WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Feature-Based Image Validation System

Hanish Patil[1], Omsai Nagvekar[2], Sahil Khandagale[3], Janhavi Sangoi[4]

[1, 2, 3]Final Year Student, Computer Enginnering Department, VIVA Institute of Technology, India
[4]Assistant Professor, Computer Enginneering Department, VIVA Institute of Technology, India

A B S T R A C T

The proposed system is a scalable expendable level solution that will assist the organizations to identify weather the uploaded image is acceptable in presented e-filing of important documents, likes of which are PAN card and Voter IDs, VISA & various admission forms this system also helps in filling e-forms for national level examinations like GATE, JEE, NEET. The proposed system will reduce the need for manual labor and people chasing the government offices and bankers to change minor details which sometimes leads to repeating the entire process multiple times. Also, many applications are rejected due to minor faults in the images uploaded by the users. As they don't follow the constraints specified in the document by the respective organization. We have implemented multiple features in the proposed system, which includes. Facial alignment and orientation, face detection and verification. The proposed system provides benefits for both users and enterprises by automating the process of document classification and eliminating the requirement for human labor to discover problems. Organizations can use this approach to create a unique set of standards that are simple to incorporate. Compared to existing e-form filling methods, the suggested approach is more versatile and user-friendly. Adopting this system would streamline the organization's verification process, saving resources that would otherwise be used for document review. It would also make form filling easier and faster.

Keywords: Background Separation, CV2, Face validation, Feature Extraction, Image Processing

1. Introduction

The most important part for any online form filling is to upload the said required documents. In which the most tedious task is to upload the photo of the user or the person for whom the form is getting submitted for, this task seems too simple but with tons of guidelines and restrictions to be followed for successful submission takes more time and hassle then filling the rest of the form. E-form filling has become the new norm after the pandemic which forced the world into lockdown.

Filling online forms requires a specific criterion to be filled: why uploading the images this criterion can beset the user since the rejection rate can rise depending upon the proficiency of the user which leads to the user losing interest in applying for their respective organization. Even after filling the form the user has to wait for long weeks to get return confirmation from the organization as the organization also has to manually check for the submitted documentation and look whether they are up to the guidelines of organization. By employing machine learning on organizationally established limitations, the suggested system addresses the issue of uploading images and signs and can determine in real-time whether an image submission would be approved or refused depending on several faults identified. The proposed system not only reveals the errors, but it also provides solutions for those issues that are discovered. When finished, the suggested method will provide a hassle-free experience for the user, making the process of filling out forms a little more user-friendly. The proposed system not only helps the user side but also the organization side of the process by limiting the manual labor needed for sorting the document as per errors or defining the error.

The proposed system also provides flexibility to organizations looking for a unique set of guidelines to be followed that can be easily implemented into the proposed system. This flexibility and ease of usability makes the proposed system step ahead of the current e-form filling techniques where user experience is poor and not so smooth. Implementing the proposed system will not only make form filling smooth and hassle free but also reduce the process of substantiation at the organization side that will save resources which are needed for reviewing the said documents.

2. Related Work

The proposed methodology not only points out inaccuracies, but also offers fixes for any errors that are identified. Once accomplished, the proposed approach will provide the user a faff-free experience, making the act of filling out forms a bit more user-friendly. Organizations seeking for a special collection of guidelines to comply can be promptly integrate into the proposed system this modularity and flexibility is the goal of the suggested system. The suggested method is an improvement over the present e-form filling procedures because of its flexibility and usability, which overcomes the poor and unsatisfactory user experience. There currently exist no such system in e-filling of form and other online form filling platforms. Expect the research that was conducted in 2005[5] which mainly focused on error detection then providing solution for the same. The proposed methodology overcomes such limitation and looks for other features that are previously went unattended or have never been encountered before.

3. Research Objectives

The proposed system provides a solution for a problem that is encountered while filling out the online form may it be for Job, a Competitive Exam, or another application form. We discovered that while filling out this form the tedious part of uploading the said photo and sign which are to be uploaded with stringent guidelines and may take anywhere from a few minutes to hours considering the proficiency of the user. This is further followed by waiting for substantiation by the respective organization whether to be considered True or False to their guidelines. The proposed system provides a solution to the current beset of uploading photos and sign by implementing machine learning on organization-defined constraints which can check in real-time whether the submitted image would be accepted or rejected on the basis of a number of errors found. By not only providing the errors the proposed system also imparts the solution for those found errors. At completion, the proposed system will give the user a hassle-free experience, making the form-filling process a bit more user-friendly. The suggested system is a scalable enterprise-level solution that will assist the computer in determining whether the image uploaded is acceptable in crucial documents, including PAN cards, voter identification cards, VISA, and various admission forms for national level exams like GATE, JEE, and NEET. The proposed system's major characteristics are face alignment and orientation detection and verification. Its application includes quick recognition and verification of user facial photos to enable a quick and secure uploading and verification procedure

4. Proposed System & Methodology

4.1 System Block Diagram:

Figure 1 depicts a comprehensive block diagram of the system under consideration. This diagram portrays the principal parts and their corresponding functions, represented by various interconnected blocks. These blocks are meticulously connected by lines, which depict the underlying relationships between them. Th diagram shows that the input image is transferred into 3 pipelines which works on different parameter of the image constructed in system. After the processing in done the different results are coagulated into one singular output to the user.

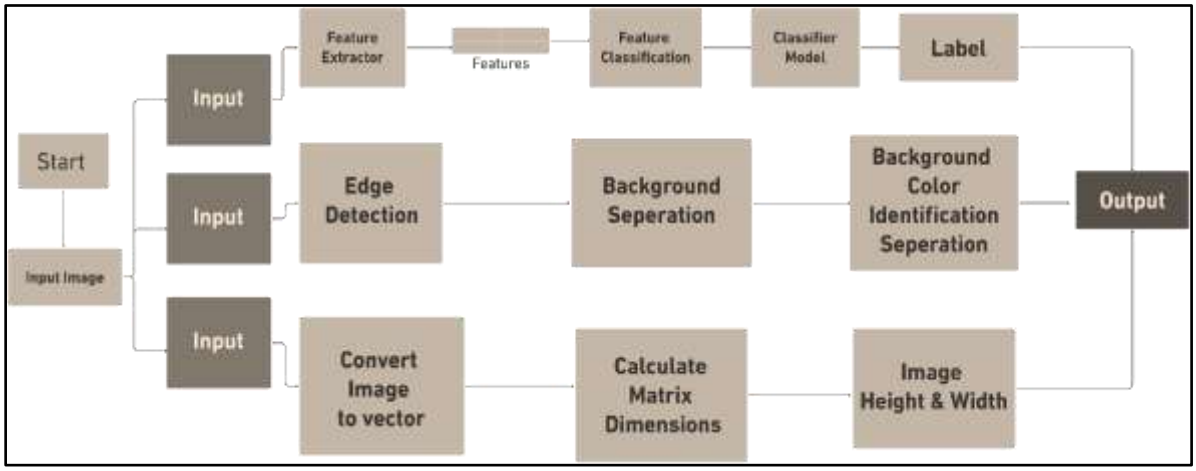

Figure 1. System Bloack Diagram

4.2 System Flowchart:

Figure 2 provides a clear and concise representation of the various steps involved in the process of detecting various constraints of the image while also highlighting the critical decision points where the system evaluates and interprets the data it receives. This diagram provides the flow of the project and it’s direction in detecting the problem and errors with the image.

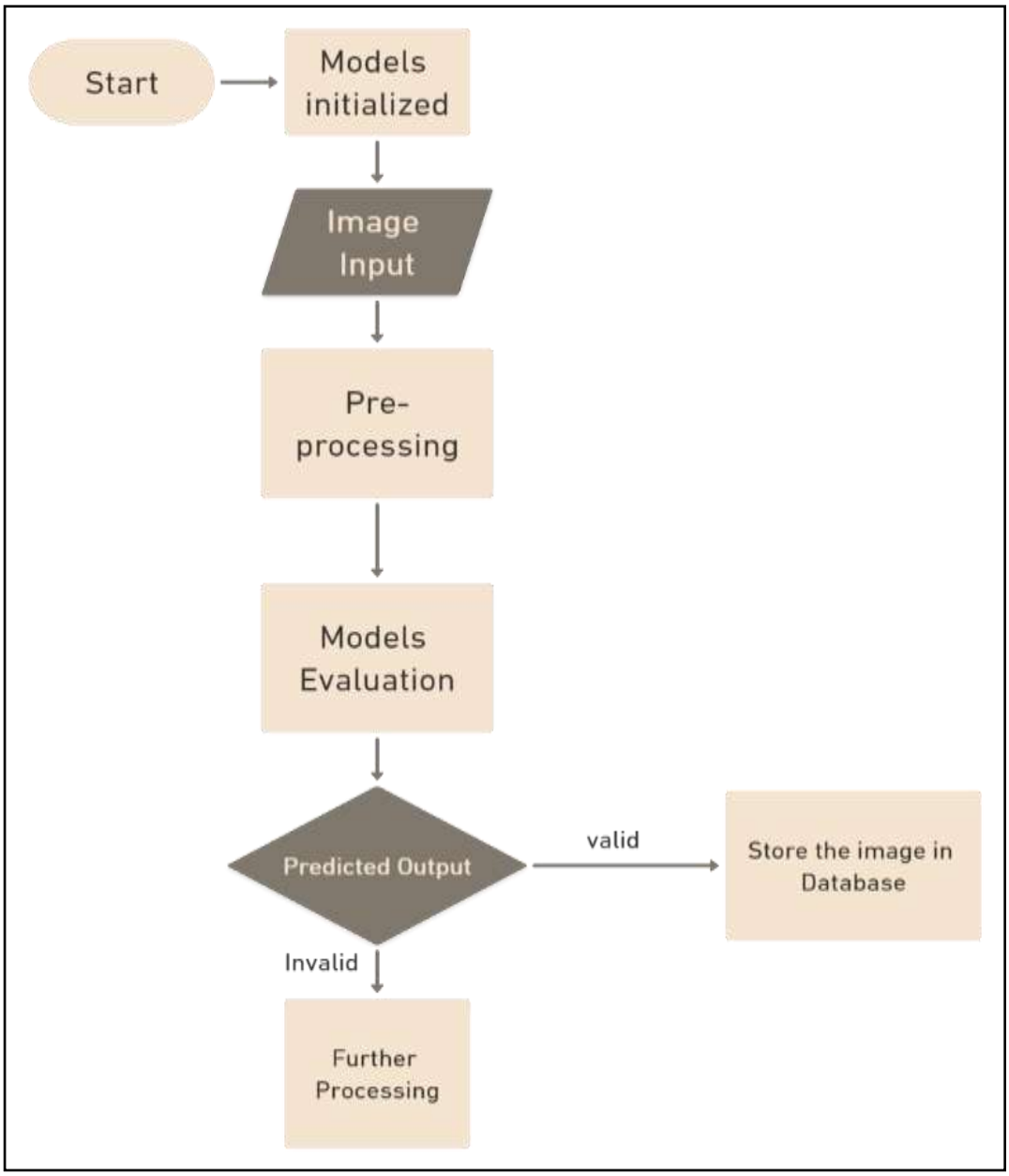

Figure 2 Detection Flowchart

Figure 3 provides a clear and concise representation of the various steps involved in the process of resolving various constraints of the image, while also highlighting the critical decision points where the system evaluates and interprets the data it receives. This diagram provides the flow of the project and its direction in solving the problem.

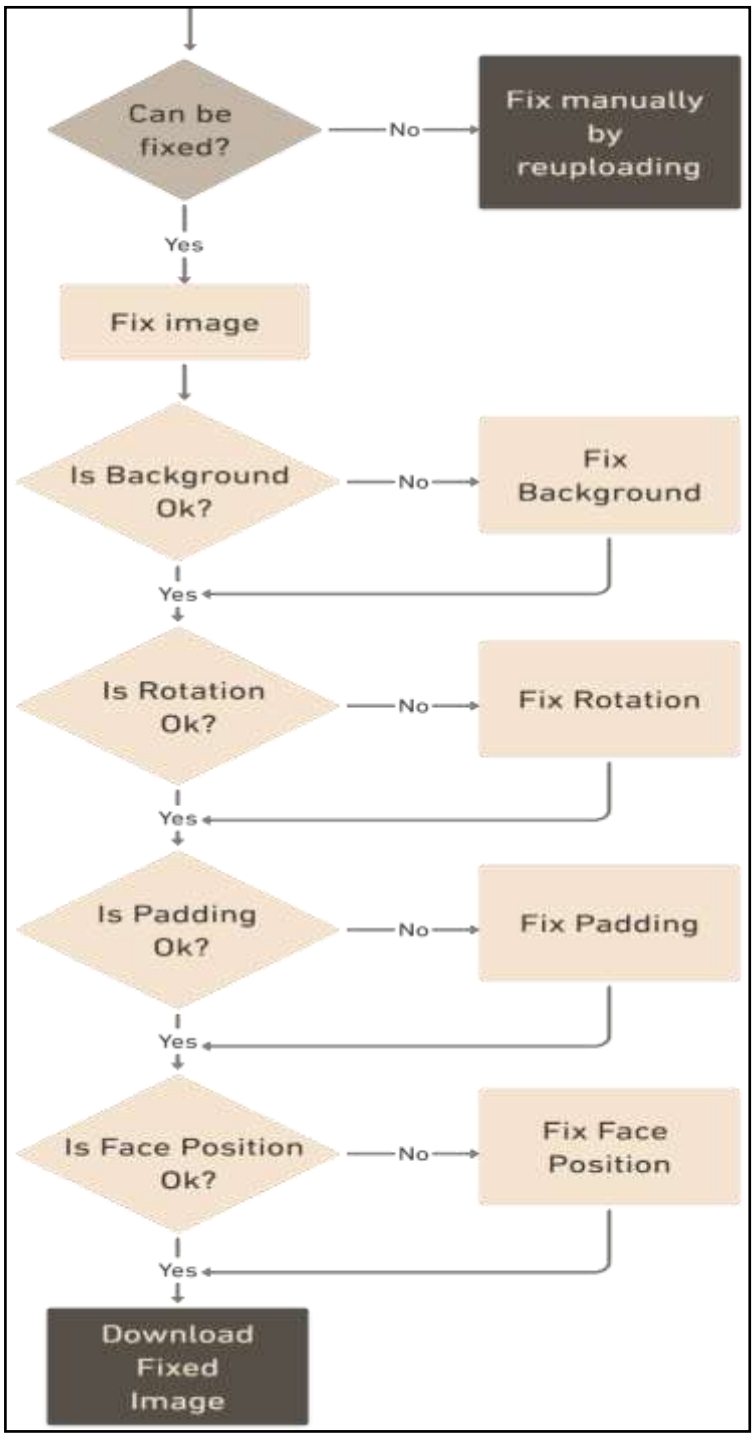

Figure 2 Resolution Flowchart

4.3 Methodology:

This system handles the issue of uploading photos and signs by utilizing machine learning on organizationally specified constraints and can determine in real-time whether an image submission would be permitted or rejected based on a number of defects found. The suggested method not only identifies faults, but it also offers remedies to the problems that are detected. When completed, this way will give the user a hassle-free experience, making the process of filling out forms a bit more user-friendly. The suggested method not only benefits the user but also the process's organization by decreasing the amount of manual work required for categorizing the document based on mistakes or identifying the error.

The suggested system can give flexibility to organizations seeking a distinct set of standards to follow that can be simply integrated into this system. Because of its flexibility and ease of use, the suggested system is a step ahead of existing e-form filling systems, which provide a terrible and jerky user

experience. Implementing the suggested system would not only make form filling easier and less time consuming, but it will also shorten the substantiation process within the organization, saving resources that would otherwise be spent on examining the documents.

To start with methodology of this system, Bring all required packages into play (NumPy, CV2, math, Dlib, Matplot, OS). user uploads an image. User made an API call. assemble the picture data, then display. data preprocessing. picture cloning using four separate processes. the first pipelines utilizing dlib for face detection. Facial feature extraction from a previously uploaded picture that has a face identified.

The picture is then further divided into modules for facial alignment and orientation. The third pipeline handles edge and background detection. The fourth pipeline is used to determine the height and width of user-uploaded images. If an error is found or a constraint is violated, the operation is stopped. send you to a website that fixes problems. If no or more than one face is discovered, prompt the user to reupload and restart the procedure. If the face rotation and alignment are not within the constraints, ask the user to reupload and restart the procedure. If the face orientation is not constrained, use CV2 to correct it. If the picture's height and width do not fit the specified limitation, modify by compressing the image. Check for errors again after previewing the changes to the user. Download the appropriate photograph from website.

5. Results & Analysis

This chapter provides the analysis and the screenshots of the results. In the implementation the system successfully detected the constraints with greater confidence and accurately detected the inconsistencies with the given constraints. To present the working of this system, Feature Based Image Validation System we have created a web page for user to upload the image for respective application along with the working of every module that, be used for the completion of the task.

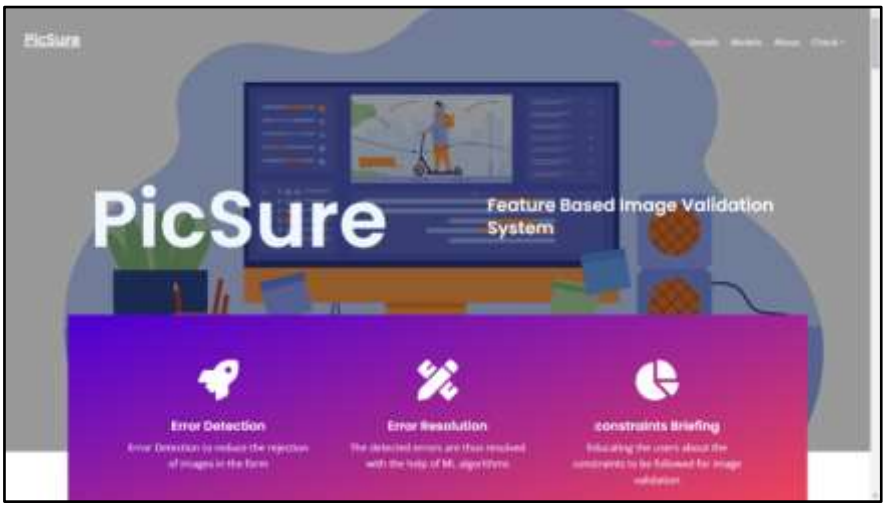

Figure 4 Landing page

The above Figure 4 shows the landing page of this system that will be shown to user after accessing the website every time.

Figure 5 Details page

Figure 5 shows the details page of the website that displays the details of form filling and the various number of details.

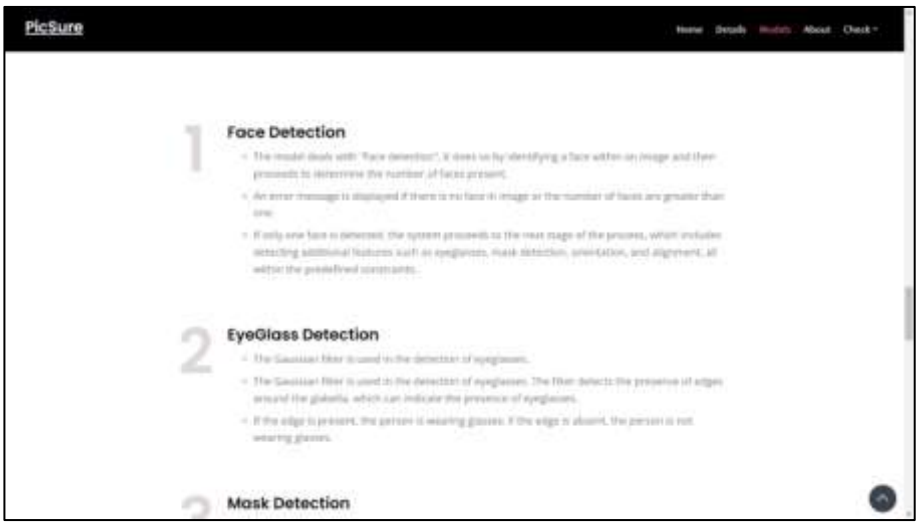

Figure 6 Models page

Above Figure 6 gives the presentation of the models page that contains the information about models used for constraints detection and resolution.

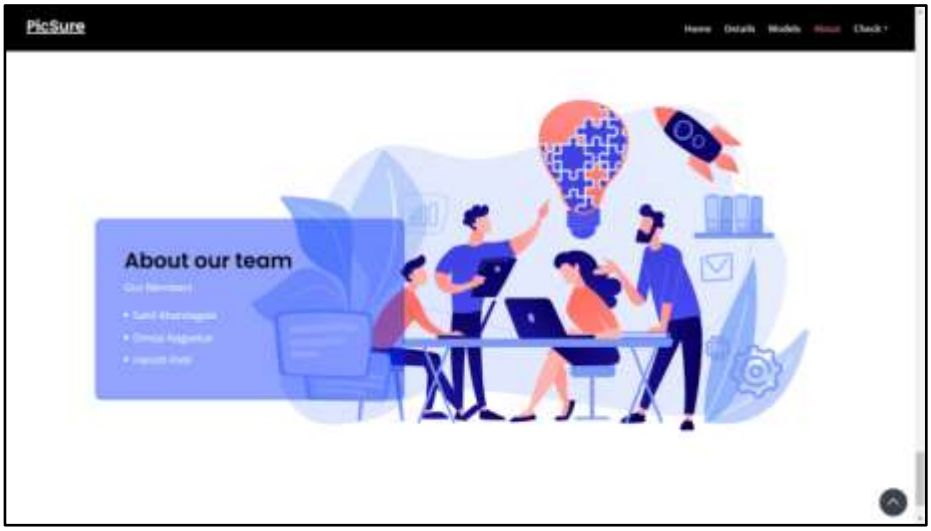

Figure 7 About page

Above Figure 7 gives you information about the team and its members along with the guide of the team.

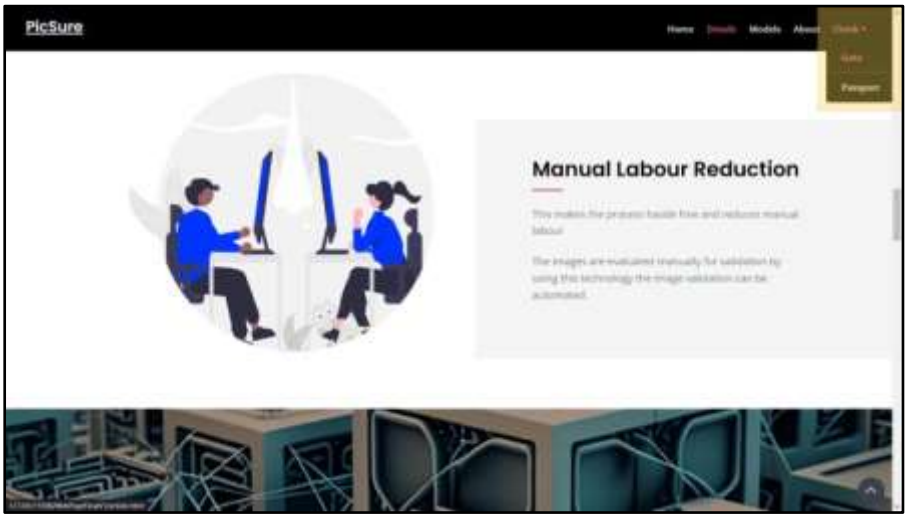

Figure 8 Check tool.

The above Figure 8 highlights the dropdown ‘Check’ tool menu that redirects you to the chosen tool for the afore mentioned use case.

Figure 9 Passport page.

Figure 9 is the passport photo checking page to verify whether users' photo is within the constraint of the passport constraints.

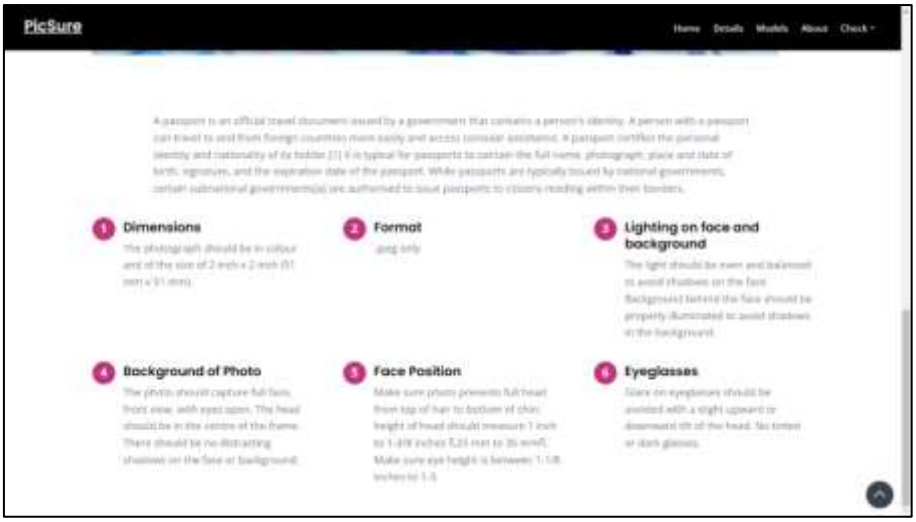

Figure 10 Passport constraints.

Above Figure 10 is the part of passport check tool that show cases the different constraints that will be need to be verified and fulfilled for passport.

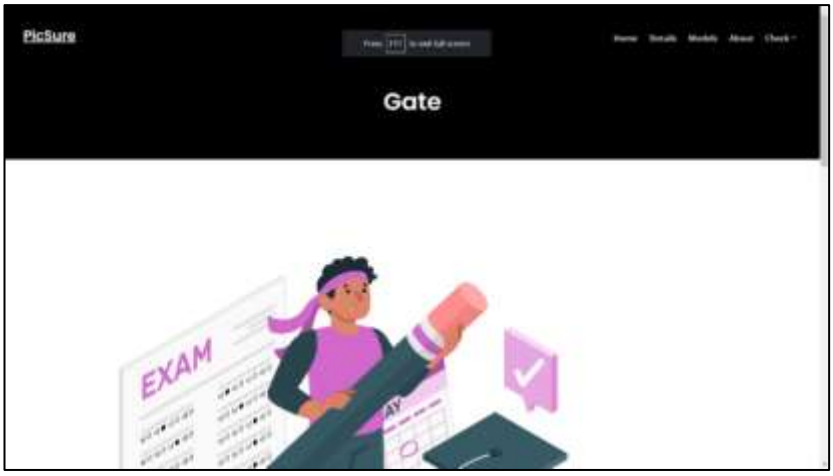

Figure 11 GATE page.

Above Figure 11 is the GATE photo checking page to verify whether users' photo is within the constraint of the GATE constraints.

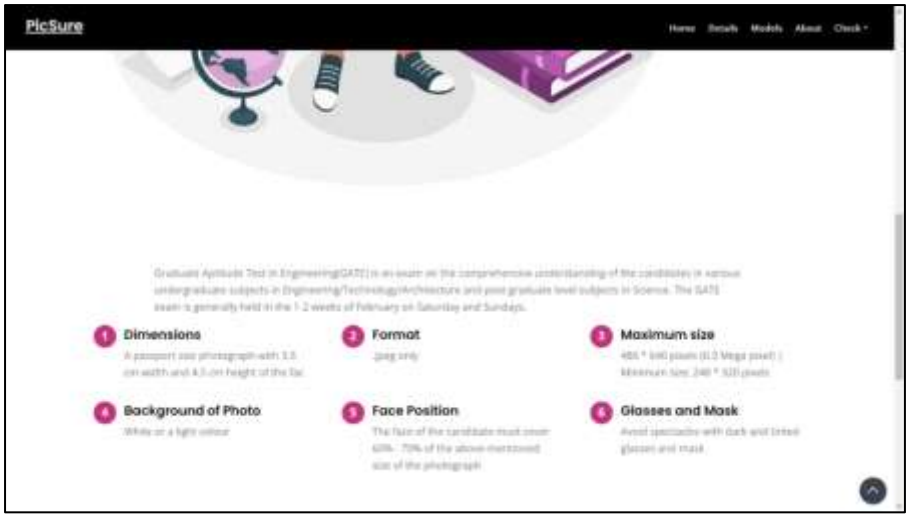

Figure 12 GATE constraints.

Above Figure 12 is the part of GATE check tool that show cases the different constraints that will be need to be verified and fulfilled for GATE.

Figure 13 Image with no face.

The above Figure 13 shows the image uploaded in GATE check without any face in the image uploaded by user.

Figure 14 Image with face.

In the above Figure 14 an image with detectable face is being uploaded into the GATE check tool.

Figure 15 Image with face but not white background.

The Figure 15 shows the output of various constraints and whether they are being fulfilled or not, in the above figure the image is not having a white background.

Figure 16 Image with face but user is having glasses and not proper background.

Figure 16 shows the demonstration on an image with scenery and user wearing the glasses which is against the constraints.

Figure 17 Image with face but user is having glasses and not proper background, corrected.

The Figure 17 shows the image with resolved issues and showing the photo that is with resolved issues from the figure 5.13.

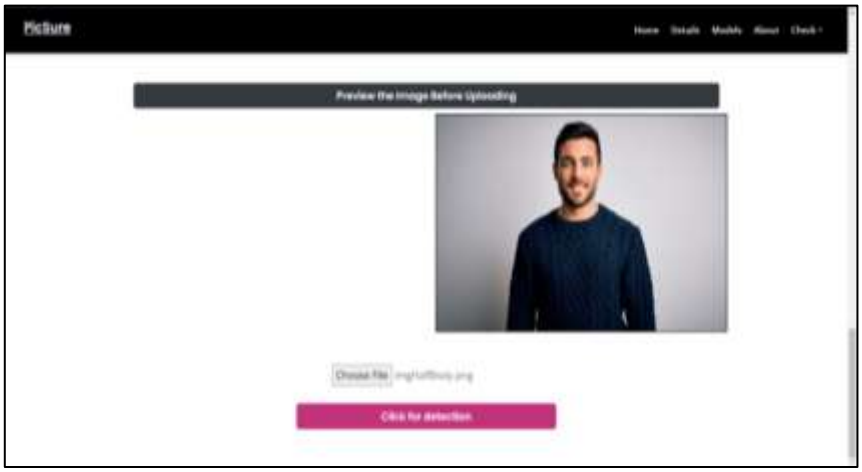

Figure 18 Image with not proper background and body.

Figure 18 gives the presentation on user uploading an image with not quite white background and more body being exposed.

Figure 19 Image with not proper background and body.

Figure 19 gives the presentation on user uploaded image with not quite white background and more body being exposed being resolved.

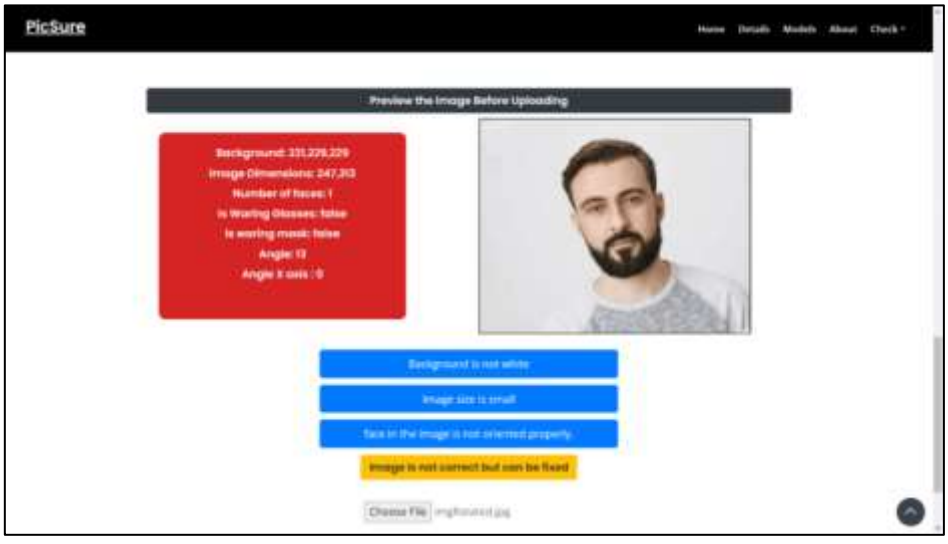

Figure 20 Image with head tilt.

Figure 20 shows us the image where user face is oriented out of the regular angle of the photo that is to be submitted.

Figure 21 Image with multiple face.

Figure 21 is an image with multiple faces that detected that are strictly not allowed in the GATE process.

Figure 22 Image with sunglasses or glasses.

Figure 22 shows an image input by user with scenery and user wearing the glasses which is against the constraints and cannot be corrected.

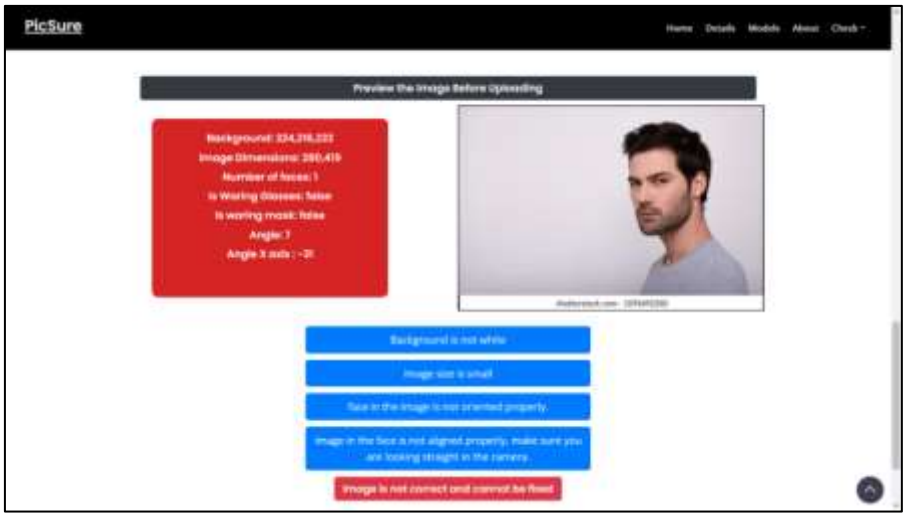

Figure 23 Image with sideways head.

Figure 23 in an image with head being rotated sideways which is irreparable and cannot be uploaded since much of his face is not disclosed.

Figure 24 Image with mask.

Above Figure 24 is an image in which the face is not visible since the user is wearing a mask in the photo.

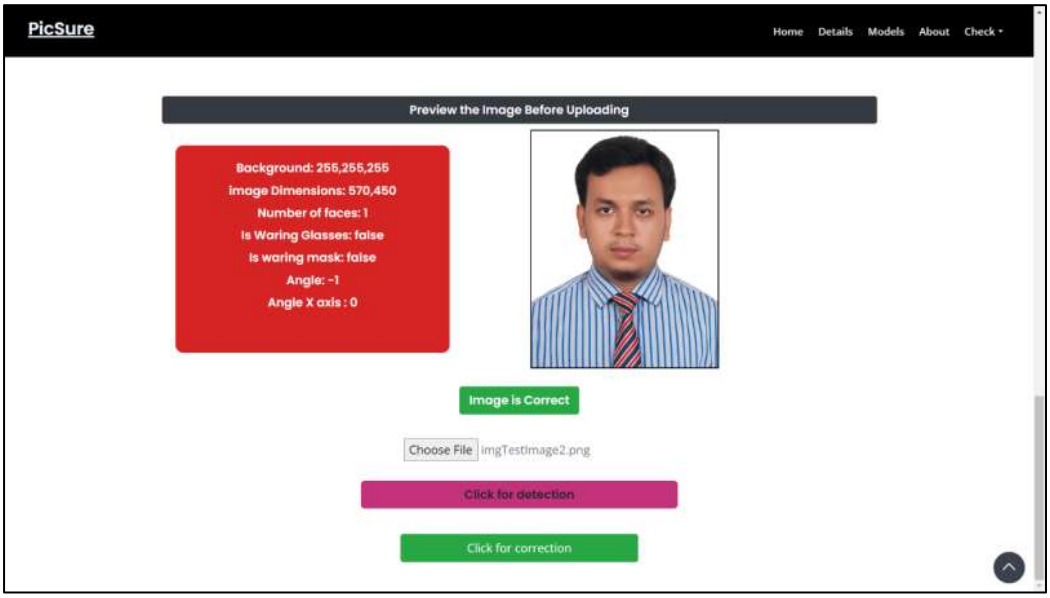

Figure 25 Ideal Image.

Figure 25 is an ideal image with all constraints being completely fulfilled and ready to be uploaded for GATE process.

At first, on the website landing page, the user will be given information about the online form-filling procedure and how important it is for the user to upload the document within the constraints of the organization's parameters for the said documentation to be accepted. The next part provides details about the models used to create the system.

To validate and resolve the image required for certain online forms, the user can directly select from the 'Check' option which online forms they want their image to be validated. After choosing either of the options, the user will be directed to the webpage of the selected choice. For the GATE validation system, the user will be first shown a short description of the constraints that are required to follow by an image to be accepted on the GATE application; below the constraints description, the user has to upload the image they want to for GATE application form and click on the 'Click for Detection' button; after that, the user will be a prompted if the user-uploaded image has any constraint issues or it is good to be submitted on GATE application form. At this point, there can be two constraint issues: one that can be solved using computer image processing techniques, and the rest where the user has to re-upload the image since performing the image processing on such issues would violate the terms of the agreement of the online form they will be filling out. The system resolves any problems that could be fixed through image processing. The user is given the image with the issues resolved and ready to be uploaded on the application.

6. Conclusion

The suggested solution benefits both users and the organization by automating the process of checking and minimizing the human labor required for classifying the document based on mistakes or identifying the error. The suggested system can give flexibility to organizations seeking a distinct set of standards to follow that can be simply integrated into this system. Because of its flexibility and ease of use, the suggested system is a step ahead of existing e-form filling systems, which provide a terrible and jerky user experience. Implementing the suggested system would not only make form filling easier and less time consuming, but it will also shorten the substantiation process within the organization, saving resources that would otherwise be spent on examining the papers

References

[1]. J.Y. Kim, KR, H.R. Choi, J.H. Kwon, T.Y. Kim, "Recognition of face orientation by divided hausdorff distance", 38th International Conference on Telecommunications and Signal Processing (TSP), Prague, Czech Republic, 2019.

[2]. S.R. Benedict, J.S. Kumar, "Geometric shaped facial feature extraction for face recognition ", IEEE International Conference on Advances in Computer Applications (ICACA), Coimbatore, India, 2017.

[3]. J. Deng, J. Guo, S. Zafeiriou, "Single-Stage Joint Face Detection and Alignment", IEEE/CVF International Conference on Computer Vision Workshop (ICCVW), Seoul, Korea (South), 2020.

[4]. J., Jia Guo, E. Ververas, I. K. Stefanos Zafeiriou, "RetinaFace: Single-Shot Multi-Level Face Localisation in the Wild", IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Seattle, WA, USA, 2020.

[5]. M. Subasic, S. Loncaric, T. Petkovic, H. Bogunovic ,V Krivec "Face image validation system", Proceedings of the 4th International Symposium on Image and Signal Processing and Analysis, Zagreb, Croatia, 2005.

[6]. A. Tarafdar, S. Roy, A. Mondal, R. Sen, A. Adhikari, "Image Segmentation Using Background Subtraction On Coloured Images", International Conference on Opto-Electronics and Applied Optics (Optronix), Kolkata, India, 2019.

[7]. S. Dome, A. P. Sathe, "Optical Character Recognition using Tesseract and Classification" International Conference on Emerging Smart Computing and Informatics (ESCI), Pune, India, 2019.

[8]. S. Gupta, A. K. Meena, "A Practical Implementation of Automatic Document Analysis and Verification using Tesseract",International Conference on Computational Techniques, Electronics and Mechanical Systems (CTEMS), Belgaum, India, 2019.

[9]. Nataliya Boyko, Oleg Basystiuk, Nataliya Shakhovska, "Performance Evaluation and Comparison of Software for Face Recognition, Based on Dlib and Opencv Library", IEEE Second International Conference on Data Stream Mining & Processing (DSMP), Lviv, Ukraine, p 21-25, 2018.

[10]. Xianghua Fan, Fuyou Zhang, Haixia Wang, Xiao Lu, "The system of face detection based on OpenCV", 24th Chinese Control and Decision Conference (CCDC), Taiyuan, p 23-25, 2012.

[11]. Arjya Das, Mohammad Wasif Ansari, Rohini Basak, "Covid-19 Face Mask Detection Using TensorFlow, Keras and OpenCV", IEEE 17th India Council International Conference (INDICON), New Delhi, India, p 10-13, 2020

[12]. Saeid Fazli, Reza Afrouzian, Hadi Seyedarabi, "Fiducial facial points tracking using particle filter and geometric features", International Congress on Ultra Modern Telecommunications and Control Systems, Moscow, Russia, p 18-20, 2010

[13]. Sofia Jennifer J., Sree Sharmila T., Srinivasan R., "Facial feature extraction for head tilt images based on eye canthus", IEEE Region 10 Conference (TENCON), Singapore, p 22-25, 2016

[14]. Fei Yang, "Robust face tracking with a consumer depth camera," ICIP, 19th IEEE International Conference on. IEEE, Orlando, FL, USA, 2012.

[15]. Gaurav Goswami, "On RGB-D face recognition using Kinect," IEEE Sixth International Conference on Biometrics: Theory, Applications and Systems (BTAS), Arlington, VA, USA, 2013.

[16]. Daniel Huttenlocher, Gregory A. Klanderman, and William J. Rucklidge, "Comparing images using the Hausdorff distance," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 23(1) 1993, p. 126-136.

[17]. Paul Bao, D. Zhang, and Xiaolin Wu, "Canny edge detection enhancement by scale multiplication," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 27(9), 2005, p. 1485-1490.

[18]. Robert Keys, "Cubic convolution interpolation for digital image processing," IEEE Transactions on Acoustics, Speech and Signal Processing, vol. 29, 1981, p. 1153-1160.

[19]. "https://www.youtube.com/watch?v=MrRGVOhARYY", last accessed on: 24/09/2022.

[20]. “https://www.youtube.com/watch?v=7IFhsbfby9s”, last accessed on: 24/09/2022.

[21]. “https://www.w3schools.com/jsref/jsref_obj_math.asp”, last accessed on: 24/09/2022.