**Software Engineering Lab**

**Session 2011-12**

**SE LAB Assignment** 3

**Submission Due:** 24th May, 11PM

**Group No:** 04

Reg. No. 2011331034

Reg. No. 2011331051

**Assignment:** Use Case

**Project Name: OMR Sheet Processing**

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| --- | --- | --- | --- |
| USE CASE ID: | UC 1.1.2 | | |
| USE CASE NAME: | Prepare Skeleton | | |
| CREATED BY: | Rumman Mahmud | LAST UPDATED BY: | Enamul Hassan |
| DATE CREATED: | 24/05/15 | LAST RIVISION DATE: | 24/05/15 |
| ACTORS: | PRIMARY ACTOR: User SEONDARY ACTOR: System | | |
| DESCRIPTION: | Skeleton of an exam paper provides the title field’s number of rows, number of columns and relative coordinate of the center of circles. To evaluate all exam paper we can find the title field’s info for every exam paper with help of the skeleton of a standard exam paper. | | |
| PRECONDITION: | 1. User should choose the option Processing Skeleton from the very first window. 2. Title File Should be Formatted. | | |
| POSTCONDITION: | 1. User should use the Skeleton file while evaluating exam paper. | | |
| NORMAL FLOW: | 1. User enters the threshold value for taking a pixel as black in threshold text field. 2. User loads a standard image of an exam paper using UC 3.1.2 (Load image). 3. User chooses two corner points of a rectangle in which the standard filled circle could fit. User requested to choose the smallest rectangle if possible. 4. User browses the title file (.txt text file) using UC 3.2.2 (File Browse) and clicks on submit button for preparing title fields. 5. User enters a file name to save skeleton and browse a folder where it should be saved using UC 3.2.2 (File Browse). 6. System shows the running title on running title text field. 7. User checks the running title is need to be processed or not. 8. User selects the number of rows and number columns. 9. User has to click the center point of every circle of first column starting from upper-left to lower-left and then set this coordinates by clicking “Set Columns” button. 10. User has to click the center point of every circle of first row starting from upper-left to upper-right and then set this coordinates by clicking Set Rows. 11. User clicks “Do this Section” button to finish this title field. 12. Use case turns back to 6. 13. User clicks finish button when the running title is “<End Title>”. 14. User clicks the Back or Exit button. | | |
| ALTERNATIVE FLOW: | 5a. At step 5 of normal flow, we can save the skeleton file any time between steps 5 to 12.  7a. At step 7 of normal flow, if the title field doesn’t need to be processed then:   1. User clicks the “Skip This Title” button. 2. Use case turns back to 6.   9a. At step 9 of normal flow, we can process row first instead of column. | | |
| EXCEPTION: | 4a. In step 4 of the normal flow, if system founds the extension other than ‘.txt’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a txt text file. Please, select a valid txt file and try again” 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case turns back to step 4.   6a. At step 6 of normal flow, if the running title is “<End Title>” and User selects or clicks any button except “Finish” button then it would do the following:   1. System prompts an error message, “No title left”. 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case goes to step 13. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE), UC 3.1.2 (LOAD IMAGE) | | |
| FREQUENCY OF USE: | This use case used only preparing skeleton. User would work on the image file only. | | |
| SPECIAL REQUIREMENT: | The title file should be in ‘.txt’ format. | | |
| ASSUMPTION : | All exam papers are identical. | | |
| NOTES & ISSUES: | * This use case is used to prepare the skeleton of an exam paper only. * Special Terms: * The two corner points of a rectangle in which the standard filled circle fit should choose carefully. Try to take the smallest possible rectangle. * Choose the center of the circle carefully. Try to click as close to the center as possible. Zoom the image if need. | | |

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| USE CASE ID: | UC 1.2.2 | | |
| USE CASE NAME: | Deskew Single Image. | | |
| CREATED BY: | Rumman Mahmud | LAST UPDATED BY: | Enamul Hassan |
| DATE CREATED: | 24/05/15 | LAST RIVISION DATE: | 24/05/15 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This use case is used to align the image correctly if needed. | | |
| PRECONDITION: | 1. User should choose the Deskew option from the very first window. | | |
| POSTCONDITION: | 1. User should check all images is correctly aligned or not. | | |
| NORMAL FLOW: | 1. User loads an exam paper image using UC 3.1.2 (Load Image). 2. User clicks on process button. 3. User clicks on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: |  | | |
| INCLUDES: | UC 3.1.2 (LOAD IMAGE) | | |
| FREQUENCY OF USE: | This use case is used to align the image correctly. User loads the image file only. | | |
| SPECIAL REQUIREMENT: |  | | |
| ASSUMPTION : |  | | |
| NOTES & ISSUES: | * This use case is used to detect and correct the skewness of an exam paper. | | |

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| USE CASE ID: | UC 1.3.2 | | |
| USE CASE NAME: | Deskew Batch Images. | | |
| CREATED BY: | Rumman Mahmud | LAST UPDATED BY: | Enamul Hassan |
| DATE CREATED: | 24/05/15 | LAST RIVISION DATE: | 24/05/15 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This use case is used to align the images correctly if needed. | | |
| PRECONDITION: | 1. User should choose the Deskew option from the very first window. | | |
| POSTCONDITION: | 1. User should check the image is correctly aligned or not. | | |
| NORMAL FLOW: | 1. User browses a folder of exam paper images using UC 3.2.2 (File Browse). 2. User clicks on process button. 3. User clicks on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: |  | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE) | | |
| FREQUENCY OF USE: | This use case is used to align the image correctly. User Browses the exam paper images folder only. | | |
| SPECIAL REQUIREMENT: |  | | |
| ASSUMPTION : |  | | |
| NOTES & ISSUES: | * This use case is used to detect and correct the skewness of an exam paper. | | |

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| USE CASE ID: | UC 1.4.2 | | |
| USE CASE NAME: | Evaluate Single Exam Paper | | |
| CREATED BY: | Rumman Mahmud | LAST UPDATED BY: | Enamul Hassan |
| DATE CREATED: | 24/05/15 | LAST RIVISION DATE: | 24/05/15 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This use case describes the procedure of evaluating a single exam paper. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. Skeleton File. 2. jPanel to show the image 3. text field to show the image file path 4. browse button which prompts a jFileChooser when clicked. 5. a co-cordinates table where the pixel’s co-ordinates would be added when clicked on the image. 6. User should choose the option corresponding to Process Single Exam Paper from the very first window. | | |
| POSTCONDITION: | 1. User should check the output file and check whether ther errror is tolerable or not. If tolerable, then he could do bactch process. Otherwise do this usecase with different parameters. | | |
| NORMAL FLOW: | 1. User browses the skeleton file using UC 3.2.2 (File Browse). 2. User enters a threshold percentage between 1 and 100. 3. User loads an exam paper image using UC 3.1.2 (Load Image). 4. User selects an output folder and a name to save the output of an exam paper. 5. User clicks on the first title’s center point of the upper-left circle. 6. User clicks on process button. 7. User clicks on Back or Exit button. | | |
| ALTERNATIVE FLOW: | 4a. At step 4 of normal flow, we can save the exam paper output file any time between steps 4 to 6. | | |
| EXCEPTION: | 1a. At step 1 of normal flow, if system founds the extension other than ‘.txt’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a txt text file. Please, select a valid txt file and try again” 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case turns back to step 1.   2a. At step 2 of normal flow, if user enters a percentage which isn’t between 1 and 100 it would do the following:   1. System prompts an error message, “The percentage you enter isn’t between 1 and 100. Please enter a valid percentage”. 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case turns back to step 2. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE), UC 3.1.2 (LOAD IMAGE) | | |
| FREQUENCY OF USE: | This use case is used to evaluate a single exam paper. User would work on the exam paper image file only. | | |
| SPECIAL REQUIREMENT: | The skeleton file should be in ‘.txt’ format. | | |
| ASSUMPTION : | * User would choose the origin carefully. * Skeleton File is configured with this software. * The image has no error relating to skewness. | | |
| NOTES & ISSUES: | * This use case is used to evaluate the output of a single exam paper only. * Special Terms: * Choose the threshold percentage carefully. * Choose the center of the circle carefully. Try to click as close to the center as possible. Zoom the image if need. | | |

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| USE CASE ID: | UC 1.5.2 | | |
| USE CASE NAME: | Evaluate Batch Exam Papers | | |
| CREATED BY: | Rumman Mahmud | LAST UPDATED BY: | Enamul Hassan |
| DATE CREATED: | 24/05/15 | LAST RIVISION DATE: | 24/05/15 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This use case describes the procedure of evaluating batch exam papers. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. Skeleton File. 2. jPanel to show the image 3. text field to show the image file path 4. browse button which prompts a jFileChooser when clicked. 5. a co-cordinates table where the pixel’s co-ordinates would be added when clicked on the image. 6. User should choose the option corresponding to Batch Process the Exam Papers from the very first window. | | |
| POSTCONDITION: | 1. User would identify the defected exam papers. | | |
| NORMAL FLOW: | 1. User browses the skeleton file using UC 3.2.2 (File Browse). 2. User enters a threshold percentage between 1 and 100. 3. User browses a folder of exam paper images using UC 3.2.2 (File Browse). 4. System prompts the current exam paper image. 5. User selects an output folder and a name to save the output of current exam paper. 6. User clicks on the first title’s center point of the upper-left circle. 7. User clicks on process button. 8. If any exam paper left then Use case turns back to step 4. 9. User clicks on Back or Exit button. | | |
| ALTERNATIVE FLOW: | 5a. At step 5 of normal flow, we can save the exam paper output file any time between steps 5 to 8. | | |
| EXCEPTION: | 1a. At step 1 of normal flow, if system founds the extension other than ‘.txt’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a txt text file. Please, select a valid txt file and try again” 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case turns back to step 1.   2a. At step 2 of normal flow, if user enters a percentage which isn’t between 1 and 100 it would do the following:   1. System prompts an error message, “The percentage you enter isn’t between 1 and 100. Please enter a valid percentage”. 2. User sees the error message and clicks “OK” button. 3. System closes the error message. 4. Use case turns back to step 2. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE) | | |
| FREQUENCY OF USE: | This use case is used to evaluate batch exam papers. User would work on the exam paper image files only. | | |
| SPECIAL REQUIREMENT: | The skeleton file should be in ‘.txt’ format. | | |
| ASSUMPTION : | * jFileChooser would be configured to FILES\_ONLY mode by default. * User would choose the origins carefully. * Skeleton File is configured with this software. * The images have no error relating to skewness. | | |
| NOTES & ISSUES: | * This use case is used to evaluate the output of a single exam paper only. * Special Terms: * Choose the threshold percentage carefully. * Choose the center of the circle carefully. Try to click as close to the center as possible. Zoom the image if need. | | |

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| USE CASE ID: | UC 2.1.2 | | |
| USE CASE NAME: | Process Skeleton | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: System  SECONDARY ACTOR: User | | |
| DESCRIPTION: | This will describe the process how the system will act and react while the user preparing the skeleton of an Ideal OMR sheet. | | |
| PRECONDITION: | 1. User should choose the option Processing Skeleton from the very first window. 2. Title File Should be Formatted. | | |
| POSTCONDITION: | 1. User should use the Skeleton file while evaluating exam paper. | | |
| NORMAL FLOW: | 1. User enters the ‘Threshold value’ for taking a pixel black between 0 and 255. 2. User would load the image file of ideal OMR sheet to be processed using use case UC 3.1.2 (LOAD IMAGE) and system would assist. 3. User click on two points to complete the process ‘process standard circle’. 4. System adds those two points in the co-ordinate table. 5. User clicks on ‘Submit’ button. 6. System handle ‘process standard circle’ using the steps 7 to 9. 7. System takes the minimum and maximum value for both x and y co-ordinate. 8. System loops through every point in the rectangle and count the the number of pixels which are have the average RGB values equals or under the ‘Threshold value’. Rectangle is found by all the co-ordinate values found in step 7 step. 9. System loops through the rows and columns and counts the consecutive black pixel and determines the radius r by dividing this value by two. 10. System shows the r and the count of the filled pixel in the corresponding field. 11. User chooses the tittle file using UC 3.2.2 (FILE BROWSE) and system would assist. 12. User enters a name for the skeleton file. 13. User chooses a folder for storing the skeleton file using UC 3.2.2 (FILE BROWSE) and system would assist. 14. System combines the upper two and creates a file in the corresponding path. 15. User clicks on ‘Submit’ button. 16. System would retrieve the first line from the tittle file and set it as ‘Running title’. It would be shown in the corresponding field. 17. User clicks ‘Finish’. Jump to the step 32. 18. User would select the number of columns say n and the number of rows say m for this title. 19. User clicks on the centers of the circles of the first row from left to right. 20. User clicks on ‘Set Columns’ button. 21. System stores the co-ordinates of the columns from the co-ordinate table. 22. User clicks on the centers of the circles of the first columns from top to bottom. 23. User clicks on ‘Set Rows’ button. 24. System stores the co-ordinates of the rows from the co-ordinate table. 25. User clicks the ‘Do this section’ button. 26. System sets the origin taking the first value from both stored values if not set. 27. System creates two n x m co-ordinate matrices, one for x co-ordinate and the other for y co-ordinate. 28. System copys the stored values for columns to the x co-ordinate table’s first row and the stored values for rows to the y co-ordinate table’s first column. 29. System copys the first row to the all other rows of the x co-ordinate and the first column to the all other columns of the y co-ordinate 30. System deducts corresponding origin values from all matrix component. 31. System writes it to the skeleton file. one line for title, one line for number of columns and number of rows and then n lines with 2m values of the matrices’ corresponding row’s alternating values from x co-ordinate table and y co-ordinate table. 32. System sets the next title to the ‘Running title’ if any title exists. Otherwise set ‘<End Title>’ and sets the ‘Last processed title’ to the current title. Go to the step 14. 33. System closes the file. 34. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: | 10a. In step 10 of the normal flow, if user do not satisfy with the showed value, then he loops through the upper steps except 2. When a satisfactory result comes, users resumes on step 11. | | |
| EXCEPTION: | 2a. In step 2 of the normal flow, if system found the extension other than ‘.jpg’ then it would do the following:   * 1. System prompts an error message, “The file you have selected does not refer to a JPG image file. Please, select a valid JPG file and try again”   2. User sees the error message and clicks “OK” button.   3. System vanishes the error message.   11a. In step 11 of the normal flow, if user clicks on cancel button, then:   * 1. System has to vanish the jFileChooser and bring all things to the initial state.   2. Use case turns back to step 1.   16a. In step 11 of the normal flow, user can click skip button, then the system would set the current title to the last processed title and take the next title from the title file. Then resumes on step 16.  20a. In step 20 of the normal flow, If the number of items in co-ordinate table does not match with the column count then system prompts an error message and resumes on step 19.  23a. In step 23 of the normal flow, If the number of items in co-ordinate table does not match with the row count then system prompts an error message and resumes on step 22. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE), UC 3.1.2 (LOAD IMAGE) | | |
| FREQUENCY OF USE: | This use case would be used only once for a session. | | |
| SPECIAL REQUIREMENT: | The image file should be in ‘.jpg’ format. | | |
| ASSUMPTION : | * jFileChooser would be configured to FILES\_ONLY mode by default. * The image has no error relating to skewness. | | |
| NOTES & ISSUES: | * Special Terms:   + ‘process standard circle’ : Selecting two corner points of a diagonal of a rectangle in which the standard circle easily fits.   + co-ordinate table: A table in the user interface where the co-ordinates of pixels are shown in X, Y columns. | | |

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| USE CASE ID: | UC 2.2.2 | | |
| USE CASE NAME: | Single File Skewness Detection and Correction | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: System  SECONDARY ACTOR: User | | |
| DESCRIPTION: | This will describe the process how the system will act and react while the user checking and correcting the skewness of a single OMR sheet. | | |
| PRECONDITION: |  | | |
| POSTCONDITION: |  | | |
| NORMAL FLOW: | 1. User clicks on browse button to select the image file using UC 3.1.2 (Load Image). 2. System reads the image file and applies Hough Transformation to detect the skew angle. 3. System applies the angle rotation clockwise or anti-clockwise based on skew angle. 4. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: |  | | |
| INCLUDES: |  | | |
| FREQUENCY OF USE: |  | | |
| SPECIAL REQUIREMENT: |  | | |
| ASSUMPTION : |  | | |
| NOTES & ISSUES: |  | | |

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| USE CASE ID: | UC 2.3.2 | | |
| USE CASE NAME: | Batch Skewness Correcting | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: System  SECONDARY ACTOR: User | | |
| DESCRIPTION: | This will describe the process how the system will act and react while the user checking and correcting the skewness of OMR sheets in batch. | | |
| PRECONDITION: |  | | |
| POSTCONDITION: |  | | |
| NORMAL FLOW: | 1. User clicks on browse button to select the image folder using UC 3.2.2 (File Browse). 2. System reads current the image file and applies Hough Transformation to detect the skew angle. 3. System applies the angle rotation clockwise or anti-clockwise based on skew angle. 4. If any image file left then Use case turns back to step 2. 5. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: |  | | |
| INCLUDES: |  | | |
| FREQUENCY OF USE: |  | | |
| SPECIAL REQUIREMENT: |  | | |
| ASSUMPTION : |  | | |
| NOTES & ISSUES: |  | | |

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| USE CASE ID: | UC 2.4.2 | | |
| USE CASE NAME: | Process Single Exam Paper | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: System  SECONDARY ACTOR: User | | |
| DESCRIPTION: | This will describe the process how the system will act and react while the user evaluating a single exam paper(OMR sheets). This would be used mainly for testing the evaluation of an exam paper. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. Skeleton File. 2. jPanel to show the image 3. text field to show the image file path 4. browse button which prompts a jFileChooser when clicked. 5. a co-cordinates table where the pixel’s co-ordinates would be added when clicked on the image. 6. User should choose the option corresponding to Process Single Exam Paper from the very first window. | | |
| POSTCONDITION: | 1. User should check the output file and check whether ther errror is tolerable or not. If tolerable, then he could do bactch process. Otherwise do this usecase with different parameters. | | |
| NORMAL FLOW: | 1. User would choose the skeleton file using UC 3.2.2 (FILE BROWSE) and system would assist. 2. User would enter a threshold value for taking a circle as filled in the ‘Threshold Percentage’ field between 0 and 100. 3. User would enter a threshold value for taking a pixel as black in in the ‘Threshold Value’ field between 0 and 255. 4. User would load the image file of the exam paper to be processed using use case UC 3.1.2 (LOAD IMAGE) and system would assist. 5. User would click on the image on a point should be considered as the origin. 6. System would make available the point in the co-ordinate table. 7. User would choose a directory using UC 3.2.2 (FILE BROWSE) for creating output file and system would assist. 8. User would provide a desired name in the file name field. 9. User would click on ‘Process’ button. 10. System would create an output file named by the user in the user desired directory and then populate output file using steps below. 11. System takes the radius and the number of filled pixel from the Skeleton file as input. 12. System takes the origin from co-ordinate table and sotre in two variables say x0, y0 where x0 is the value of x co-ordinate and y0 is the value of y co-ordinate. 13. Sytem takes a title name from the Skeleton file as input. 14. System takes the number of columns say n and the number of rows say m from the Skeleton file as input. 15. System takes two n x m matrices in the memory. One for keeping x co-ordinate and the other is for keeping y co-ordinate. 16. System would take values from the skeleton file as input and fill these matrices. 17. System would take value one by one and first value would be placed in the first row of first column of the x co-ordinate matrix. Second value would be placed in the first row of first column of the y co-ordinate matrix. Third value would be placed in the first row of second column of the x co-ordinate matrix. Fourth value would be placed in the first row of second column of the y co-ordinate matrix. In this way all the matrix would be filled. 18. While filling the matrix, Sytem would add corresponding origin value (x0 or y0) to it. 19. System would process now columnwise from left to right. 20. System would take a co-cordinate and get four co-ordinate value from that co-ordinate by adding and subtracting the radius r from x and y. These four co-ordinate would make a square. 21. System would count the number of pixels which are in radius distance from the co-ordinate (x,y) and their RGB average is under ‘Threshold value’, say it is cnt. 22. System would calculate the ‘Filled percentage’ by multiplying the value of dividing the cnt by the filled pixel got from skeleton file by 100. 23. System would take a circle consider the condition: If ‘Filled percentage’ is greater than or equal to ‘Threshold Percentage’, then the circle would be considered as filled, otherwise not. 24. System would get a value from one column. 25. System would write the value on the output file for every column. 26. System would do: If Skeleton file has more title, then go to step 13. 27. System closes the file writing. 28. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: | Step 1 to 9 are indepent except 5,6. step 6 would be done just after doing 5 and step 5 would be done just after doing step 4. Without it, steps can shuffle their order. | | |
| EXCEPTION: | 1a. In step 1 of the normal flow, if system found the extension other than ‘.txt’ then it would do the following:   * 1. System prompts an error message, “The file you have selected does not refer to a text file. Please, select a valid text file and try again”   2. User sees the error message and clicks “OK” button.   3. System vanishes the error message.   4. Use case resumes on step 1.   4a. In step 4 of the normal flow, if system found the extension other than ‘.jpg’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a JPG image file. Please, select a valid JPG file and try again” 2. User sees the error message and clicks “OK” button. 3. System vanishes the error message. 4. Use case resumes on step 4.   9a. In step 9 of the normal flow, if system found ‘Threshold Percentage’ other than between 0 and 100, then it would prompt an error message and go to step 1.  9b. In step 9 of the normal flow, if system found ‘Threshold Value’ other than between 0 and 100, then it would prompt an error message and go to step 1.  24a. In step 24 of the normal flow, if system found more than one value for a column, then it would write a ‘?’ instead in step 25 and Use case resumes on step 26. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE), UC 3.1.2 (LOAD IMAGE) | | |
| FREQUENCY OF USE: | This use case would be used while evaluating exam paper for testing purpose. User would work on the batch evaluating mainly. | | |
| SPECIAL REQUIREMENT: | The image file should be in ‘.jpg’ format. | | |
| ASSUMPTION : | * jFileChooser would be configured to FILES\_ONLY mode by default. * User would choose the origin carefully. * Skeleton File is configured with this software. * The image has no error relating to skewness. | | |
| NOTES & ISSUES: | * Special terms:   + Threshold Percentage : Minimum percentange to take a cirlce as filled. This ‘percentage’ came from the number of filled pixel in a circle compared to the number of filled pixel in an ideal circle.   + Threshold Value: The maximum allowed average RGB value of a pixel.   + Skeleton file: A text file where the title, columns and rows of the corresponding tittle and the relative co-ordinate of every circle under a tittle is derscribed in a manner. | | |

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| USE CASE ID: | UC 2.5.2 | | |
| USE CASE NAME: | Batch Process the Exam Papers | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: System  SECONDARY ACTOR: User | | |
| DESCRIPTION: | This will describe the process how the system will act and react while the user evaluating exam papers (OMR sheets) in batch. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. Skeleton File. 2. jPanel to show the image 3. text field to show the image file path 4. browse button which prompts a jFileChooser when clicked. 5. a co-cordinates table where the pixel’s co-ordinates would be added when clicked on the image. 6. User should choose the option corresponding to Batch Process the Exam Papers from the very first window. | | |
| POSTCONDITION: | 1. User would identify the defected exam papers. | | |
| NORMAL FLOW: | 1. User would choose the skeleton file using UC 3.2.2 (FILE BROWSE) and system would assist. 2. User would enter a threshold value for taking a circle as filled in the ‘Threshold Percentage’ field between 0 and 100. 3. User would enter a threshold value for taking a pixel as black in in the ‘Threshold Value’ field between 0 and 255. 4. User would choose a directory where image file of the exam paper are in using UC 3.2.2 (FILE BROWSE) and system would assist. 5. User would click on ‘Process’ button. 6. System would list all the image files (only JPG) of that directory. 7. System would process the image files one by one using the steps 8 to 31. 8. Systen loads the image file of the exam paper to be processed in the panel. 9. User would click on the image on a point should be considered as the origin. 10. System would make available the point in the co-ordinate table. 11. User would choose a directory using UC 3.2.2 (FILE BROWSE) for creating output file and system would assist. 12. User would provide a desired name in the file name field. 13. User would click on ‘OK’ button. 14. System would create an output file named by the user in the user desired directory and then populate output file using steps below. 15. System takes the radius and the number of filled pixel from the Skeleton file as input. 16. System takes the origin from co-ordinate table and sotre in two variables say x0, y0 where x0 is the value of x co-ordinate and y0 is the value of y co-ordinate. 17. Sytem takes a title name from the Skeleton file as input. 18. System takes the number of columns say n and the number of rows say m from the Skeleton file as input. 19. System takes two n x m matrices in the memory. One for keeping x co-ordinate and the other is for keeping y co-ordinate. 20. System would take values from the skeleton file as input and fill these matrices. 21. System would take value one by one and first value would be placed in the first row of first column of the x co-ordinate matrix. Second value would be placed in the first row of first column of the y co-ordinate matrix. Third value would be placed in the first row of second column of the x co-ordinate matrix. Fourth value would be placed in the first row of second column of the y co-ordinate matrix. In this way all the matrix would be filled. 22. While filling the matrix, Sytem would add corresponding origin value (x0 or y0) to it. 23. System would process now columnwise from left to right. 24. System would take a co-cordinate and get four co-ordinate value from that co-ordinate by adding and subtracting the radius r from x and y. These four co-ordinate would make a square. 25. System would count the number of pixels which are in radius distance from the co-ordinate (x,y) and their RGB average is under ‘Threshold value’, say it is cnt. 26. System would calculate the ‘Filled percentage’ by multiplying the value of dividing the cnt by the filled pixel got from skeleton file by 100. 27. System would take a circle consider the condition: If ‘Filled percentage’ is greater than or equal to ‘Threshold Percentage’, then the circle would be considered as filled, otherwise not. 28. System would get a value from one column. 29. System would write the value on the output file for every column. 30. System would do: If Skeleton file has more title, then go to step 13. 31. System would do: If image file list has unprocessed file, select the next file then go to step 8. 32. System closes the file writing. 33. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: | Step 1 to 4 are indepent except 5,6. Steps can shuffle their order. | | |
| EXCEPTION: | 1a. In step 1 of the normal flow, if system found the extension other than ‘.txt’ then it would do the following:   * 1. System prompts an error message, “The file you have selected does not refer to a text file. Please, select a valid text file and try again”   2. User sees the error message and clicks “OK” button.   3. System vanishes the error message.   4. Use case resumes on step 1.   4a. In step 4 of the normal flow, if system found the extension other than ‘.jpg’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a JPG image file. Please, select a valid JPG file and try again” 2. User sees the error message and clicks “OK” button. 3. System vanishes the error message. 4. Use case resumes on step 4.   5a. In step 5 of the normal flow, if system found ‘Threshold Percentage’ other than between 0 and 100, then it would prompt an error message and go to step 1.  5b. In step 5 of the normal flow, if system found ‘Threshold Value’ other than between 0 and 100, then it would prompt an error message and go to step 1.  28a. In step 28 of the normal flow, if system found more than one value for a column, then it would write a ‘?’ instead in step 28 and Use case resumes on step 29. | | |
| INCLUDES: | UC 3.2.2 (FILE BROWSE) | | |
| FREQUENCY OF USE: | This use case would be used mostly in the software. The work load on it is most. User would would get the outcome depending on this use case mainly. | | |
| SPECIAL REQUIREMENT: | The image file should be in ‘.jpg’ format. | | |
| ASSUMPTION : | * jFileChooser would be configured to FILES\_ONLY mode by default. * User would choose the origins carefully. * Skeleton File is configured with this software. * The images have no error relating to skewness. | | |
| NOTES & ISSUES: | * Special terms:   + Threshold Percentage : Minimum percentange to take a cirlce as filled. This ‘percentage’ came from the number of filled pixel in a circle compared to the number of filled pixel in an ideal circle.   + Threshold Value: The maximum allowed average RGB value of a pixel.   + Skeleton file: A text file where the title, columns and rows of the corresponding tittle and the relative co-ordinate of every circle under a tittle is derscribed in a manner. | | |

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| --- | --- | --- | --- |
| USE CASE ID: | UC 3.1.2 | | |
| USE CASE NAME: | Loading Image | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This will take a path from the user desired field and load the image on the image panel. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. jPanel to show the image 2. text field to show the image file path 3. browse button which prompts a jFileChooser when clicked. 4. a co-cordinates table where the pixel’s co-ordinates would be added when clicked on the image. | | |
| POSTCONDITION: | 1. User should process the co-ordinates from the co-ordinate table. | | |
| NORMAL FLOW: | 1. User would choose the image file using UC 3.2.2 (FILE BROWSING) and system would assist. 2. User clicks ‘Submit’ button to load the picture on the image panel. 3. System takes the FILE PATH from the corresponding text field in the User Interface. 4. System validates the extension of the image file. 5. System loads the image and shows to the corresponding image panel. 6. Syetem sets an action listener to the image which takes the co-ordinates of the clicked pixel and then pushes it to the co-ordinate table when user clicks on any pixel on the image. 7. User clicks some points and gets them in co-ordinate table and proceed further. 8. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: | 4a. In step 4 of the normal flow, if system found the extension other than ‘.jpg’ then it would do the following:   1. System prompts an error message, “The file you have selected does not refer to a JPG image file. Please, select a valid JPG file and try again” 2. User sees the error message and clicks “OK” button. 3. System vanishes the error message. 4. Use case turns back to step 1. | | |
| INCLUDES: | UC 3.2.2 (File Browsing) | | |
| FREQUENCY OF USE: | This use case would be used in all sections. User would work on the loaded image mainly. | | |
| SPECIAL REQUIREMENT: | The image file should be in ‘.jpg’ format. | | |
| ASSUMPTION : | jFileChooser would be configured to FILES\_ONLY mode in File Browsing. | | |
| NOTES & ISSUES: | * This use case would be used in several use case where the image loading is necessary. * special terms:   + jPanel : An area in the user interface where the image and other component could be included.   + co-ordinate table: A table in the user interface where the co-ordinates of pixels are shown in X, Y columns. | | |

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| USE CASE ID: | UC 3.2.2 | | |
| USE CASE NAME: | File Browsing | | |
| CREATED BY: | Enamul Hassan | LAST UPDATED BY: | Rumman Mahmud |
| DATE CREATED: | 24/05/2015 | LAST RIVISION DATE: | 24/05/2015 |
| ACTORS: | PRIMARY ACTOR: User  SECONDARY ACTOR: System | | |
| DESCRIPTION: | This will give the opportunity to browse files in a new window and to select the desired file from them and load the file path to the corresponding text field. | | |
| PRECONDITION: | The program should be in a position where the User Interface contains:   1. text field to show the selected file path 2. browse button which prompts a jFileChooser when clicked. | | |
| POSTCONDITION: | 1. User should process the file taking from the text field. | | |
| NORMAL FLOW: | 1. User clicks on browse button to select the file. 2. System prompts a jFileChooser to browse and choose a file. 3. User selects the file and clicks ‘Open’ button in the jFileChooser. 4. System takes the file path from the jFileChooser and set it to the FILE PATH text field. 5. User proceed further. 6. System disposes the User Interface form when clicked on Back or Exit button. | | |
| ALTERNATIVE FLOW: |  | | |
| EXCEPTION: | 3a. In step 3 of the normal flow, if user clicks on cancel button, then:   * 1. System has to vanish the jFileChooser and bring all things to the initial state.   2. Use case resume on step 6. | | |
| INCLUDES: |  | | |
| FREQUENCY OF USE: | This use case would be used in all sections. User would use it while a file is needed to be prcessed taking from user. | | |
| SPECIAL REQUIREMENT: |  | | |
| ASSUMPTION : |  | | |
| NOTES & ISSUES: | * This use case would be used in several use case where a file loading is necessary. * special terms:   + jFileChooser: A window which gives the opportunity to browse the directiries and folders and to choose the desired file or folder. It can be configured manually. In some case, it is assumed that the jFileChooser would only allow to choose the files only. At that case, it would be mentioned in the assumption field. | | |