Instructions

1. You are expected to complete the task within the time-frame assigned to you.
2. You are free to refer any online or offline material but make sure to acknowledge your references in the report.
3. Your code should be well commented and formatted with section wise work.
4. Once your attempt is complete, we expect you to delete all the files stored and shared by us from your system and submit following files in a single compressed file (like zip/rar etc.) with your full name on the compressed file:
    a. MATLAB Script and function files (m files)
    b. Explanation Report (PDF or Doc) with result
    c. You do not need to send us the image separately.
5. Submit everything in a single compressed file (like zip/rar etc.) and reply to the task email with file attached.
6. For any query related to procedure you can ask us by e-mail. If you feel there is some information missing, you can assume it from your end and mention it in the submission email or report. You should not ask us any query or help for the given task.

TASK

You need to detect Machine Readable Zone (Zone-VII) as described in Passport_Guidelines.pdf from given passport image with help of adaptive algorithms through MATLAB Code and return the output as text detected of Machine Readable Zones. We are attaching steps which you can follow for this work which might help you but they are not compulsory to follow and you can use your own approach. We want to see how close you can reach to the result by the time you submit the work. **Remember your code must find only MRZ Section and its text output not the whole text from the given passport image. All calculations must be done programmatically and if you enter pixel values or positions manually for MRZ detection then your work will be considered as hard-coded and not optimized for other images. We will be testing your code with different images during evaluation.**

Fig1 : Input Image-1

Steps which you may follow in MATLAB for above task:

1. Load the image.
2. Rotate: portrait -> landscape (if required)
3. Scale: If image size is bigger than 4MP than Normalize image size to a width of 1000 while retaining aspect ratio
4. Adaptive blur
5. Contour detection: If reliable contour is found, draw it on the image
6. Line identification: Find lines based on edges for required zones (For image and text in bottom)
7. Intersection identification: Extend lines in step 6 to find intersections
8. Intersection filtering (contours): Remove intersections that fall outside of valid contours of the document
9. Intersection filtering (aspect ratio): Remove intersections that don't yield a valid, pre-specified document aspect ratio
10. Intersection selection: Of the remaining intersections, choose four representing the required zone result that are closest to the edges of the image and draw rectangle for showing output with different colors
11. Apply your own logic or use MATLAB functions for detecting the text from Machine Readable Zone and display the text in command window.

Most important part of your work will be displaying Text in command of MRZ Section only.

Link for Given Sample Image:
https://www.dropbox.com/s/gepwp48l2nv2lky/Passport%20%285%29.jpg?dl=0
One more sample image for your reference and testing:
https://www.dropbox.com/s/ige3dijcj66j6h6/Passport%20%281%29.jpg?dl=0
Description of Result:
https://www.dropbox.com/s/zs334cbtsbdaesp/Example_Result_Pic1.jpg?dl=0
Passport_Guidelines.pdf:
https://www.dropbox.com/s/jhdw4u8m90tu048/Passport_Guidelines.PDF?dl=0
Report format for MATLAB Helper:
https://www.dropbox.com/s/t83wzyhjgzhu4lg/Sample-MATLAB%20Helper.docx?dl=0

All the Best!