CS5063 Assessment 1: Test an AI System

Preface. System Description.

For this assessment I am going to test free online Optic Character Recognition system (OCR), available at: https://ocr.space/ This is the free OCR available online, optionally on the web site available Premium paid version for business use which I am not going to buy and test. The web site also provides Free OCR API. The Online OCR functionality steps provided in Figure1.

Figure 1 OCR Steps

Interface of the online OCR is simple and easy to learn and understand. For the first step (Figure 1) users have two options "Upload image or PDF file (.png,.jpg,.webp or .PDF)" or "Paste url to source file (.png,.jpg,.webp or .PDF)". The option to choose the language from 24 languages is available from dropdown menu for the users.

The options "Detect orientation and auto-rotate image if needed", "Do receipt scanning and/or table recognition", and "Auto-enlarge content (recommended for low DPI)" are available with the checkboxes. With the amount tests I need to do and the amount of time for the assessment I am not going to test these functionalities, and for my tests I will tick all 3 of these boxes expecting better performance from the Online OCR system. The help for these options is available through the links provided.

The "Create Searchable PDF" selector parameter is available to select from 3 options: "1. Just extract text and show overlay (fastest option)", "2. Create searchable PDF with *visible* text layer", "3. Create searchable PDF with *invisible* text layer". I tried all three options. The first option (fastest option) returns the result on the web page. The second option returns result on the web page and creates the pdf file with the text overlay shown. The third option returns the result on the web page and creates the pdf file without the text overlay shown. The pdf files for options 2 and 3 are available for download after the OCR process finished. The searchable PDF files with *visible* text layer for the test cases can be found in folder "Output img" provided in assessment submission.

The "Select OCR Engine to use:" selector parameter is available to select between OCR Engine1 and OCR Engine2. In this document appendix with test cases I am pointing which option is used for this selector.

OCR'ed Result window is positioned right from the input Image Preview window. The result can be represented in two formats text and json. The json format is provided to parse the text result into another API or program. I am going to concentrate my test cases on the text results, not on parsing them. This functionality can be tested additionally, but not in this assessment.

The rationale for choosing the test cases.

The main purpose for any test is to test the functionality and performance of the system. I will be entailing the test cases in case the result of the test case is unexpected or from the result appears that system can be challenged with more difficult test case. Otherwise I will try to test the basic functionalities first and then try more difficult and complex tests. Under the basic functionalities I mean the basic tests with different types of fonts, colours, tables, text positioning and orientation. All the original images used will be stored and submitted separately, images in the table are just to make the test case readable. I will provide the purpose and the conclusion for each test case in Appendix with test cases. And summarising conclusion on the tested system functionalities bellow. I am going to provide the overlayed image output in case where it is available from the system. The overlayed image originals can be found in the folder with input images.

The evaluation of the Online OCR system test results.

The system was black box tested with 53 different testcases (9 easy, 1 easy-hard, 20 hard and 23 challenging). The system can recognise printed text (with easy to read fonts), and able to recognise neat handwriting. The system tested with Russian language which is claimed as the one of the languages the system can work with, but performance of the system is poor with this language and only engine 1 can work with Russian. The output is available in plain text and pdf overlayed image format. The overlayed image very often is hard to read and have no use, but sometimes it helps to realise which character from output corresponds to character from input. I would suggest adding possibility for the user to choose the overlayed image format (pdf, png or jpg for example). Also, I would suggest adding possibility for the user to copy text from output window to the clipboard. The edge cases were tried with DPI reduction and different contrast rates between font and background. The input image DPI reduction had strong impact on the system output, as it was expected. The system can detect text orientation and recognise characters from this text, but if input image has blocks with different text orientation performance of the system is lower. The system is not good with recognising low contrast images (text and background colours are similar), as it was expected. The system is found sustainable with exceptional testing cases (online system). As the system has two engines the result from both engines provided for each test case. The engine 2 performed better with different orientation of the text and graphical (decorated) text. Input test files available from the "Test Case img" folder, the "Output img" folder contains overlayed images from the system. For some test cases the system has not been able to provide some overlayed images, which is mentioned in appendix. The appendix of this document has a detailed description of each test case.

Appendix (test cases).

Test case 1.

The purpose of the test, tested parameters	The purpose is to test the basic functionality of the OCR system and performance with normal conditions. Normal conditions mean the pdf file uploaded contains the plain text written with font Arial size 11px, the orientation of the text horizontal (normally used to read the text), the paper is white contrast to the black text with no shadows. Compare the results from both engines.
Expected output	The system will be able to recognise all characters from the input image, including punctuation markings and whitespaces.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	Text Arial 11: existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment; and yet I feel that I never was a greater artist than now.
OCR'ed output text, Engine1	Text Arial 11: existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment; and yet I feel that I never was a greater artist than now.
OCR'ed output text, Engine2	Text Arial 11: existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment; and yet I feel that I never was a greater artist than now.
Conclusion:	The OCR system was able to recognise all characters from input image file. The system can recognise upper case letters, lower case letters, numbers, and punctuation symbols ("." dot, "," coma, ";" semicolon, ":" colon, " " whitespace). The results from both engines are equivalent (the same).

Test case 2.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with marked text (underlined, different size, italic). Compare the results from both engines.
Expected output	The system will be able to recognise all characters from the input image, including punctuation markings and whitespaces.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	Heading 1, Heading 2, *Werther "Book title"*, *Intense emphasis* A wonderful serenity has taken possession of my entire soul, like these sweet mornings of **Bold: spring which I enjoy with my whole heart. I am alone, and feel the charm of** *Italic: existence in this spot, which was created for the bliss of souls like mine.* Underlined: I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil

OCR'ed output text, Engine1	Heading 1, Heading 2, Werther "Book title", Intense emphasis A wonderful serenity has taken possession of my entire soul, like these sweet mornings of Bold: spring which I enjoy with my whole heart. I am alone, and feel the charm of Italic: existence in this spot, which was created for the bliss of souls like mine. Underlined: I am so happy. mv dear friend, so absorbed in the exquisite sense of mere tranquil
OCR'ed output text, Engine2	Heading 1, Heading 2, Werther "Book title", Intense emphasis A wonderful serenity has taken possession of my entire soul, like these sweet mornings of Bold: spring whichI enjoy with my whole heart. I am alone, and feel the charm of Italic: existence in this spot, which was created for the bliss of souls like mine Underlined: I am so happy. my dear friend, so absorbed in the exquisite sense of mere tranguil
Conclusion, justification	The OCR system was able to recognise all characters from input image file. The system can recognise upper case letters, lower case letters, numbers, and punctuation symbols ("." dot, "," coma, ";" semicolon, ":" colon, "_" whitespace). Two mistakes in text generated by engine2 were found (whichI and tranguil). All markings were removed from output text, which could be an advantage for more difficult cases where lines and font varieties obstruct the characters. I will try to test this with more difficult image files in test cases below. The results from both engines are equivalent (the same).

Test case 3.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with tables. Compare the results from both engines.
Expected output	The system will be able to recognise all characters from the input image, including table lines.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	<table><tr><td>Name</td><td>Age</td><td>Country</td></tr><tr><td>Steve</td><td>31</td><td>Australia</td></tr><tr><td>Paul</td><td>45</td><td>Canada</td></tr><tr><td>Pamela</td><td>55</td><td>Brasil</td></tr><tr><td>Kasun</td><td>20</td><td>Sri Lanka</td></tr></table>
OCR'ed output text, Engine1	Name Age Country Steve 31 Australia Paul 45 Canada

	Pamela 55 Brasil Kasun 20 Sri Lanka
OCR'ed output text, Engine2	Name Age Country Steve 31 Australia Paul 45 Canada Pamela 55 Brasil Kasun 20 Sri Lanka
Conclusion, justification	The OCR system was able to recognise all characters from input image file. The system can recognise letters and words inside of the table. No mistakes in text were found. The table lines are removed from output text. We can see the white spaces between the columns. The white space between columns is big in output because in the input table first column aligned to the left, second column positioned to the center, and the last column aligned to the right. The results from both engines are equivalent.

Test case 4.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with tables. This test case is following to the test case 3, difference in purpose is to test the system behaviour with the output whitespace dependence on input table text alignment in a column. Compare the results from both engines.
Expected output	The system will be able to recognise all characters from the input image and will be able to see reasonable white spacing between columns.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	 | Name	Surname	Age		Country
---	---	---	---	---
Steve	Andersen	31		Australia
Paul	Verhoven	45		Canada
Pamela	Cunis	55		Brasil
Kasun	Matsaka	20		Sri Lanka	
OCR'ed output text, Engine1	Name Surname Age Country Steve Andersen 31 Australia paul Verhoven 45 Canada Pamela Cunis 55 Brasil Kasun Matsaka 20 Sri Lanka
OCR'ed output text, Engine2	Name Surname Age Country Steve Andersen 31 Australia Paul Verhoven 45 Canada Pamela Cunis| 55 Brasil Kasun Matsaka 20 Sri Lanka
Conclusion, justification	The OCR system was able to recognise all characters from input image file. The system can recognise letters and words inside of the table. Some issues in output text were found. The table lines are removed from output text, except for the Engine2 kept the line (symbol '|' displayed) after the Surname 'Cunis' in line 4 of the table. We can see the white spaces between the columns in Engine1 result

	clearer (except line 4 again) comparing to engine2. Note: some differences in text formatting after the copy-paste operation (whitespace related).

Test case 5.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system working with the files (exception test). For this test case I am uploading file into the system, then removing it from my computer hard drive, and then initiating the test.
Expected output	The system will not be able to process the file and give user corresponding exception message.
The difficulty of the test	Hard
OCR Engine used	Does not matter for this test, because we are testing how the system work with files.
Input file content	<table><tr><td>Name</td><td>Age</td><td>Country</td></tr><tr><td>Steve</td><td>31</td><td>Australia</td></tr><tr><td>Paul</td><td>45</td><td>Canada</td></tr><tr><td>Pamela</td><td>55</td><td>Brasil</td></tr><tr><td>Kasun</td><td>20</td><td>Sri Lanka</td></tr></table>
OCR system output	**Error when processing image.** undefined X
Conclusion, justification	The online OCR system does not upload and keep the file before processing it just saves the physical address or location of the file. Corresponding error message is given by the system. The image is undefined

Test case 6.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with easy and hard to read fonts.
Expected output	The system will be able to recognise all characters from the input image within the table.
The difficulty of the test	Easy-Hard
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	
OCR'ed output text, Engine1	Easy to read fonts Difficult to read fonts Calibri (Body) ALGERIAN Verdana Courier New Tahoma Sec#t Gill Sans MT Oli englisl)
OCR'ed output text, Engine2	Easy to read fonts Difficult to read fonts Calibri (Body) ALGERIAN Verdana Courier New Tahoma Erush Seript 7K7 Gill Sans MT Od English Text sMT
Conclusion, justification	The OCR system was able to recognise all characters from input image file in easy to read column. The system can recognise black characters on a blue background. Some issues in output text were found in difficult to read fonts column. The Brush Script MT font engine1 recognised 2-3 (2-3 because c recognised but on the wrong place) characters out of 13 not counting whitespaces. The Brush Script MT font engine recognised 9 characters out of 13 not counting whitespaces. In engine2 advantage - it was able to recognise the rest of the characters presence, but recognised them incorrectly (E-B, e-c, 7K7-MT). In this case the engine2 performed better with the difficult to read fonts.

Test case 7.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with upside-down text in the table.
Expected output	The system will be able to recognise easy to read characters from the input image within the table.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	

OCR'ed output text, Engine1	Easy to read fonts Difficult to read fonts Calibri (Body) ALGERIAN Verdana x ax Naw Tahoma Gill Sans MT
OCR'ed output text, Engine2	Edsy lo red lons Dilficul lo read forls Calibri (Dody) ALGERIAN Verdana ourieE New Tahoma Brush Sentue M7 GIl Sans T OD C'nglish Text fMU
Conclusion, justification	The OCR system was able to recognise the upside-down text. Performance of engine1 is still similar comparing with performance in test case 6. Performance of engine2 is worse with upside-down text comparing with normal orientation. Engine2 performed better then engine1 again (as test case 6).

Test case 8.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with upside-down text in block with the normally oriented text.
Expected output	The system will be able to recognise all characters from the input image.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the stroke at the present moment; and yet I feel that I never was a greater artist than now. Text Arial 11: existence, that I neglect my talents. I should be incapable of drawing a single exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the •mou ueuu Flue e sem Jeneu I leeJ I pue Äuewow weseld e16u!S e 5u!Meup JO elqedeou! eq plnoqs I •swelQ Kw pe16eu I 'eouespce levy exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine2	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring whichI enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the Mau uey 15JE aEað e seM JaAaU | 1EY} jsaj| 1a pue juauou juesaid ayi je ayos ajouis e bueip jo ajqedeouj aq pinoys I *suPl ku jaej2au | JEI '*ua]SIxa :LL jEUY IXa1 exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
Conclusion, justification	The OCR system was not able to recognise the upside-down text inside of the normal block text. Performance of engine1 is similar comparing with performance of engine2.

Test case 9.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with easy and hard to read fonts.
Expected output	The system will be able to recognise all characters from the input image including diagonal text block.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the Text Arial 11: existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment; and yet I feel that I never was a greater artist than now. exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine2	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created tor the bliss of souls like mine. I am so happy. my dear friend, so absorbed in the Text Arial 11: existence, thati neglect my talents. shouid be incapable of drawing a singie stroke at the present moment, and yet 1 teel that l neyer was a greater arist thai now. exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
Conclusion, justification	The OCR system engine2 was able to recognise most of the characters from input image file with some mistakes and missing symbols. The OCR system engine1 was not able to recognise any symbol from the diagonal text block.

Test case 10.

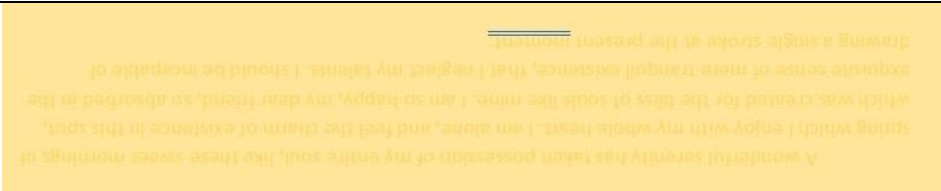|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the fonts and background of different colours. For this test, the text block is light-dark yellow on white background which is hard to read for the human.

Expected output	The system will be able to recognise some or all characters from the input image.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine2	A Wondertul serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm ot existence in this spot, which was created for the bliss of souls like mine.Iam so happy, my dear friend, so absorbed in the exqu isite se sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
Conclusion, justification	The OCR system engine1 was able to recognise all the characters from the input image file correctly. No mistakes were found in engine1 output text, except for the white space line between lines 3 and 4. The OCR system engine2 was not able to recognise some symbols, some characters are missing, some are misinterpreted. The performance of the engine1 in this case is better than performance of engine2.

Test case 11.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the fonts and background of different colours. For this test, the text block is light-dark yellow on yellow background which is extremely hard to read for the human.
Expected output	The system will be able to recognise all characters from the input image.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment;
OCR'ed output text, Engine1	No result text returned.

OCR'ed output text, Engine2	Awonderful serenity has taken possession of my entire soul, like these sweet mormings of pring whichi enjoy with my whole heart.| am alone, and feel the charnmofexistence in this spot hich was created for the biss of souls like mine. lam so happy, my dear friend, so absorbed in the site sense of mere tranquil existence, that I neglect my talents. I should be in capable
Conclusion, justification	The OCR system engine1 was not able to recognise any character from the input image file. The OCR system engine2 was not able to recognise some symbols, some characters are missing, some are misinterpreted. The performance of the engine2 in this case is better than performance of engine1.

Test case 12.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the upside-down text, and fonts and background of different colours. For this test, the text block is light-dark yellow on yellow background which is extremely hard to read for the human.
Expected output	The system will be able to recognise all characters from the input image.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result text returned.
OCR'ed output text, Engine2	Awonderful serenity has taken possession of my entire soul, like these sweet mormings of pring whichi enjoy with my whole heart.| am alone, and feel the charnmofexistence in this spot hich was created for the biss of souls like mine. lam so happy, my dear friend, so absorbed in the site sense of mere tranquil existence, that I neglect my talents. I should be in capable
Conclusion, justification	The OCR system engine1 was not able to recognise any character from the input image file. The OCR system engine2 was not able to recognise some symbols, some characters are missing, some are misinterpreted. The performance of the engine2 in this case is better than performance of engine1.

Test case 13.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the downscaled DPI text from the table. For this test, the table from test case 6 is down scaled 50%.
Expected output	The system will be able to recognise all characters from the input image of the table with downscaled DPI. This test case considering similar image to the image in test case 6, the difference is that image is downscaled 50%.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	
	<table><tr><td>Easy to read fonts</td><td>Difficult to read fonts</td></tr><tr><td>Calibri (Body)</td><td>ALGERIAN</td></tr><tr><td>Verdana</td><td>Courier New</td></tr><tr><td>Tahoma</td><td>Brush Script MT</td></tr><tr><td>Gill Sans MT</td><td>Old English Text MT</td></tr></table>

OCR'ed output text, Engine1	Cimcüllto roots Vere] a Gill MT
OCR'ed output text, Engine2	Easy to resd tonts DiTieult to read fants calli |Dece) ALGERLAN Verdena Courier iew Tahoma Gill Sans P1T ngli Tru MT
Conclusion, justification	This test showed that for the system is much harder to recognise characters from lowered DPI image. Like the test case 6 engine2 performed better in this case. We can assume that for the system is much harder to work with low DPI image. The engine1 even was not able to recognise the characters from easy to read column (performed bad in this test case).

Test case 14.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the downscaled DPI plain text. For this test, the text from test case 2 is down scaled 50%. I want to compare if the system will be able to perform better with the plain text than with the text in the table (test case 13).
Expected output	The system will be able to recognise all characters from the input image of the table with downscaled DPI. This test case considering similar image to the image in test case 6, the difference is that image is downscaled 50%.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	Heading 1, Heading 2, *Werther "Book title"*, *Intense emphasis* A wonderful serenity has taken possession of my entire soul, like these sweet mornings of **Bold: spring which I enjoy with my whole heart. I am alone, and feel the charm of** *Italic: existence in this spot, which was created for the bliss of souls like mine.* Underlined: I am so happy. my dear friend, so absorbed in the exquisite sense of mere tranquil
OCR'ed output text, Engine1	Heading 1, Head' na 2, Werlher "800k A 'wonderful serenity' has taken passessian of my entire soul, like these sweet marmngs of Sold: spring which I enjoywith my whole I am alone, and feel the charm of It—iie: ,szisterxs in this spot: VISE far tha biiE.s iiks mine. Underlined: I am sa happy. mv dear friend. so absoraed in the exquisite sense of mere tranquil
OCR'ed output text, Engine2	Heading 1, Heading 2, Werther "Book title", interse ernohasis A wonderful serenity has taken possession of my entire sGul, like these sweet mornings of Bold: spring whichl enjoy with my whole heat. I am alone, and feel the charm of taic: sxistence in this spoi, w7ich was craatsd for tha bis of souls liks mine.

	Underined:Iam so happy. my dear friencd, s0 absorbedin the exquisite sense of mere tranquil
Conclusion, justification	The system performs better with the plain text than with the text from a table, but we can see the lowered image DPI makes character recognition much harder for the system. In this case engine 2 performed better than engine 1.

Test case 15.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the bad graphics brochure.
Expected output	The system will be able to recognise characters from the input. This test case considering to be challenging for the system because of the different fonts of the different size with different background are used on the image and it is hard to read the blocks of the text for the human as well.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	

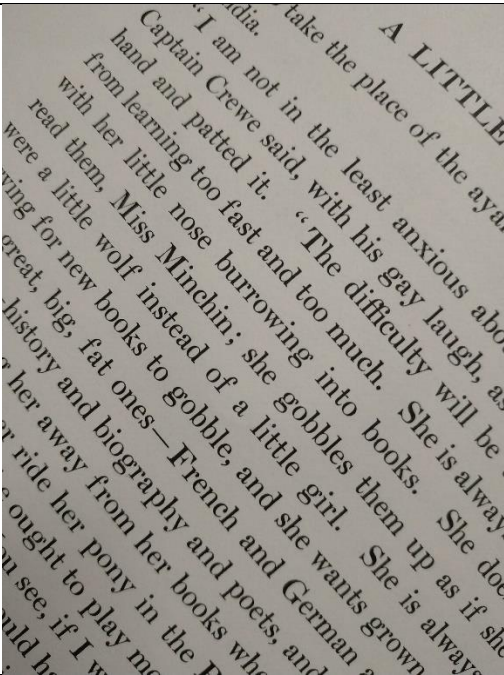|	
OCR'ed output overlayed image, Engine1	
OCR'ed output overlayed image, Engine2	
Conclusion, justification	The engine2 performed better in this test case it was able to recognise more different characters from different blocks. The main difficulty for the system to recognise different characters in this case is related to the problem that some fonts used on the input image are hard to read.

Test case 16.

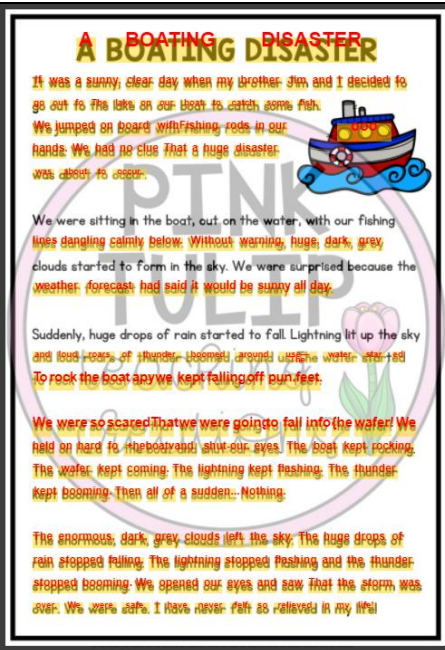|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the diagonal book text image. The reading of this text characters is really challenging for the system because the text is slightly dimmed to the sides and the background is yellowish grey.

Expected output	The system will be able to recognise all characters from the input image (optimistically). More realistically expecting more characters recognised in the middle of the image.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	take V Idia. "I am not in the least anxious abov Captain Crewe said, with his gay laugh, as hand and patted it. " The difficulty will beÄ from learning too fast and too much. She is with her little nose burrowing into books. She (II read them, Miss Minchin; she gobbles them up as •were a little wolf instead of a little girl. She is a "Ving for new books to gobble, and she wants grm great, big, fat ones—French and German history and biography and poets, and her away from her books whf

OCR'ed output text, Engine2:

were a little	great,	ere a	for n	d them,	tle wol	ew boo	from learning too fast
and too much. She is alwa		from learning too fast and too much.					from learning too fast and too
	hand and patted it.	The difficulty will be		Miss		instead	Captain Crewe said,
with his gay laugh, a4		linchin; sh		nose burrowing in		I am not in the least anxious abd	
	Crewe said, with his		The difficu	his gay laugh, as	gay		laugh,
	anxious abo						
Captai	lia.	A L	A LITTLK				
with her lit		hand and patted it.	Captain Crewe said, with his		am not in the least	take	the
place of the ayad	LITTL						
story	, fat ones	0oks to g	oks to	chin; she gobble	The difficulty will be		much.
	ulty						
her away	her aw	ory and bio	and bi	nd biograp		biog	t ones	ones-Frencl
	es-	gobble	ad of a 1	little	he gobbles	gobblest into	books.
	books	will be					
ride her books wh	ought	nld hs	nld h	1 see, if I	see,	ught to play	e,	if
	her po	lo	to play m	r pony in	play	m her bo	mo	aphy	and1	po
	her books		in the	d poets	I poets, an	h	nd	German
	nd she wvants g		le girl. She is alw	Germ	erman	nts grown	nts	gT

		She	growr	he is alwaem up	em up as	up as iftsh	She is alway	s
	alwa	p as	as if she	She do She do	if she			
	ride he	away from her	raphy and		Frend	rench and	ench and e, and she w	
		a little girl. S	Sir					

Conclusion, justification	The overlayed image looked very messy, because of the input text orientation. It is hard to say which engine performed better in this case and recognised more characters correctly, but the result from the engine1 looks more readable. From the engine 2 result we can see that the system for example placed the top title into the middle for example which makes hard to evaluate the result (the overlay image is not readable either).

Test case 17.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the text over the image with the text. Is the system will be able to recognise both background and main text?
Expected output	The system will be able to recognise all characters from the input image both background and main text (optimistically). More realistically expecting more characters recognised from the main text.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	

OCR'ed output overlayed image, Engine1		
OCR'ed output text, Engine1	A BOATING DISASTER If was a sunny, clear day when my brother Jim and I decided fo go out fo The lake on our boat to catch some fish. We jumped on board wifhFishing rods in our ooo hands. We had no clue That a huge disaster was about to occur. lines dangling calmly below. Without warning, huge, dark, grey weather forecast had said it would be sunny all day. and loud roars of thunder boomed around use—The water star ed To rock the boat apywe kept falling off pun.feet. We were so scared That we were going to fall info {he wafer! We held on hard fo +heboatvand shut-our. eyes The boat kept rocking. The wafer kept coming. The lightning kept flashing. The thunder kept booming. Then all of a sudden... Nothing. The enormous, dark, grey clouds left the sky. The huge drops of rain stopped falling. The lightning stopped flashing and the thunder stopped booming. We opened our eyes and saw That the storm was over. We were safe. I have never felf so relieved in my life!	

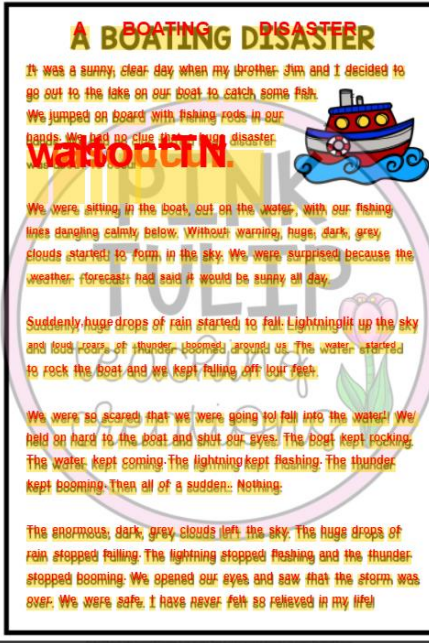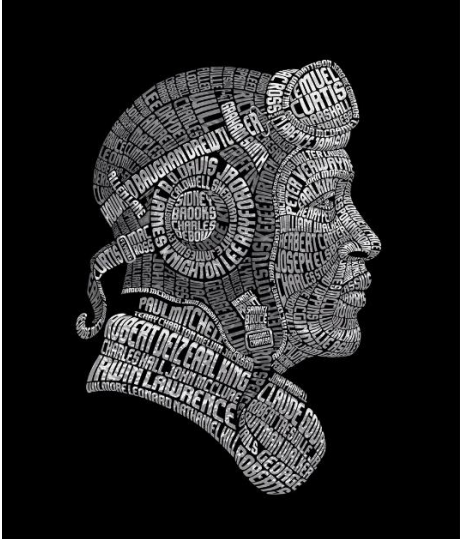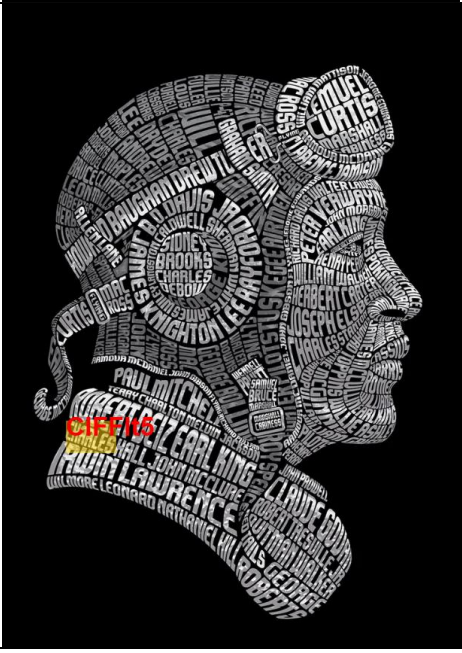| OCR'ed output overlayed image, Engine2	
OCR'ed output text, Engine2	A BOATING DISASTER It was a sunny, clear day when my brother Jim and I decided to go out to the lake on our boat to catch some fish. We jumped on board with fishing rods in our hands. We had no clue that a huge disaster was about to occur. TN We were sitting in the boat, out on the water, with our fishing lines dangling calmly below. Without warning, huge, dark, grey clouds started to form in the sky. We were surprised because the weather forecast had said it would be sunny all day. Suddenly, huge drops of rain started to fall. Lightning lit up the sky and loud roars of thunder boomed around us The water started to rock the boat and we kept falling off lour feet. We were so scared that we were going tol fall into the water! We/ held on hard to the boat and shut our eyes. The bogt kept rocking. The water kept coming. The lightning kept flashing. The thunder kept booming. Then all of a sudden.. Nothing. The enormous, dark, grey clouds left the sky. The huge drops of rain stopped failling. The lightning stopped flashing and the thunder stopped booming. We opened our eyes and saw that the storm was over. We were safe. I have never felt so relieved in my lifel
Conclusion, justification	The engine 2 recognised more characters than engine 1 from the main text. The last line of the first paragraph on the overlayed result from engine2 looks messy, but in text result this line represented correctly. Possibly at the end of this line the system placed two characters from the background text (P"IN"K recognised as TN). Engine 2 performed better in this case.

Test case 18.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance. For this test I will be using the pilot face image made of names.

Expected output	The system will be able to recognise some characters from the input image.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output overlayed image, Engine1	
OCR'ed output text, Engine1	CIFFlt5

OCR'ed output overlayed image, Engine2	
OCR'ed output text, Engine2	IUST URIS laTliLL AUGNlUneli ORL GAMDDR EDRE PAULMIE J0HDB TEARY CHRRLTON MELDIN J CEoRAAD AATAARIEE MELS TRESUITE RILI LSURENC CHARLESNGLL JORMMCELURE 2 JONNPPDNN ROBE
Conclusion, justification	Engine 2 was able to recognise more characters from the input image. In this case need to note that system was able to recognise that characters are the capital letters (upper case) at most, but some characters are still mixed up with numbers and lower-case letters.

Test case 19.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the handwriting text along with the print text from the image. The reading of this text characters is really challenging for the system because even the sharp handwriting is particularly challenging for machine to read.
Expected output	The system will be able to recognise some or all characters from the input image (optimistically). More realistically expecting more characters recognised from the banners with the printed text.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	
OCR'ed output text, Engine1	Learn to Write Sharp edge Cursive Handwriting
OCR'ed output text, Engine2	doesmt mates Mow_maM speopll, MoW Meet_ who ym_phe AM MILLION* VIEWS Learn to Write Sharp edge Cursive Handriting
Conclusion, justification	As it was expected the system performs better with the printed text. The engine1 was able to read text from the bottom banner. The engine 2 missed "1" from the red banner and recognised + as *. Also, engine 2 was able to recognise some handwritten text. The performance of the engine 2 in this case is significantly better than engine 1.

Test case 20.

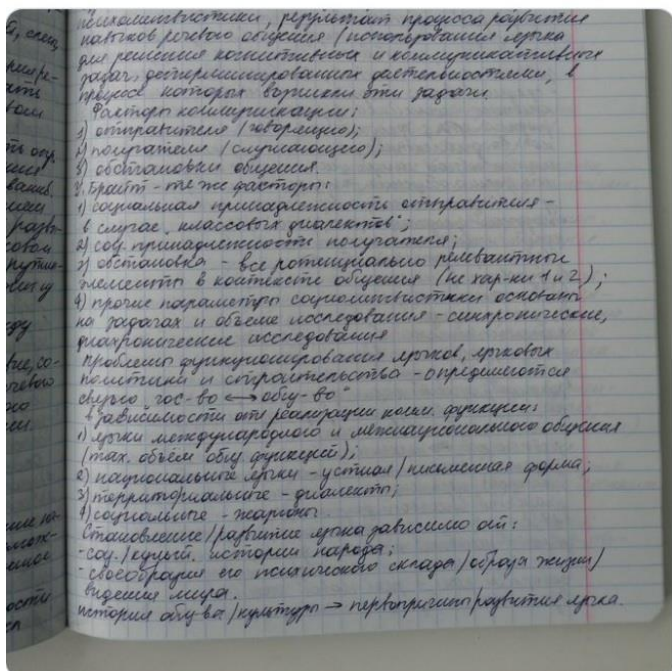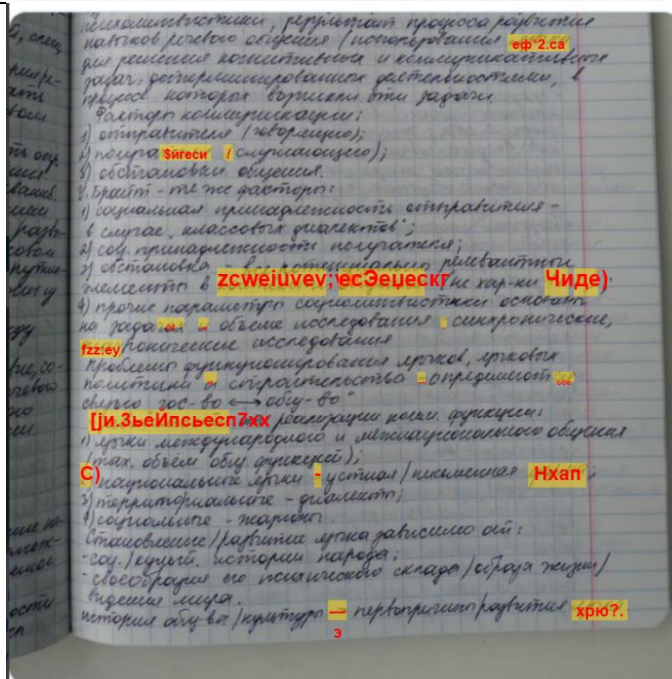| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with different from English text. As an input used image of the text in Russian language. Text format is hard to read for the machine (words of the different colour, background grey, additional syntactic symbols)
Expected output	The system will be able to recognise all characters from the input image.
The difficulty of the test	Hard
OCR Engine used	Engine1
Input file content	
OCR'ed output text, Engine1	Девйтое МАЯ — бто осббый день для всех русских людёй. бто день Побёды. бто день, когда закбнчилась Велйкая Отёчественная война (так в Россйи называют Вторую мировую войну).
Conclusion, justification	Engine 1 was was able to recognise only some characters correctly. The output text is not readable, too many characters confused with the wrong characters. No Russian language option available for engine2. The additional symbols distracted the system more than expected.

Test case 21.

The purpose of the test,	The purpose is to test the functionality of the OCR system and performance with different from English text. As an input used image of the text in Russian language.

tested parameters	The text is contrast with background, expected to be easy to recognise by the system. Text format is simplified comparing to the test case 20 where system performed worse than expected.
Expected output	The system will be able to recognise most characters from the input image.
The difficulty of the test	Easy
OCR Engine used	Engine1
Input file content	**Любой сайт для любой аудитории.** WordPress.com позволит создать веб-сайт для решения именно ваших задач. Вы сможете сделать из него всё, что захотите: блог, корпоративный ресурс, онлайн-магазин или что-то ещё, что вам подскажет воображение. Встроенные средства оптимизации и гибкие темы для мобильных устройств сделают ваш сайт доступным для всех пользователей. Вы сможете создать простой сайт для своих близких или продавать товары пользователям со всего мира. Что делать с этими возможностями — решать вам.
OCR'ed output text, Engine1	Любой сайт для любой аудитории. WordPress.com позволит создать веб-сайт для решения именно ваших задач. Вы сможете сделать из него всё, что захотите: блог, корпоративный ресурс, онлайн-магазин или что-то ещё, что вам подскажет воображение. Встроенные средства оптимизации и гибкие темы для мобильных устройств сделают ваш сайт доступным для всех пользователей. Вы сможете создать простой сайт для своих близких или продавать товары пользователям со всего мира. Что делать с этими возможностями — решать вам.
Conclusion, justification	Engine 1 was able to recognise all characters correctly. No Russian language option available for engine2.

Test case 22.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with different from English text. As an input used image of the handwritten text in Russian language. The text is not contrast at the left side; background is grey with lines.
Expected output	It is challenging image for the system, but handwriting is neat. I am expecting to recognise some characters, words, optimistically sentences.
The difficulty of the test	Challenging
OCR Engine used	Engine1
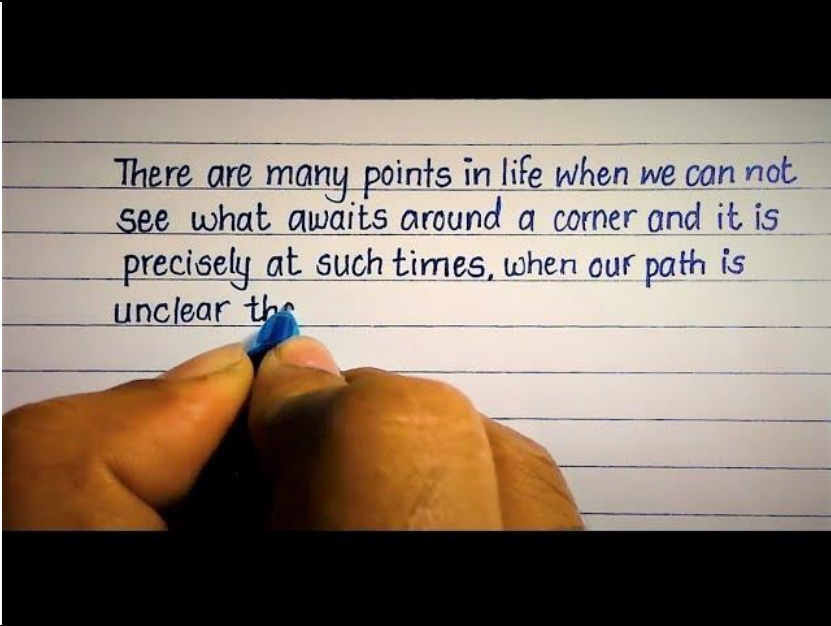
Input file content	
OCR'ed output overlayed image, Engine1	
OCR'ed output text, Engine1	еф*2.са $йгеси / zcweiuvev;ve есЭеųескг Чи де) 20 и - fzz:ey и — сое [jи.ЗьеЙпсьесп7хх С) - Нхап —э хрю?.
Conclusion, justification	Only a few punctuation marking symbols were recognised correctly. No letter was recognised correctly. Bad result can be explained that text is dense and quality is really bad for the system.

Test case 23.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text font imitating handwriting. As an input used image of the text in English language, font used – Blackadder ITC.
Expected output	The system will be able to recognise some characters from the input image.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	*Heading 1,* *Heading 2, **Werther "Book title", Intense emphasis*** *A wonderful serenity has taken possession of my entire soul, like these sweet mornings of **Bold: spring which I enjoy with my whole heart. I am alone, and feel the charm of*** *Italic: existence in this spot, which was created for the bliss of souls like mine.* *Underlined: I am so happy, my dear friend, so absorbed in the exquisite sense of mere tranquil* *Blackadder ITC: existence, that I neglect my talents. I should be incapable of drawing a single stroke at the present moment; and yet I feel that I never was a greater artist than now.*
OCR'ed output text, Engine1	%feacßny 1, %feacßny 2, Ras Éire soul fire tRe•e -sweet "c" $ • w"" crewed-yor U*CerßrtedT gam •o Céarfrze;ttd; so aEsor5e,cCrn vite c/ mere trarwui,f dfacEaUer exv•tertce, tRaÉ tafe*É4. incaraffe a •treze yet FeeftRat rte•ver wa• "2' sreater artist *'tow.
OCR'ed output text, Engine2	tfeading i, 7Heading 2, Wirthir ook tikhe. Sntense ephasns wenderfl serenity has taken possessrion efny enve deus, ike thase seet mornzsngs ef-el pring wich ejey witk my whoe heert I mn co, zndfiesEe chiam ef Staher exristence in thio spet uhioh uras created for the 6Tiss of seuto Sike mine hnderhinediLn so hiy ny dear fiend eo afrorhedin the exquirite sense of mere tranguil laokrdder ISG: existence, thae 3 negleet y talents. Jshoule he ineapašle eféraning a single stroke ar.the present rMemee and yet 3eel that rever wa* agreater artist tharn now.
Conclusion, justification	The engine2 was able to recognise more characters in total and more characters correctly. The engine 1 was able to read some characters, which engine2 could not (example word "soul"). The engine2 performed better in this case.

Test case 24.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text font handwriting. As an input used image of the handwritten text in English language. The image has no banners with printed text. The text on the image written neatly and straight.
Expected output	The system will be able to recognise some characters from the input image.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	
OCR'ed output text, Engine1	Tiere are many points in life when we con not see what awaits around a corner and is prec(sgly at such times, whemouf path is nclear
OCR'ed output text, Engine2	lhere are many points in lite When we can not see what awaits around a corner and it is precisely at such times, uhen our path is unclear th
Conclusion, justification	Both engines performed well with this text because the writing is neat and easy to read.

Test case 25.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text font handwriting. As an input used image of the handwritten text in English language from test case 24. The image is turned 90 degrees left.
Expected output	The system will be able to recognise the same characters from the input image as in test case 24.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2

Input file content		
OCR'ed output text, Engine1	Tiere are many points in life when we con not see what awaits around a corner and is prec(sgly at such times, when our path is nc ear	
OCR'ed output text, Engine2	lhere are many points in lite when we can not see what awaits around a coner and it is precisely at such times, uhen ouf path is unclear th	
Conclusion, justification	The engine 1 performed a little bit worse in this case than in previous (letter "l" missing in the last word comparing to previous output). The engine2 result is like the previous with few characters different. The results are similar but not the same.	

Test case 26.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text font handwriting. As an input used image of the handwritten text in English language from test case 25. The image has 50% reduced DPI.
Expected output	The system will be able to recognise less characters from the input image than in test case 25.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	
OCR'ed output text, Engine1	arg many pints in liFe When we con see What au;aits Gtgund_a.gner and it is precisely at such times u.'hen aurpath is unclear
OCR'ed output text, Engine2	There are many_pöints în life when we can not. see what awaits around a corner gnd it is precisely at such timeS, uhen ouf path is unclear the
Conclusion, justification	The engine 1 performed a little bit worse in this case than in previous (first word missing, letter "ö" even it is not English alphabet etc). The engine2 result is like the previous with few characters different. The results slightly worse.

Test case 27.

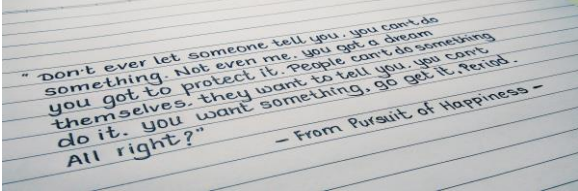| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text font handwriting. As an input used image of the handwritten text in English language from test case 25. The image has reduced DPI by 75%.
Expected output	The system will be able to recognise less characters from the input image than in test case 26.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	Then oe mOy pei nie in iíe sien En ne 5BR uat aiia orued a conmer and it is ucbar

Conclusion, justification	The engine 1 did not recognise any character. The engine2 result recognised only about 10-20 characters correctly. The performance is bad with the bad quality (image size 120-160 px)

Test case 28.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text handwriting. As an input used image of the handwritten text in English language with high resolution (4608x2592px). The handwriting is diagonal, and the font size is in the 3D perspective (smaller to the right side of the page).
Expected output	The system will be able to recognise some character, especially characters on the left side of the page.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	oon•b ever let someone +ueW ou, ou somethin Nob even me. gou ou ot roEect Qeo themselves- the w. do it. YOLI wane sornek-htng, go All ri ht?" From
OCR'ed output text, Engine2	Dont eve let someone tell uou. uou Conttdo you qot to protect it. People cant do something Somethinq. Not even me. you qot a dream themselveS. theuy want to tell you.you Cont do it. you uwaht something, go get it,feriod. From Pursuit ot Happiness All riqht?"
Conclusion, justification	The engine 1 recognised the beginning of each line correctly, as it was expected, the lines are in the correct order. The engine2 was able to recognise more characters, but some lines are missing, and the last line from input placed before another line in output text.

Test case 29.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with poor contrast and colour choice, difficult to read font (Arabic Typesetting 12), DPI reduced by 60%.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

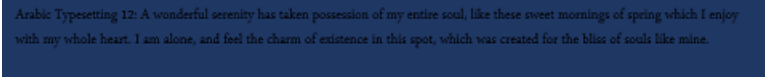| Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	No result
Conclusion, justification	DPI is too low.

Test case 30.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with poor contrast and colour choice, difficult to read font (Arabic Typesetting 12), DPI reduced by 40% (60% of initial size).
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	Arabic Typesetting 12: A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	krake Tyæset.tiri* 12: A wondezful has a.ke:n of m'/ er:.ize seal. like these sweet rnorriings L e:niet• with my whole heu:. 1 alone, •rid feel the churn of exi=mce in this spot, which created for the bliss souls Like
OCR'ed output text, Engine2	Arabie Typeseting 12: A wondeshul serenity has taken posseszlon of my entire soul, Like these sweet morninga af sparing nwrbich I enjor with y whsle heut. I ann alene, znd feel the charm of edisence bn this spot, whieh seas created for the blies of seul: Lke nmuine.
Conclusion, justification	The engine2 performed better than engine1. Many characters recognised wrong by both engines.

Test case 31.

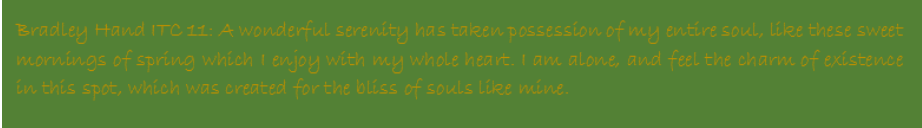| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with poor contrast and colour choice, difficult to read font (Agency FB 11), the text turned upside-down.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine. Agency FB It: A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with
OCR'ed output text, Engine1	No results
OCR'ed output text, Engine2	Ageney FB l: A wondertul serenity has taken posession ot my entire soul, like these sweet mornings of spring whichl enjoy with my whole heart. I am alone, and teel the charm ot existence in this spot, wihich was Created for the bliss of souls like mine.
Conclusion, justification	The engine2 was able to reproduce most of the characters correctly.

Test case 32.

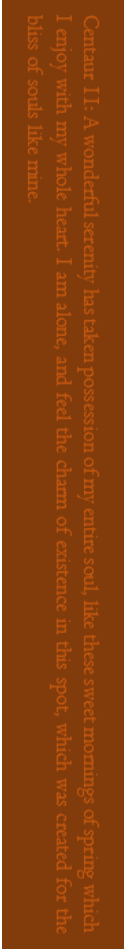| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with poor contrast and colour choice, difficult to read font (Bradley Hand ITC 11).
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	Bradley Hand ITC 11: A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	No results
OCR'ed output text, Engine2	Bradlley rand ITO 11: A wDvndlerjul Serensty as taetnpossessuon ot ey ttre soul, Lolet these swest e.orrungs of sprung whteh T joy wetM wuy wholE htnrt. ae alonE, and fee tht eharm of tkustt wet vw tnis spot, whioh was orenttd torthe oliss of souls liee hebne
Conclusion, justification	The engine2 was able to reproduce many of the characters correctly. Many characters were recognised wrong.

Test case 33.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with poor contrast and colour choice, difficult to read font (Centaur 11), text turned right 90 degrees.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2

Input file content	Centaur II: A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	Centaur I l: A wonde:ful scalin- has cakel possession of mv soul like chest sweet mornings of spring which I eniov with mv whole heart. I am alone, and feel charm of edstzzcz in this spots which was created for the åliss of souls like
OCR'ed output text, Engine2	Centatir l: Awonderhal serenity has takem poss ession of my entıre soul, like these sweet mornmgs of spring which Tenjoy with my whole heart. I am alone, and feel the cham of existence m ths spot, which was created for the bliss of souls like mne.
Conclusion, justification	Many characters recognised wrong.

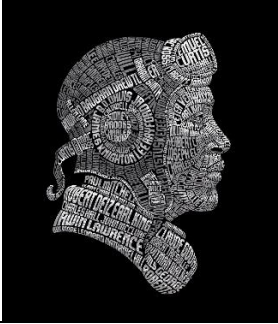*Test case 34.*

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system working with interruption. For this test case I am uploading file into the system, starting the system, and then refreshing the page when the system processing the image file.
Expected output	The system will not be able to process the file and give user corresponding exception message or go into the initial state.
The difficulty of the test	Hard
OCR Engine used	Does not matter for this test, because we are testing exceptional functionalities.

Input file content	
OCR system output	The web page refreshed, file processing interrupted, file name removed from upload.
Conclusion, justification	Pass. System performed as expected.

Test case 35.

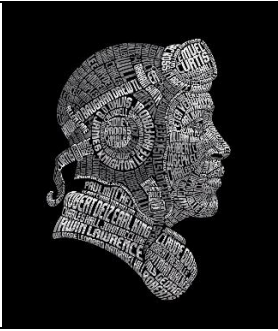| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system working with interruption. For this test case I am uploading file into the system, starting the system, and then interrupting the Wi-Fi connection when the system processing the image file.
Expected output	The system will not be able to process the file and give user corresponding exception message or go into the initial state.
The difficulty of the test	Hard
OCR Engine used	Does not matter for this test, because we are testing exceptional functionalities.
Input file content	
OCR system output	The system got stuck (hung up) processing image, had to refresh the page.
Conclusion, justification	The system hung up in browser window, had to refresh the page.

Test case 36.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system working with interruption. For this test case I am uploading file into the system, starting the system, and then closing browser when the system processing the image file.
Expected output	The system will not be able to process the file and after restarting browser will go into the initial state.
The difficulty of the test	Hard

OCR Engine used	Does not matter for this test, because we are testing exceptional functionalities.
Input file content	
OCR system output	Processing stopped; page reloaded.
Conclusion, justification	As it was expected the system restarted in browser with last file name in upload field. Pass.

Test case 37.

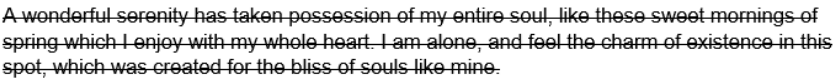| The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English shadowed text. The text is black, shadow is blue, font: Arial, size 11.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Hard
OCR Engine used	Does not matter for this test, because we are testing exceptional functionalities.
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	A serenijty taken possessi10!j1J or my entjire soul], sweet mornilngs or sprilng II enjoy my VliJ01]e liljearv,, II alone, reel Eli)ils spot, was created] b!lilss or sow'S IliJWe
OCR'ed output text, Engine2	A wondertul serenity has takem possesslom of my entire seul, ike these sweet mornings of spring which I enjoy with my whele heart. I am alene, and teel the eharm of existence in this spot, which 6s ereated for the bliss of souls like mine
Conclusion, justification	As it was expected the system was able to recognise most of the characters. The engine2 was able to recognise more characters correctly than engine1.

Test case 38.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English mirrored text. The text colour is blue Accent 5, font: Arial, size 11.
Expected output	The system will be able to recognise most of the characters.

The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet momings of spring which I enpy witl my whole heart I am abne, and feel the charm of existence in t'lis spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine2	A wonderful serenity has taken possession of my entire soul, Ilike these sweet momings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine
Conclusion, justification	As it was expected the system was able to recognise most of the characters. The engine2 was able to recognise more characters correctly than engine1.

Test case 39.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with line through. The text colour is black, font: Arial, size 11.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	A-wenderÁULserent-has-takenpOSsessioR-o-my-entire-sou, ike- these-sweet menings-of sping WeichLenjoyith Pmy-4hole-heat-+am alene,and feel the-cham-of-existence-in this spot which-was-created-for- the-bliss-of seuls-like-mine
Conclusion, justification	The engine2 was able to reproduce some of the characters correctly. Many characters were recognised wrong.

Test case 40.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with the same text between the first text lines. The text colour is black, font: Arial, size 11.

Expected output	The system will be able to recognise some characters.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	aHAAI9ROS8Sg l8eRe Re98ARLHNAREUEYYSMRBERTAS J83Bta8APSNs
Conclusion, justification	The engine2 was able to reproduce some of the characters. Could not find any reproduced character corresponding to input.

Test case 41.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English upside-down text with the same text of normal orientation between the first text lines. The text colour is black, font: Arial, size 11.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	oc a) (Dc:-sncemo
OCR'ed output text, Engine2	A wONdeHR SEfenit Ras tareR 533oHShy ERtresoli. FNIA PHEHYAWaHSSRSFHRCRAAS HLRS this 8HHR WAS EPES 18XHEBHSPSSIHRE YAIM
Conclusion, justification	The engine 1 reproduced some symbols, but I could not find corresponding symbols in input. I guess first o from output corresponds to o from input word wonderful. The engine2 was able to reproduce some of the characters. The A is reproduced correctly as it stands separately and not messed up with other text.

Test case 42.

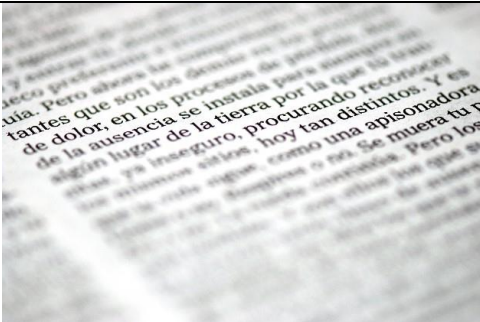|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with double line through. The text colour is black, font: Arial, size 11.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	AwenderLserenityhas takenpOSSESsien-ef my-etire-set ke-these SWeet meHnings-ef spring whieh Leajayth myAhala hean Lam-aene andfeelthe chamef axistenee in this spot hich was creaied for the-bliss of settske mine
Conclusion, justification	The engine2 was able to reproduce some of the characters correctly (spring, in this spot, for the, bliss of, mine). Many characters were recognised wrong.

Test case 43.

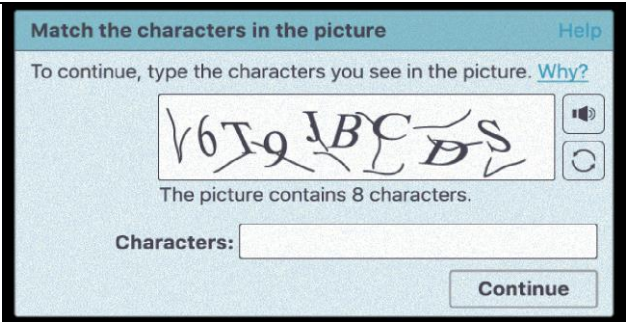|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with in-text marking. The text colour is black, font: Arial, size 11, marking purple.
Expected output	The system will be able to recognise some characters, marked text expected hard to read for the system.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine2	A Wonderful serenity has taken possession of my entire soul, like these sweet mornings of e Crlaiffi 01 ence in this spot, which was created for the bliss of souls like mine.
Conclusion, justification	As it was expected the marked text is hard to recognised. The engine 2 reproduced some symbols, but they do not correspond to the input (incorrect).

Test case 44.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English characters from keyboard photography. The orientation of the text is diagonal, top and bottom of the image are blured.
Expected output	The system will be able to recognise some characters, marked text is hard to read for the system.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	H
OCR'ed output overlayed image, Engine2	
Conclusion, justification	The engine 2 was able to recognise "H" from the middle of the image, but on overlayed image it is placed on the bottom. So, I assume it recognised button shadow as character "H".

Test case 45.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text bmp image which is not on the list of the files these can be uploaded. The text orientation is diagonal, the top and the bottom of the image are blurred, the DPI is low (628x421px).
Expected output	The system will be able to recognise some characters from the middle of the image.
The difficulty of the test	Challenging

OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	uia. Pero ahea a tantes que son as ssi de dolor, en los proca de la ausenca se instala hgan agar de \a ierTa por \a qu s ms, hoy tan distintOS. (e e 7imseuro, prOCurando reots eno una apiSonadora. Ses te t Se muera tun eede Pero los
Conclusion, justification	The overlayed image is not available (undefined), I guess because of the input image is in bmp format. Engine 2 was able to recognise some characters from the image.

Test case 46.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text gif image which is not on the list of the files these can be uploaded. The image is the captcha image found by google (not from application or web actual captcha).
Expected output	The system will be able to recognise some characters from the image, but not actual captcha characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	Match the characters in the picture 'To continue, type the characters you see in 'the picture. Why? The picture contains 8 characters. Characters: Continue
OCR'ed output text, Engine2	**Error:** Engine 2 has no GIF support X

Conclusion, justification	The overlayed image is not available (undefined), I guess because of the input image is in gif format. Engine 1 was able to recognise some characters from the image, but as expected not from the captcha window.

Test case 47.

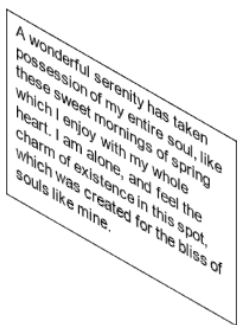|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text (waving letters).
Expected output	The system will not be able to recognise any character from the image.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	No result
Conclusion, justification	As it was expected no characters returned.

Test case 48.

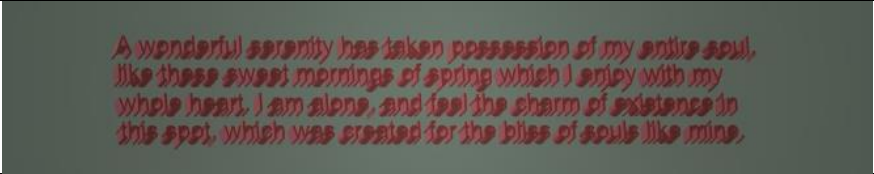|	
The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text waving letters.
Expected output	The system will be able to recognise the words in the middle but not the top and bottom words.
The difficulty of the test	Hard
OCR Engine used	Tried on both Engine1 and Engine2

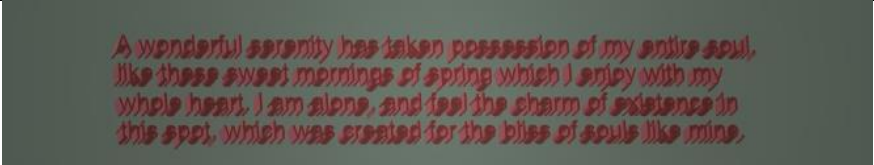| Input file content	
OCR'ed output text, Engine1	INTRODUCTION METHODS RESULTS DISCUSSION
OCR'ed output text, Engine2	INTRODUCTION METHODS RESULTS DISCUSSION
Conclusion, justification	The system was able to recognise all characters correctly. The characters are inline, expected the system confusion with bump on the word, but system managed to read all characters.

Test case 49.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English isometric text.
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	No result
OCR'ed output text, Engine2	ariehl erijgoy itth rrny uhole sNeet morrings of aprink) possessondf mmy ertite sod, \ke ANOndertul sererity has 1alk.en these

	S6e ike mine. Theart.I an alone, and leel the rich was created for the bkiss ot charrm o exietencein this spot
Conclusion, justification	The engine 2 was able to return some characters, some of them are correct (corresponding to the input, for example "was created for the"), overlay image is not readable.

Test case 50.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English isometric 3D text with dark background, font colour dark red. Image file format is tiff (not in the list).
Expected output	The system will not be able to recognise any character.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	
OCR'ed output text, Engine1	yyhfrh
OCR'ed output text, Engine2	Engine 2 has no TIFF support
Conclusion, justification	The engine 1 did not show the image in image preview and the overlayed image option is not available. The engine 1 was able to return some characters, but I cannot identify which symbols are these.

Test case 51.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English isometric 3D text with dark background, font colour dark red. Image file format is jpg (want to try acceptable format with this image).
Expected output	The system will be able to recognise some characters.
The difficulty of the test	Challenging
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	

OCR'ed output text, Engine1	yyhj'h
OCR'ed output text, Engine2	Dk9 3h959 BVPDŠ MPIngs PIBPpng woph)9npy wD my whplg bes Jam slpn9, Bnd ipp) 3ho gherm pf PABIONEP
Conclusion, justification	The engine 1 was able to return some characters, but they are not correct. The engine 2 was able to identify some characters, some of them correct characters from input (for example word "my" at the end of the 2nd line.

Test case 52.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text, font: Verdana 11, blue on white background, input image is png.
Expected output	The system will be able to recognise all characters.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine1	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
OCR'ed output text, Engine2	A wonderful serenity has taken possession of my entire soul, like these sweet mornings of spring which I enjoy with my whole heart. I am alone, and feel the charm of existence in this spot, which was created for the bliss of souls like mine.
Conclusion, justification	Pass. All characters were recognised as it was expected.

Test case 53.

The purpose of the test, tested parameters	The purpose is to test the functionality of the OCR system and performance with the English text with jumping letter case, font: Impact 12, orange on white background. Input file is pdf.
Expected output	The system will be able to recognise all characters.
The difficulty of the test	Easy
OCR Engine used	Tried on both Engine1 and Engine2
Input file content	A WonDerFul SerEnIty Has TakEn PoSsesSion Of My EnTire SoUl, Like ThEse SwEet MorNings Of Spring WhIch I EnJoy WitH My WhOle HeaRt. I Am AloNe, And FeEl The ChaRm Of ExiStence In This Spot, WhIch Was CreAted For The BliSs Of SoUls LiKe MIne.

OCR'ed output text, Engine1	A wonoerFul serEnltY Has TakEn Possession ot MY soul, Like ThEse SwEet MorNings Of spring which I Enjoy Wit" MY wh01e HeaRt. I Am AloNe, And FeEl The ChaRm ot Existence In This Spot, Which was CreAted For The BOSS Of souls Lil(e Mine.
OCR'ed output text, Engine2	A WonDerFul SerEnity Has TakEn PoSsesSion 0f My EnTire SoUi, Like ThEse SwEet MorNings 0f Spring Whlch I Enloy WitH My Whole HeaRt. I Am AloNe, And FeEl The ChaRm 0f ExiStence in This Spot, Which Was CreAtedl For The Bliss 0f SoUls like Mine.
Conclusion, justification	The system was able to recognise most of the characters correctly, some characters recognised incorrectly. For example: the engine 2 recognised upper case "O" as zero "0".