PhotoGraph

User Documentation

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1 Introduction

PhotoGraph is an Android application that allows the user to scan hand-written mathematical expressions using their phone camera and solve them, graph them and perform operations on them.
This guide explains how to access the various functions and use all the functionalities of the app efficiently.

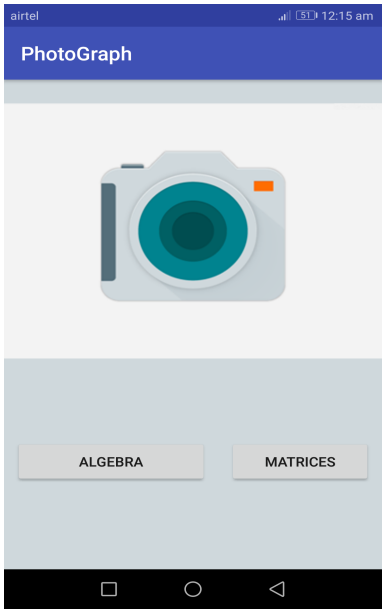
2 Providing App-permissions

On launching the application for the first time, the app requires permission to access the internet and camera. Press "Allow" on both the app-permission pop-ups that appear on the screen to provide said permissions.

3 Using the App

Once permissions are provided, the main page of the app is displayed. The two main buttons that are displayed are:

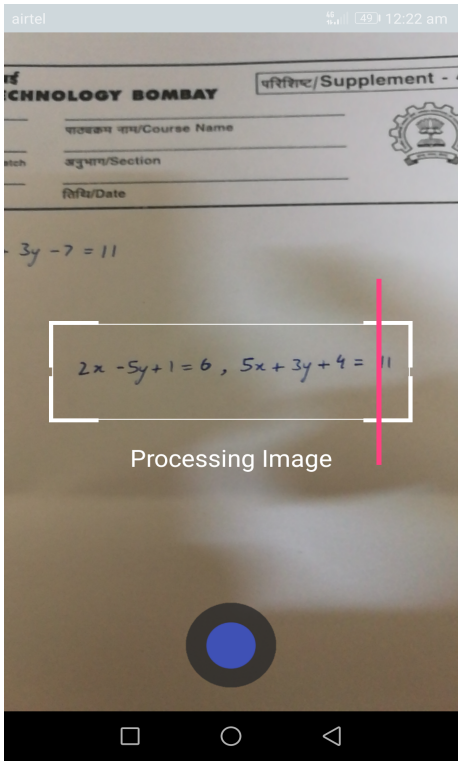
1. Algebra
2. Matrices



Each of the buttons leads the user to the relevant activities, which are explained in detail below. Key to the working of these activities is the Camera activity.

4 Operating the Camera

The camera interface is shown below



4.1 Crop-control

The cropping frame present in the centre of the screen is configurable. User can stretch it to suit requirements so that the entire expression fits within the rectangle with no other irrelevant markings.

4.2 Capture button

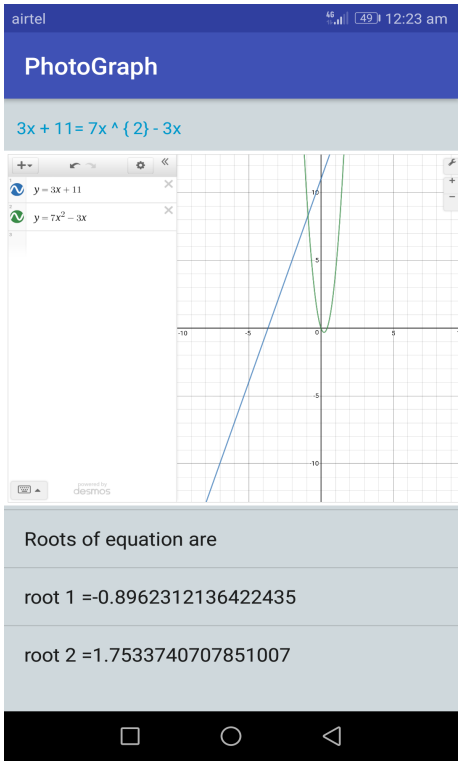
The blue circular button located on the bottom of the screen acts as the shutter button. It can be pressed to capture the image within the frame and commence scanning.

5 Algebra

Pressing the Algebra button on the main page launches the Camera activity. Once the expression is captured by the camera, one of the following two things may happen:-

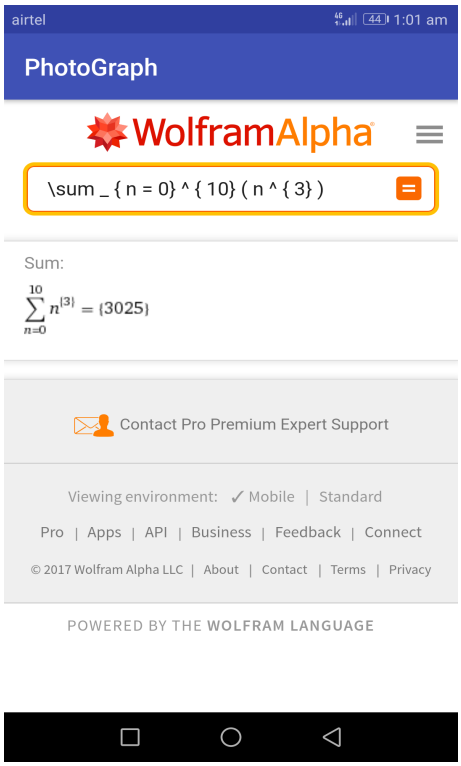
1. The app recognizes the expression and proceeds to calculate the solution
2. The expression isn't recognized and the app proceeds to produce the alternate output

5.1 Case 1: Expression Recognized



In this case, the app displays the input at the top of the screen, along with an appropriate graph right below it. The solution of the expression is also displayed at the bottom of the screen.

5.2 Case 2: Expression not recognized



If in case the expression isn't recognized, the app sends a request to the admin to update the app to support said expression. It then redirects the user to a WolframAlpha page displaying the output of the expression.

Pressing back while viewing any of these pages will take the user back to the main page.

6 Matrices

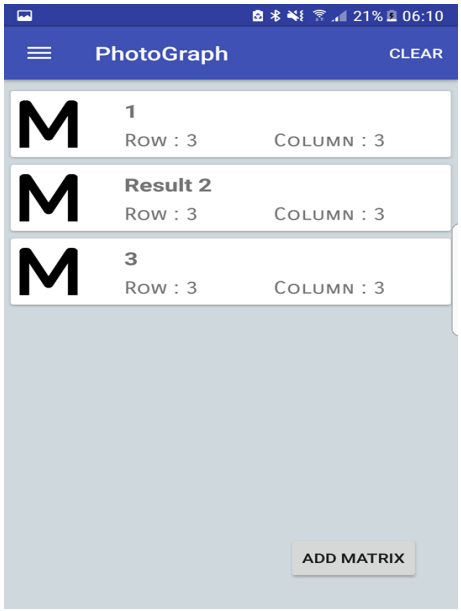
On clicking MATRICES button on main page App will open Matrix section.

6.1 Add Matrix

On bottom-right corner a button named ADD MATRIX is present,through which user can input the matrix on which the user wants to do further operations.

Clicking the button will open camera activity through which user can scan the Matrix after scanning is finished the App will redirect to Matrix page and a Variable matrix will appear as a copy of scanned matrix

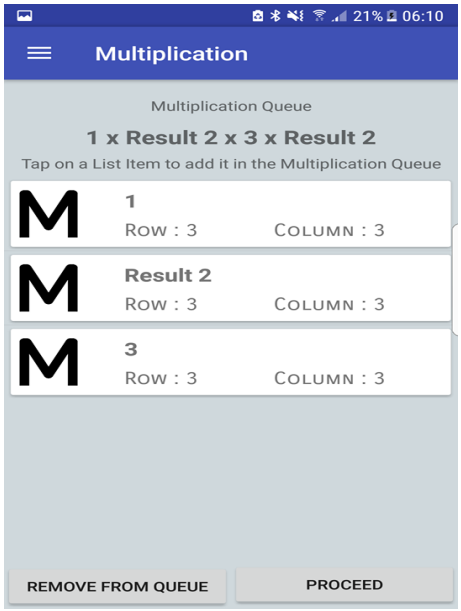
clicking the variable user can see the in scanned matrix , and long pressing the variable will show a option to delete the matrix , pressing it will delete the saved variable



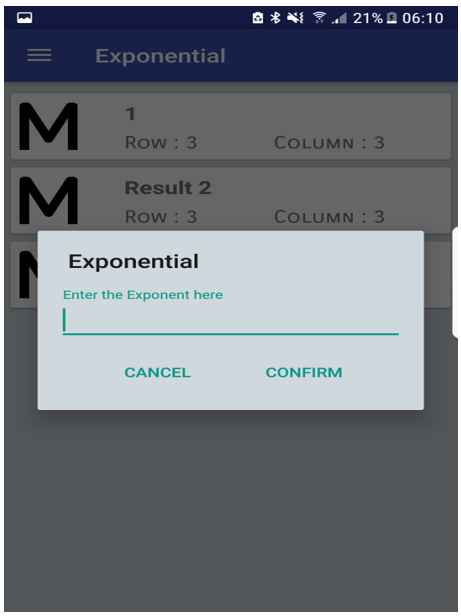
6.2 operations

On the top-left corner a drawer is present, clicking which will open a slide menu on left side,which contains all the operation user can perform on matrices

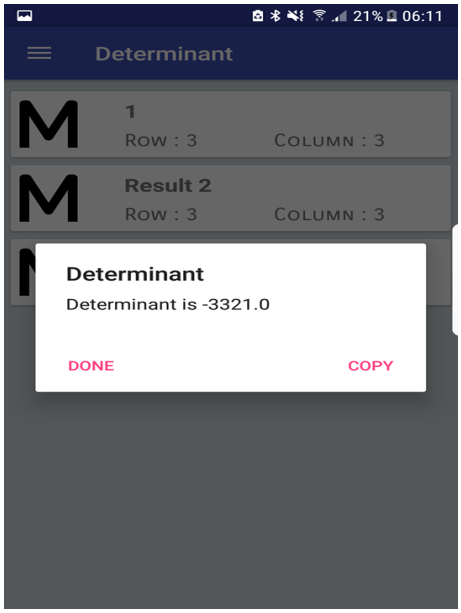
1. **Addition** clicking addition will open a page showing all variables(stored matrices).
   - clicking on any variable will add it to the queue of the addition
   - clicking REMOVE FROM QUEUE button on bottom-left corner will remove the last element from the queue
   - clicking PROCEED button on bottom-right corner will take user to the page with answer of the all queue operation
   - on answer page clicking SAVE will save the copy of variable on home matrix page
2. **Subtraction** clicking addition will open a page showing all variables(stored matrices).
   - clicking on any variable will add it to the queue of the Subtraction
   - clicking REMOVE FROM QUEUE button on bottom-left corner will remove the last element from the queue
   - clicking PROCEED button on bottom-right corner will take user to the page with answer of the all queue operation
   - on answer page clicking SAVE will save the copy of variable on home matrix page
3. **Multiplication** clicking multiplication will open a page showing all variables(stored matrices).
   - clicking on any variable will add it to the queue of the multiplication
   - clicking REMOVE FROM QUEUE button on bottom-left corner will remove the last element from the queue
   - clicking PROCEED button on bottom-right corner will take user to the page with answer of the all queue operation
   - on answer page clicking SAVE will save the copy of variable on home matrix page



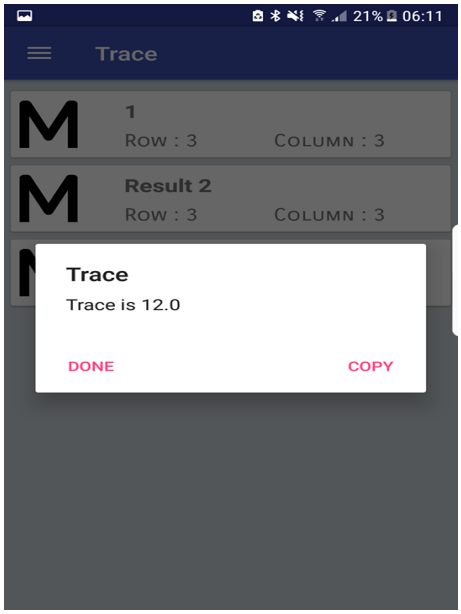
4. **Transpose** clicking transpose will open a page showing all variables(stored matrices).
   - clicking on any variable will take user to the page with transpose of the matrix
   - on answer page clicking SAVE will save the copy of variable on home matrix page
5. **Exponential** clicking Exponential will open a page showing all variables(stored matrices).
   - clicking on any variable will open a small dialog box,asking for exponent as input from user.
   - giving any integer as input and clicking CONFIRM will go to the answer page showing matrix to the power input integer.
   - on answer page clicking SAVE will save the copy of variable on home matrix page



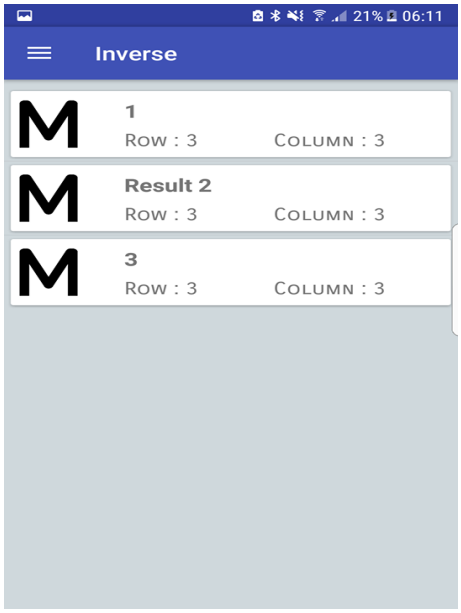
6. **Determinant** clicking Determinant will open a page showing all variables(stored matrices).
   - clicking on any variable will show a pop-up containing determinant of the variable.
   - clicking copy button will copy the value of determinant in clipboard



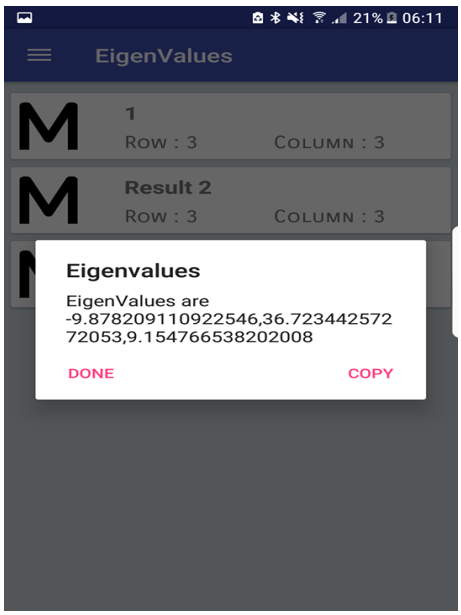
7. **Trace** clicking Trace will open a page showing all variables(stored matrices).
    - clicking on any variable will show a pop-up containing Trace of the variable.
    - clicking copy button will copy the value of determinant in clipboard



8. **Inverse** clicking Inverse will open a page showing all variables(stored matrices).
    - clicking on any variable will take user to the page with Inverse of the matrix
    - on answer page clicking SAVE will save the copy of variable on home matrix page



9. **Adjoint** clicking Adjoint will open a page showing all variables(stored matrices).
   - clicking on any variable will take user to the page with Adjoint of the matrix
   - on answer page clicking SAVE will save the copy of variable on home matrix page
10. **Eigen values** clicking Eigen values will open a page showing all variables(stored matrices).
    - clicking on any variable will show a pop-up containing eigen values of the variable.
    - clicking copy button will copy the value of eigen values in clipboard



11. **Eigen vector** clicking Eigen vector will open a page showing all variables(stored matrices).
    - clicking on any variable will take user to the page with Eigen vector of the matrix
    - on answer page clicking SAVE will save the copy of variable on home matrix page