DAYANANDA SAGAR UNIVERSITY

SCHOOL OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
(DATA SCIENCE)

Statistical Foundation Of Data science

Mini Project

REPORT

ON

"A Graphical User Interface For Drug Inventory Management Using MATLAB App Designer"

2025 - 2026

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE & ENGINEERING(DATA SCIENCE)

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CERTIFICATE

It is certified that the mini project work entitled "A Graphical User Interface For Drug Inventory Management Using MATLAB App Designer"has been carried out at Dayananda Sagar University, Bangalore, by Akshay- ENG23DS0051, Hari Vishnu S - ENG23DS0012, Anshu Singh - ENG23DS0055 Bonafide student of fourth Semester, B.Tech in partial fulfilment for the award of degree in *Bachelor of Technology in Computer Science & Engineering (Data Science)* during academic year 2024-25. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in departmental library.

The project report has been approved as it satisfies the academic requirements in respect of project work for the said degree.

Signature of the Guide **Signature of the Chairperson**

ACKNOWLEDGEMENT

A project's successful completion offers a sense of satisfaction, but it is never finished without expressing gratitude to everyone who contributed to its accomplishment. We would like to convey our sincere gratitude to our esteemed university, Dayananda Sagar University, for offering the first-rate facilities.

We are especially thankful to our Chairperson, Dr. Shaila S G, for providing necessary departmental facilities, moral support and encouragement. The largest measure of our acknowledgment is reserved for Prof. Sindhu A whose guidance and support made it possible to complete the project work in a timely manner.

We would want to thank everyone who has assisted us in successfully completing this project work, both directly and indirectly. The staff has provided us with a great deal of direction and cooperation.

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DECLARATION

We hereby declare that the project entitled "A Graphical User Interface For Drug Inventory Management Using MATLAB App Designer" submitted to Dayananda Sagar University, Bengaluru, is a bona fide record of the work carried out by me under the guidance of Prof. Sindhu A. , Assistant Professor in the Dayananda Sagar University School of Engineering's Department of Computer Science and Engineering (Data Science). This work is submitted toward the partial fulfillment of the requirements for the award of a Bachelor of Technology in Computer Science and Engineering (Data Science).

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ABSTRACT

Effective management of pharmaceutical inventory is crucial for healthcare providers to ensure drug availability, minimize waste due to expiry, and maintain regulatory compliance. This project details the development of a Drug Inventory Management System, a desktop application created using MATLAB App Designer. The system provides a user-friendly graphical user interface (GUI) designed to streamline the tracking and management of drug stocks. Key functionalities include the ability to add new drug entries with details such as name, ID, quantity, price, and expiry date; search and filter the existing inventory; update drug information; and delete entries from the stock. Furthermore, the application incorporates a reporting feature that automatically identifies and displays drugs that are low in stock (below a predefined threshold) and those that have surpassed their expiry dates. The system utilizes MATLAB tables for data storage and manipulation within the application environment. The resulting application offers an efficient and organized solution for managing drug inventories, aimed at improving operational efficiency and reducing the risk of stock-related issues in a pharmacy or clinical setting.

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1. INTRODUCTION

The management of drug inventories within pharmacies and healthcare facilities is a complex and critical task. Manual tracking systems are often inefficient, susceptible to human error, and lack the capability for real-time analysis. These shortcomings can lead to significant problems, including stock shortages of essential medicines, financial losses from expired products, and potential risks to patient safety.

Recognizing these challenges, this project leverages technology to create a robust solution. The Drug Inventory Management System is a desktop application designed to streamline and automate the entire process of inventory control. By providing a centralized, digital platform, the system aims to enhance accuracy, improve operational efficiency, and provide valuable, at-a-glance insights into the inventory's status, ultimately contributing to better resource management and patient care.

2. OBJECTIVES AND SCOPE OF WORKS

OBJECTIV:

The primary objective of this project is to design and implement a comprehensive, interactive, and user-friendly Drug Inventory Management System using MATLAB App Designer. The system aims to:

- Provide a centralized platform for recording and maintaining drug inventory data.
- Offer full CRUD (Create, Read, Update, Delete) functionalities for managing drug records.
- Automate the identification of low-stock and expired drugs through integrated reporting.
- Deliver powerful visual analysis through a dynamic dashboard with a summary pie chart.
- Ensure a high degree of usability through an intuitive and color-coded GUI.

The scope of this project includes:

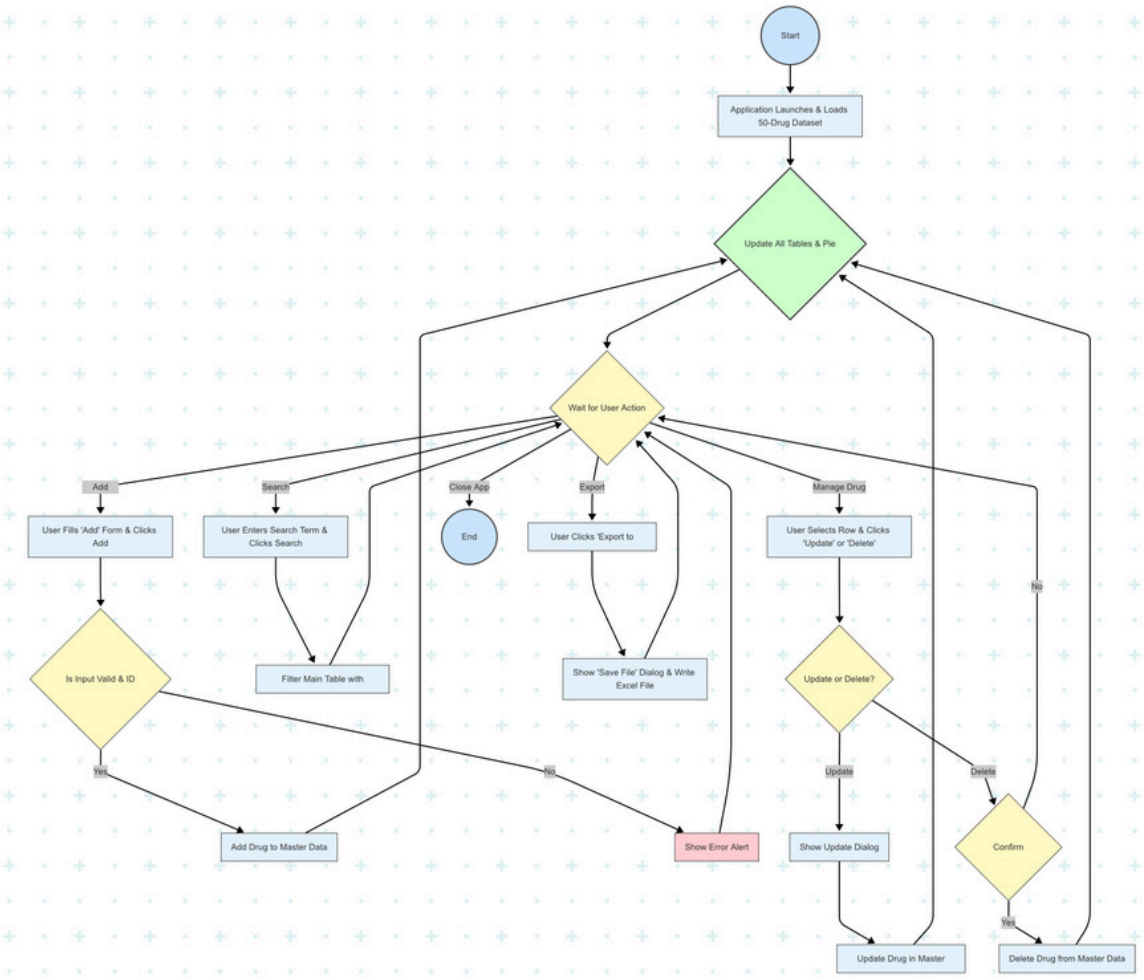
- UI Development: The creation of a two-tab GUI with dedicated panels for adding, searching, and managing inventory, as well as a separate tab for reports and visual analysis.
- Core Functions: Implementation of logic to add new drugs with validation, search the inventory case-insensitively, update existing records via a dialog box, delete records with confirmation, and export the full inventory to an Excel file.
- Reporting Module: The development of automated functions to dynamically filter the master data and display lists of all drugs that are low in stock (quantity < 10) or have passed their expiry date.
- Visual Dashboard: The integration of a pie chart that visually represents the proportion of total units in 'Good Stock', 'Low Stock', and 'Expired' categories, with corresponding summary labels.
- Data Initialization: Configuration of the application to launch with a large, pre-loaded dataset of 50 drugs, specifically designed to showcase all reporting and analytical features immediately.

3. DESCRIPTION OF WORK

The work involved developing a Drug Inventory Management System using MATLAB's App Designer. This system, named Dsystem, provides a graphical user interface (GUI) for managing pharmaceutical inventory. Key functionalities implemented include:

- Inventory Management:
  - Adding New Drugs: Users can input details such as Drug Name, Drug ID, Quantity, Price, and Expiry Date to add new entries to the inventory.
  - Searching Drugs: The system allows users to search for drugs by name or ID, displaying filtered results in the main inventory table.
  - Updating Drug Information: Existing drug entries can be selected and their details (Drug Name, Quantity, Price, Expiry Date) updated via an input dialog.
  - Deleting Drugs: Selected drug entries can be removed from the inventory after a confirmation prompt.
  - Exporting Inventory: The entire inventory data can be exported to an Excel file.
- Reporting and Analytics:
  - Low Stock Alerts: A dedicated section displays drugs that have a quantity below a specified threshold (10 units).
  - Expired Drug List: Another section lists all drugs that have passed their expiry date.
  - Inventory Status Overview: A pie chart provides a visual summary of the inventory, categorizing drugs into "Good Stock," "Low Stock," and "Expired" based on their quantities and expiry dates.
  - Summary Metrics: Labels show the total units in stock, total expired units, and total low stock units.

- Data Handling: The application maintains a FullInventoryData property to store the complete dataset, ensuring that search and filter operations on the main table do not affect the underlying comprehensive inventory. Helper functions updateInventoryTables and updatePieChart are used to dynamically refresh the various tables and charts based on changes to the FullInventoryData.
- Initialization: Upon startup, the application populates the inventory with a pre-defined sample dataset containing a mix of expired, low stock, and good stock items to demonstrate functionality.



4. SOURCE CODE

```
classdef DrugInventorySystem < matlab.apps.AppBase

    % Properties that correspond to app components
    properties (Access = public)
        UIFigure        matlab.ui.Figure        TabGroup
        matlab.ui.container.TabGroup        InventoryTab
        matlab.ui.container.Tab                AddPanel
        matlab.ui.container.Panel          DrugNameLabel
        matlab.ui.control.Label             DrugNameEdit
        matlab.ui.control.EditField          DrugIDLabel
        matlab.ui.control.Label               DrugIDEdit
        matlab.ui.control.EditField        QuantityLabel
        matlab.ui.control.Label             QuantityEdit
        matlab.ui.control.NumericEditField    PriceLabel
        matlab.ui.control.Label                PriceEdit
        matlab.ui.control.NumericEditField
        ExpiryDateLabel          matlab.ui.control.Label
        ExpiryDateEdit      matlab.ui.control.DatePicker
        AddButton               matlab.ui.control.Button
        InventoryTable           matlab.ui.control.Table
        SearchPanel            matlab.ui.container.Panel
        SearchField          matlab.ui.control.EditField
        SearchButton            matlab.ui.control.Button
        ResetSearchButton       matlab.ui.control.Button
        ManagePanel            matlab.ui.container.Panel
        UpdateButton            matlab.ui.control.Button
        DeleteButton            matlab.ui.control.Button
        ExportButton            matlab.ui.control.Button
        ReportsTab               matlab.ui.container.Tab
        LowStockPanel          matlab.ui.container.Panel
        LowStockTable            matlab.ui.control.Table
        ExpiredDrugsPanel      matlab.ui.container.Panel
        ExpiredDrugsTable matlab.ui.control.Table

    end


    properties (Access = private)
        FullInventoryData table % Store the full inventory data
    end


    methods (Access = private)

        function updateInventoryTables(app)
            % Update all tables when data changes
            % Use the FullInventoryData for calculations
            data = app.FullInventoryData;

            % Check for low stock (threshold = 10)
            % Ensure data.Quantity is not empty before indexing
            if ~isempty(data) && ~isempty(data.Quantity)
                lowStockIdx = data.Quantity < 10;
                app.LowStockTable.Data = data(lowStockIdx, :);
            else
                app.LowStockTable.Data = table(); % Set to empty table if no data
            end

            % Check for expired drugs
            % Ensure data.ExpiryDate is not empty before indexing
            if ~isempty(data) && ~isempty(data.ExpiryDate)
                currentDate = datetime('today');
                expiredIdx = data.ExpiryDate < currentDate;
                app.ExpiredDrugsTable.Data = data(expiredIdx, :);
            else
                 app.ExpiredDrugsTable.Data = table(); % Set to empty table if no data
            end
        end
    end

    % Callbacks that handle component events
    methods (Access = private)

        % Code that executes after component creation
        function startupFcn(app)
            % Initialize with sample data
            initialData = table(...
                {'Paracetamol', 'Amoxicillin', 'Ibuprofen'}', ...
```

```
            {'D001', 'D002', 'D003'}', ...
            [100; 50; 75], ...
            [5.99; 12.50; 8.25], ...
            datetime({'2024-12-31', '2023-11-15', '2024-06-30'})', ...
            'VariableNames', {'DrugName', 'DrugID', 'Quantity', 'Price', 'ExpiryDate'});

        % Store initial data in the FullInventoryData property
        app.FullInventoryData = initialData;

        % Display initial data in the main inventory table
        app.InventoryTable.Data = app.FullInventoryData;

        % Update report tables based on the initial data
        updateInventoryTables(app);
    end

    % Button pushed function: AddButton
    function AddButtonPushed(app, event)
        % Get input values
        drugName = app.DrugNameEdit.Value;
        drugID = app.DrugIDEdit.Value;
        quantity = app.QuantityEdit.Value;
        price = app.PriceEdit.Value;
        expiryDate = app.ExpiryDateEdit.Value;

        % Validate inputs
        if isempty(drugName) || isempty(drugID)
            uialert(app.UIFigure, 'Drug Name and ID are required!', 'Error');
            return;
        end

        % Check if Drug ID already exists in the full data
        existingIDs = app.FullInventoryData.DrugID;
        if any(strcmp(existingIDs, drugID))
            uialert(app.UIFigure, 'Drug ID already exists!', 'Error');
            return;
        end

        % Add new drug to the full data
        newRow = {drugName, drugID, quantity, price, expiryDate};
        app.FullInventoryData = [app.FullInventoryData; newRow];

        % Update the displayed inventory table and other tables
        app.InventoryTable.Data = app.FullInventoryData; % Display full data after adding
        updateInventoryTables(app);

        % Clear input fields
        app.DrugNameEdit.Value = '';
        app.DrugIDEdit.Value = '';
        app.QuantityEdit.Value = 0;
        app.PriceEdit.Value = 0;
        app.ExpiryDateEdit.Value = datetime('today');

        uialert(app.UIFigure, 'Drug added successfully!', 'Success');
    end

    % Button pushed function: SearchButton
    function SearchButtonPushed(app, ~)
        searchText = app.SearchField.Value;
        if isempty(searchText)
            uialert(app.UIFigure, 'Please enter a search term!', 'Warning');
            return;
        end

        data = app.FullInventoryData; % Search in the full data

        % Search in DrugName and DrugID
        nameMatches = contains(data.DrugName, searchText, 'IgnoreCase', true);
        idMatches = contains(data.DrugID, searchText, 'IgnoreCase', true);
        matches = nameMatches | idMatches;

        if any(matches)
            app.InventoryTable.Data = data(matches, :); % Display filtered data
        else
            uialert(app.UIFigure, 'No matching drugs found!', 'Info');
            app.InventoryTable.Data = table(); % Clear table if no matches
         fungicides;
```

```
        end
    end

    % Button pushed function: ResetSearchButton
    function ResetSearchButtonPushed(app, ~)
        app.SearchField.Value = '';
        app.InventoryTable.Data = app.FullInventoryData; % Display full data
        % No need to call updateInventoryTables here unless resetting search should also refresh reports
        % updateInventoryTables(app);
    end

    % Button pushed function: UpdateButton
    function UpdateButtonPushed(app, event)
        selectedRow = app.InventoryTable.Selection;
        if isempty(selectedRow)
            uialert(app.UIFigure, 'Please select a row to update!', 'Error');
            return;
        end

        % Get the data currently displayed in the table
        displayedData = app.InventoryTable.Data;

        % Get the DrugID of the selected row in the displayed data
        selectedDrugID_displayed = displayedData.DrugID{selectedRow};

        % Find the corresponding row in the full inventory data using DrugID
        fullData = app.FullInventoryData;
        [~, fullDataRow] = ismember(selectedDrugID_displayed, fullData.DrugID);

         if fullDataRow == 0
             % This case should ideally not happen if the displayed data is a subset of full data
             uialert(app.UIFigure, 'Could not find the selected drug in the full inventory.', 'Error');
             return;
         end


        % Get selected drug data from the full data
        selectedDrug = fullData(fullDataRow, :);

        % Open a dialog to edit
        prompt = {'Drug Name:', 'Quantity:', 'Price:', 'Expiry Date (yyyy-mm-dd):'};
        dlgtitle = 'Update Drug';
        dims = [1 35];
        definput = {...
            selectedDrug.DrugName{1}, ...
            num2str(selectedDrug.Quantity), ...
            num2str(selectedDrug.Price), ...
            datestr(selectedDrug.ExpiryDate, 'yyyy-mm-dd')};

        answer = inputdlg(prompt, dlgtitle, dims, definput);

        if ~isempty(answer)
            % Update the full data
            fullData.DrugName(fullDataRow) = answer(1);
            fullData.Quantity(fullDataRow) = str2double(answer{2});
            fullData.Price(fullDataRow) = str2double(answer{3});
            % Add error handling for invalid date string
            try
                fullData.ExpiryDate(fullDataRow) = datetime(answer{4}, 'InputFormat', 'yyyy-MM-dd');
            catch
                 uialert(app.UIFigure, 'Invalid date format. Please use yyyy-mm-dd.', 'Error');
                 return; % Stop update if date is invalid
            end


            % Update the full inventory data property
            app.FullInventoryData = fullData;

            % If currently displaying filtered data, update the filtered display
            if size(displayedData, 1) < size(fullData, 1)
                % Re-apply the current search filter
                searchText = app.SearchField.Value;
                nameMatches = contains(app.FullInventoryData.DrugName, searchText, 'IgnoreCase', true);
                idMatches = contains(app.FullInventoryData.DrugID, searchText, 'IgnoreCase', true);
                matches = nameMatches | idMatches;
                app.InventoryTable.Data = app.FullInventoryData(matches, :);
            else
```

```
                % Otherwise, update the full display
                 app.InventoryTable.Data = app.FullInventoryData;
            end


            updateInventoryTables(app); % Update report tables
            uialert(app.UIFigure, 'Drug updated successfully!', 'Success');
        end
    end

    % Button pushed function: DeleteButton
    function DeleteButtonPushed(app, event)
        selectedRow = app.InventoryTable.Selection;
        if isempty(selectedRow)
            uialert(app.UIFigure, 'Please select a row to delete!', 'Error');
            return;
        end

        % Get the data currently displayed in the table
        displayedData = app.InventoryTable.Data;

        % Get the DrugID of the selected row in the displayed data
        selectedDrugID_displayed = displayedData.DrugID{selectedRow};

        % Confirm deletion
        selection = uiconfirm(app.UIFigure, 'Are you sure you want to delete this drug?', 'Confirm Delete', ...
            'Options', {'Yes', 'No'}, ...
            'DefaultOption', 2);

        if strcmp(selection, 'Yes')
            % Find the corresponding row in the full inventory data using DrugID
            fullData = app.FullInventoryData;
            [~, fullDataRow] = ismember(selectedDrugID_displayed, fullData.DrugID);

             if fullDataRow == 0
                 uialert(app.UIFigure, 'Could not find the selected drug in the full inventory.', 'Error');
                 return;
             end

            % Delete the row from the full data
            fullData(fullDataRow, :) = [];

            % Update the full inventory data property
            app.FullInventoryData = fullData;

             % If currently displaying filtered data, update the filtered display
            if size(displayedData, 1) < size(fullData, 1) + 1 % +1 because a row was removed
                % Re-apply the current search filter
                searchText = app.SearchField.Value;
                nameMatches = contains(app.FullInventoryData.DrugName, searchText, 'IgnoreCase', true);
                idMatches = contains(app.FullInventoryData.DrugID, searchText, 'IgnoreCase', true);
                matches = nameMatches | idMatches;
                app.InventoryTable.Data = app.FullInventoryData(matches, :);
            else
                % Otherwise, update the full display
                 app.InventoryTable.Data = app.FullInventoryData;
            end


            updateInventoryTables(app); % Update report tables
            uialert(app.UIFigure, 'Drug deleted successfully!', 'Success');
        end
    end

    % Button pushed function: ExportButton
    function ExportButtonPushed(app, event)
        [file, path] = uiputfile('*.xlsx', 'Save Inventory Report');
        if file ~= 0
            writetable(app.FullInventoryData, fullfile(path, file)); % Export the full data
            uialert(app.UIFigure, 'Inventory exported to Excel!', 'Success');
        end
    end
end

% App initialization and construction
methods (Access = public)
```

```
% Create UIFigure and components
function createComponents(app)

    % Create UIFigure app.UIFigure = uifigure('Visible',
    'off'); app.UIFigure.Position = [100 100 900 600];
    app.UIFigure.Name = 'Drug Inventory Management System';


    % Create TabGroup app.TabGroup =
    uitabgroup(app.UIFigure);
    app.TabGroup.Position = [20 20 860 560];

    % Create InventoryTab
    app.InventoryTab = uitab(app.TabGroup);
    app.InventoryTab.Title = 'Inventory';

    % Create AddPanel
    app.AddPanel = uipanel(app.InventoryTab);
    app.AddPanel.Title = 'Add New Drug';
    app.AddPanel.Position = [20 400 400 150];

    % Create DrugNameLabel
    app.DrugNameLabel = uilabel(app.AddPanel);
    app.DrugNameLabel.Position = [20 100 70 22];
    app.DrugNameLabel.Text = 'Drug Name:';

    % Create DrugNameEdit
    app.DrugNameEdit = uieditfield(app.AddPanel, 'text');
    app.DrugNameEdit.Position = [100 100 150 22];

    % Create DrugIDLabel
    app.DrugIDLabel = uilabel(app.AddPanel);
    app.DrugIDLabel.Position = [20 70 70 22];
    app.DrugIDLabel.Text = 'Drug ID:';

    % Create DrugIDEdit
    app.DrugIDEdit = uieditfield(app.AddPanel, 'text');
    app.DrugIDEdit.Position = [100 70 150 22];

    % Create QuantityLabel
    app.QuantityLabel = uilabel(app.AddPanel);
    app.QuantityLabel.Position = [20 40 70 22];
    app.QuantityLabel.Text = 'Quantity:';

    % Create QuantityEdit
    app.QuantityEdit = uieditfield(app.AddPanel, 'numeric');
    app.QuantityEdit.Position = [100 40 150 22];
    app.QuantityEdit.Value = 0;

    % Create PriceLabel
    app.PriceLabel = uilabel(app.AddPanel);
    app.PriceLabel.Position = [270 100 70 22];
    app.PriceLabel.Text = 'Price ($):';

    % Create PriceEdit
    app.PriceEdit = uieditfield(app.AddPanel, 'numeric');
    app.PriceEdit.Position = [330 100 60 22];
    app.PriceEdit.Value = 0;

    % Create ExpiryDateLabel
    app.ExpiryDateLabel = uilabel(app.AddPanel);
    app.ExpiryDateLabel.Position = [270 70 70 22];
    app.ExpiryDateLabel.Text = 'Expiry Date:';

    % Create ExpiryDateEdit
    app.ExpiryDateEdit = uidatepicker(app.AddPanel);
    app.ExpiryDateEdit.Position = [330 70 100 22];
    app.ExpiryDateEdit.Value = datetime('today');

    % Create AddButton
    app.AddButton = uibutton(app.AddPanel, 'push');
    app.AddButton.Position = [270 20 100 22];
    app.AddButton.Text = 'Add Drug';
    app.AddButton.ButtonPushedFcn = createCallbackFcn(app, @AddButtonPushed, true);

    % Create InventoryTable
    app.InventoryTable = uitable(app.InventoryTab);
```

```
            app.InventoryTable.ColumnName = {'Drug Name', 'Drug ID', 'Quantity', 'Price ($)', 'Expiry Date'};
            app.InventoryTable.ColumnWidth = {150, 100, 80, 80, 120};
            app.InventoryTable.Position = [20 20 820 370];
            app.InventoryTable.Data = table();

            % Create SearchPanel
            app.SearchPanel = uipanel(app.InventoryTab);
            app.SearchPanel.Title = 'Search Drugs';
            app.SearchPanel.Position = [440 400 400 150];

            % Create SearchField
            app.SearchField = uieditfield(app.SearchPanel, 'text');
            app.SearchField.Position = [20 80 250 22];
            app.SearchField.Placeholder = 'Enter drug name or ID';

            % Create SearchButton
            app.SearchButton = uibutton(app.SearchPanel, 'push');
            app.SearchButton.Position = [280 80 100 22];
            app.SearchButton.Text = 'Search';
            app.SearchButton.ButtonPushedFcn = createCallbackFcn(app, @SearchButtonPushed, true);

            % Create ResetSearchButton
            app.ResetSearchButton = uibutton(app.SearchPanel, 'push');
            app.ResetSearchButton.Position = [280 40 100 22];
            app.ResetSearchButton.Text = 'Reset';
            app.ResetSearchButton.ButtonPushedFcn = createCallbackFcn(app, @ResetSearchButtonPushed, true);

            % Create ManagePanel
            app.ManagePanel = uipanel(app.InventoryTab);
            app.ManagePanel.Title = 'Manage Inventory';
            app.ManagePanel.Position = [440 250 400 140];

            % Create UpdateButton
            app.UpdateButton = uibutton(app.ManagePanel, 'push');
            app.UpdateButton.Position = [20 80 100 22];
            app.UpdateButton.Text = 'Update';
            app.UpdateButton.ButtonPushedFcn = createCallbackFcn(app, @UpdateButtonPushed, true);

            % Create DeleteButton
            app.DeleteButton = uibutton(app.ManagePanel, 'push');
            app.DeleteButton.Position = [140 80 100 22];
            app.DeleteButton.Text = 'Delete';
            app.DeleteButton.ButtonPushedFcn = createCallbackFcn(app, @DeleteButtonPushed, true);

            % Create ExportButton
            app.ExportButton = uibutton(app.ManagePanel, 'push');
            app.ExportButton.Position = [260 80 100 22];
            app.ExportButton.Text = 'Export to Excel';
            app.ExportButton.ButtonPushedFcn = createCallbackFcn(app, @ExportButtonPushed, true);

            % Create ReportsTab
            app.ReportsTab = uitab(app.TabGroup);
            app.ReportsTab.Title = 'Reports';

            % Create LowStockPanel
            app.LowStockPanel = uipanel(app.ReportsTab);
            app.LowStockPanel.Title = 'Low Stock Alert (Quantity < 10)';
            app.LowStockPanel.Position = [20 300 820 200];

            % Create LowStockTable
            app.LowStockTable = uitable(app.LowStockPanel);
            app.LowStockTable.ColumnName = {'Drug Name', 'Drug ID', 'Quantity', 'Price ($)', 'Expiry Date'};
            app.LowStockTable.ColumnWidth = {150, 100, 80, 80, 120};
            app.LowStockTable.Position = [20 20 780 150];
            app.LowStockTable.Data = table();

            % Create ExpiredDrugsPanel
            app.ExpiredDrugsPanel = uipanel(app.ReportsTab);
            app.ExpiredDrugsPanel.Title = 'Expired Drugs';
            app.ExpiredDrugsPanel.Position = [20 50 820 200];

            % Create ExpiredDrugsTable
            app.ExpiredDrugsTable = uitable(app.ExpiredDrugsPanel);
            app.ExpiredDrugsTable.ColumnName = {'Drug Name', 'Drug ID', 'Quantity', 'Price ($)', 'Expiry Date'};
            app.ExpiredDrugsTable.ColumnWidth = {150, 100, 80, 80, 120};
            app.ExpiredDrugsTable.Position = [20 20 780 150];
            app.ExpiredDrugsTable.Data = table();
```

```
            % Show the figure after all components are created
            app.UIFigure.Visible = 'on';
        end
    end

    % App creation and deletion
    methods (Access = public)

        % Construct app
        function app = DrugInventorySystem

            % Create UIFigure and components
            createComponents(app)

            % Register the app with App Designer
            registerApp(app, app.UIFigure)

            % Execute the startup function
            runStartupFcn(app, @startupFcn)

            if nargout == 0
                clear app
            end
        end

        % Code that executes before app deletion
        function delete(app)

            % Delete UIFigure when app is deleted
            delete(app.UIFigure)
        end
    end
end
```

5. RESULT

The development resulted in a functional MATLAB App Designer application capable of performing essential drug inventory management tasks.

- The GUI provides a clear and organized layout with distinct panels for adding, searching, and managing drugs on the "Inventory" tab, and separate panels for reports on the "Reports" tab.
- Users can successfully add new drug entries, and the system performs basic validation for required fields and duplicate Drug IDs.
- Searching and filtering of inventory data works as intended, displaying relevant subsets of the FullInventoryDatain the main inventory table.
- Updating and deleting existing drug entries are implemented and operate correctly, reflecting changes in the inventory data.
- The export functionality allows users to save the complete inventory to an Excel file.
- The "Reports" tab accurately displays low stock and expired drugs in dedicated tables.
- The inventory status pie chart and associated summary labels dynamically update to reflect the current state of the inventory, providing a quick overview of stock health.
- The internal FullInventoryData table correctly stores and manages the entire inventory, allowing for consistent reporting and updates even when the main display table is filtered.

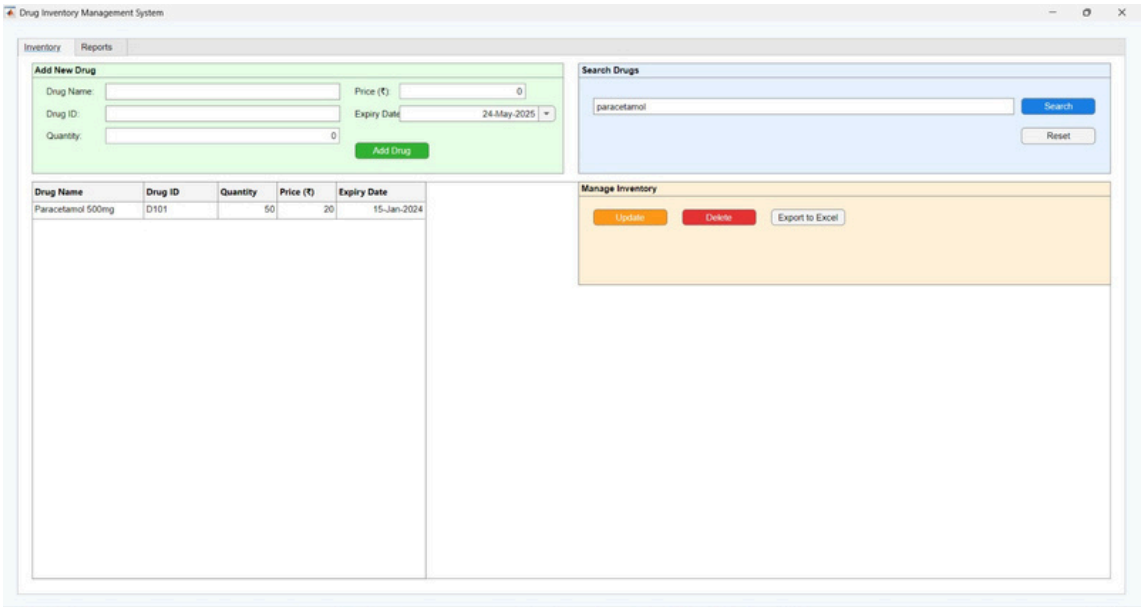


Figure 1: Main Inventory Management Interface

This figure displays the primary user interface of the Drug Inventory Management System, showing the "Inventory" tab. This screen serves as the central hub for daily operations.

- Data Entry and Management: The top-left "Add New Drug" panel provides fields for adding new items to the inventory, including Drug Name, ID, Quantity, Price, and Expiry Date. The "Manage Inventory" panel on the right provides the core functions to "Update," "Delete," or "Export to Excel" the data selected in the main table.
- Search Functionality: The screenshot demonstrates a live search operation. The user has typed "paracetamol" into the "Search Drugs" field.
- Filtered Results: As a result of the search, the main inventory table below has been filtered to display only the matching record: "Paracetamol 500mg" with Drug ID "D101". This showcases the system's ability to quickly locate specific items within a larger dataset.

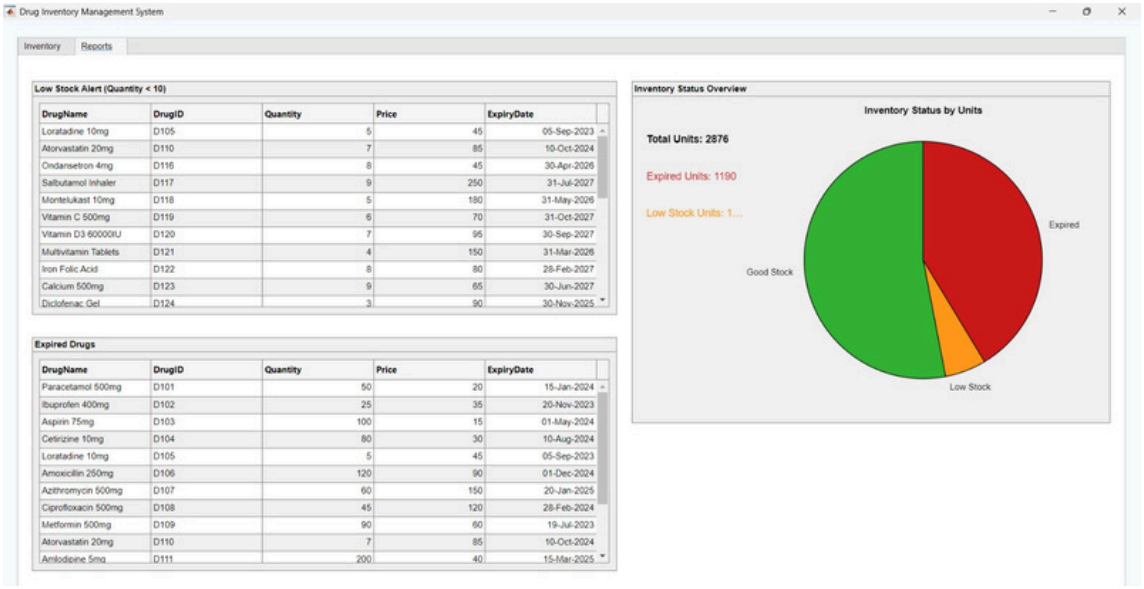


Figure 2: Reporting and Analytics Dashboard

This figure showcases the "Reports" tab, which acts as the analytical dashboard for the inventory manager. This interface provides critical, at-a-glance insights into the inventory's status.

- Automated Alerts: The left side of the screen features two automated report tables:
  - Low Stock Alert: This table automatically lists all drugs with a quantity of less than 10, such as "Loratadine 10mg" with a quantity of 5. This feature is crucial for preventing stockouts.
  - Expired Drugs: This table lists all medications that have passed their expiration date, such as "Paracetamol 500mg" which expired on "15-Jan-2024". This is a vital patient safety feature.
- Inventory Status Overview: The panel on the right provides a high-level summary of the entire inventory.
  - Quantitative Summary: It displays key metrics, including "Total Units," "Expired Units," and "Low Stock Units".
  - Visual Breakdown: A prominent pie chart offers an immediate visual representation of the inventory's health, clearly segmenting the stock into "Good Stock," "Low Stock," and "Expired" categories. This allows for rapid assessment and decision-making.

6. CONCLUSION

The Dsystem MATLAB application effectively addresses the core requirements of a basic drug inventory management system. It provides a user-friendly interface for managing drug records and offers valuable reporting features to track low stock and expired items, along with an overall inventory status summary.

While the application is functional, a crucial next step for real-world deployment would be to implement data persistence. Currently, all changes to the inventory are lost when the app is closed. Integrating functionalities to automatically save FullInventoryData to a file (e.g., an Excel file or a .mat file) upon changes and to load this data at startup would make the system robust and truly practical for ongoing inventory management. Further enhancements could include more advanced input validation (e.g., ensuring non-negative quantities/prices) and potentially integrating with a more robust database system for larger-scale operations.

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