailer view of the Application allows the User to send mail or broadcast with help of the data in the CSV data file. The Mailer view is shown in the figure 3.

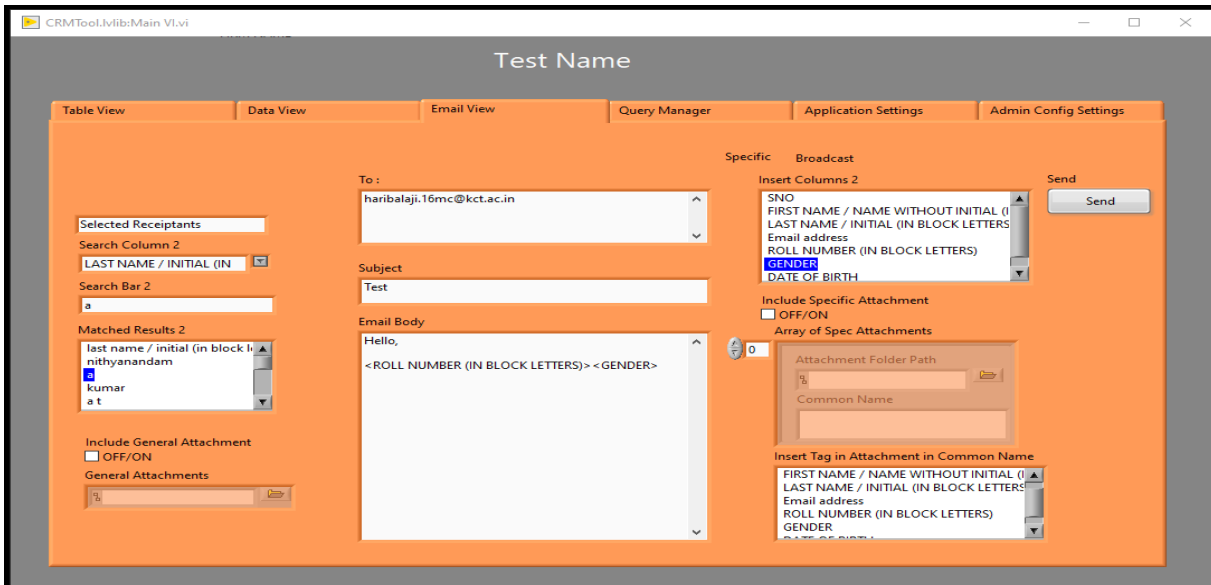


Figure 3 Mailer View

DATA VIEW:The Data view of the Application allows the User to modify the details of a particular field with help of the data in the CSV data file. The Data view is shown in the figure 4.

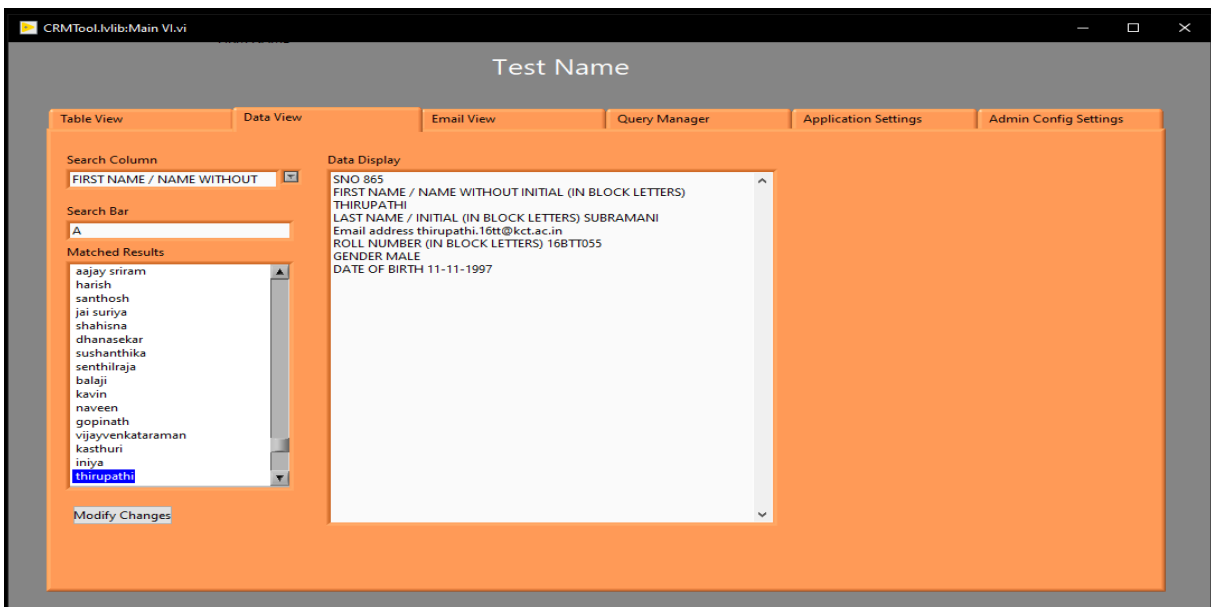


Figure 4 Data View

ADMIN SETTINGS VIEW:This view allows the Admin to set the configurations specific to Application with higher Access Level. The Admin Settings view is shown in the figure 5.



VI. CONCLUSION

The application is a light weighted application that is designed with the least memory usage as much as possible. The base pack delivers the essential features that can be suited for a customer who cannot afford high cost tools for possible increase in business. The additional outcome of the project are the reusables which can be extensively used across different requirements. The reusables prove to be helpful in reducing complexity of code in many applications as the reusables developed are not limited to only CRM based tools. The application is not a generic solution for all use cases. It is a Template that can be used specifically for each use case with minor modifications. Thus, the LabVIEW product acts as a valuable proof for any LabVIEW developer who wish to find scope in other fields than Instrumentation that LabVIEW has immense features to offer in all fields and allows scalable development of End User Applications. The future Scope includes addition of features like Macros, Cloud Backup and Ticketing System.

REFERENCES

- [1]Anu Thomas ET Bureau presented a CRM Software: A guide to how SMEs can boost its customer relations (Jun 08, 2018).
- [2]Hana Štverková, Michael and Pohludkapresented "The best practice of CRM implementation for small-and medium-sized enterprises."(2019)
- [3]AmarolindaZanelaSaccol, Cristiane Drebes and Pedronpresented "What lies behind the concept of customer relationship management? Discussing the essence of CRM through a phenomenological approach" at BAR-Brazilian Administration Review(2009).
- [4]Amy Volda, Dane Bertram, Robert J. Walker, Saul Greenberg presented Communication, Collaboration, and Bugs: The Social Nature of Issue Tracking in Software Engineering(2009).
- [5]Grant, Heimbach proposed " Creating Quality UIs with LabVIEW." National Instruments. Available: <http://www.ni.com> (2016).
- [6]Balaji Tata, Geetha Devi Appari, Surya Prasada Rao Borra: Encryption And Decryption Of Text File Using LabVIEW(JULY - SEPTEMBER 2018)