

PAPER NAME

ASIP2022_removing or avoiding the camera

AUTHOR

Lianly Rompis

WORD COUNT

2327 Words

CHARACTER COUNT

12352 Characters

PAGE COUNT

7 Pages

FILE SIZE

426.9KB

SUBMISSION DATE

Jun 7, 2023 6:58 AM GMT+8

REPORT DATE

Jun 7, 2023 6:59 AM GMT+8**● 16% Overall Similarity**

The combined total of all matches, including overlapping sources, for each database.

- 16% Internet database

● Excluded from Similarity Report

- Publications database
- Crossref Posted Content database
- Small Matches (Less than 20 words)
- Crossref database
- Submitted Works database

1 Removing or Avoiding the Camera Focus Light Appearing on Glossy or Bouncing Surfaces by Light Guiding and Image Warping

LIANLY, ROMPIS *

Electrical Engineering Study Program, Faculty of Engineering Universitas Katolik De La Salle Manado

Irompis@unikadelasalle.ac.id

1 Digital picture or image becomes more and more important in people's daily life, such as for administration, documentation, active communications, and learning processes. People also demand the exchange of information through digital applications and social media. Taking picture or photo of a document, book, certificate, or thing is usually done by the help of digital scanner, but not all these stuffs can be converted into digital with a scanner. In specific condition people need real image transfer and will take photo of the real view directly using their own digital camera or smartphone camera. From author experience and observations, when taking photos of a document or book or certificate or thing normally with plastic cover or glass surface or bouncing surface, we clearly got an annoying light came from the camera focus light or flash that usually creates noise and messy image. This research was conducted based on the idea to remove or avoid getting the unwanted or disturbing light while taking photos of glossy or bouncing surfaces. A procedure to get a clear and smooth image instead of noise and broken image was derived and implemented by author using light guiding and image warping. These two methods bring accurate images that are necessary for communication needs and facilitate better future works without compromising security policies and people's rights. As the research methodology, author performed literature study, observation, analysis, and implementation. The result of this research offers a good procedure and method that can help people getting clear photos or pictures of a glossy or bouncing surface, advance research to be implemented related to camera technology, and best comprehension to improve photography techniques for future developments.

CCS CONCEPTS • Social and Professional Topics

Additional Keywords and Phrases: Camera, Flash, Taking Photo, Bouncing Surface, Glossy Surface, Digital

1 INTRODUCTION

In our daily life, taking pictures or photos of a document, book, certificate, or thing are often done for the purpose of administration, documentation, collection, sale, and other important needs. The best thing to do is by using a digital scanner. However not all the documents, books, certificates, or things are able to scan using scanner. A picture or text pasted on cupboard, table, or wall, things to sell such as watch, laptop, shoes and other stuffs cannot be captured by scanner and need to be directly taken using digital camera or smartphone. After pandemic 2019 people also treat images more and more important than they usually do. Digital pictures and images are considered urgent and essential to be used in exchanging information through social media, and people are more comfortable taking photos or pictures directly with their digital camera or smartphone.

* Place the footnote text for the author (if applicable) here.

Nowadays, digital camera technology and smartphone camera has improved their performance and embedded digital circuits, so it is not difficult to get many good qualities of various kind of images. However, for some specific reasons, people still need proper technology and the right and professional techniques to get an awesome outcome as expected.

From author experience and observations, usually people got an annoying light or disturbing result of image came from the camera focus light or flash light while portraying an object with a glossy or bouncing surface.

Through this research, an idea to remove or avoid getting the unwanted or annoying light while taking photos of glossy or bouncing surfaces was taken into consideration. The author decided to conduct small research regarding light and image processing, the combination of Electronics Engineering and Computer Graphics Field, to portray documents, books, certificates, or things that normally have a plastic cover, glass surface, or glossy/bouncing surface. The results of this research are believed will solve the important issue explained above and produce a good quality of glossy or bouncing surface portrait to help people manage their own stuffs, communicate effectively, and exchange information better through images without compromising security policies and people's rights.

2 AIM

This research derives a procedure to get a clear and best image of a glossy or a bouncing surface by removing and avoiding the camera focus light using light guiding and image warping method. The research output can be implemented with digital camera or smartphone camera technology.

3 RELATED STUDIES

A literature study and observation were conducted as the preliminary steps to find out the basic concept and right procedure for this research.

3.1 Literature Study

After conducting literature study, author found out that a research or scientific discussion directly related to a problem of removing or avoiding the camera focus light appearing on a glossy or bouncing surface has never been done. However, some research with different related scopes such as for focus light, light intensity, and light shifting, have ever implemented. Those conducted research were chosen by author to form the main concept and analysis for this research.

In the field of photograph, image property such as focus light may not be significantly modified post-capture however a new software and camera technology will allow people to adjust image focus after a picture has been taken [1].

Regarding the light intensity, the highest intensity comes from a white lamp and the lowest intensity comes from a black lamp [2]. This fact indirectly related to and affects the quality of portrayed image with glossy white background and other colors background.

The other important things that author got from literature study, adding some degrees to the cameras is possible to improve the capabilities and result of a good quality image [3], and image fusion provides a great tool for enhancing image capture [4].

Image warping is a transformation which maps all positions in one image plane to positions in a second plane [5]. A source image can be re-projected to improve its performance. The choice of conducting warping can be considered for smooth distortion and correlation between images [6].

3.2 Observation

Real observations in daily life gave comprehension that every plastic, glass, or bouncing surface reflect light. When we took portraits of bouncing surfaces using flash light from camera, they reflect a ray of light. Suppose we are not using the flash light, the result will give little shadow or darker illumination [7,8,9,10].

With a white glossy or bouncing surface background it will not affect much and the portrait still looks good and great. But for other background colors, this gives bad effects and disturb the performance of images. These observations can be seen in the following figure 1 and figure 2.

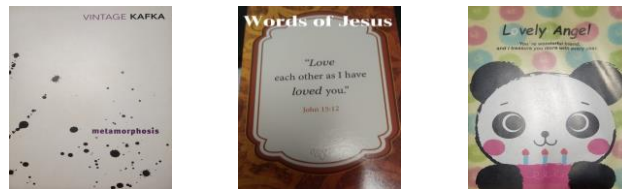


Figure 1: Photo of Books with Glossy or Bouncing Cover Paper



Figure 2: Photo of Calendar Pictures Pasted on the Glass Cupboard

4 ANALYSIS

Based on the related studies described in section 2, an analysis was done to derive the right method and procedure for portraying pictures or images with glossy or bouncing surfaces. The major problem was the camera focus light that interrupts the photo or captured image. Not using the focus light would made the image darker and sometimes had shadows and another object reflections [7,8,9,10].

Author determines a procedure that consists of two primary steps: guiding the camera focus light or flash light into a proper area and apply the image warping technique to get the result. Logically, these two methods will remove or avoid the camera focus light usually appearing when taking photos of glossy or bouncing surfaces.

4.1 GUIDE THE FOCUS LIGHT INTO A PROPER AREA

The first step or first method is to guide the focus light into a proper area because this is the essential problem although in some cases the focus light is needed to create a beautiful and sharp image. Nevertheless, for taking

photos of documents, books, certificates, or things with bouncing surface, mostly we do not want the light to be appeared. How to guide the focus light? It can be done in four standard ways: to the upper side, to the bottom side, to the left side, or to the right side of the object to be photographed, as described in figure 3.

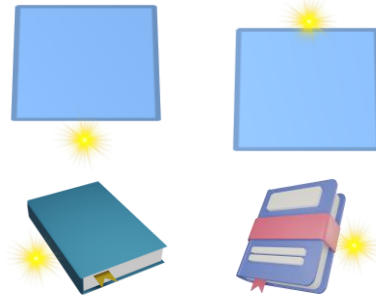


Figure 3: Method of Guiding the Camera Focus Light into Proper Area

Although we do not want the camera focus light to be appeared, remember that we still need the ray of light to illuminate the proper area or side of the object. The position of the object and camera focus light could be set properly to get a better ray of light and best result as given by figure 4 and 5. It needs good practices and this method surely will make the portrayed image stands in a rotate perspective.



Figure 4: Camera Focus Light was Guided to The Upper Side of The Photographed Object



Figure 5: Camera Focus Light was Guided to The Bottom Side of The Photographed Object

4.2 APPLY IMAGE WARPING TECHNIQUE

The result of rotate perspective must go through the next step or the second method, i.e., image warping technique, so the photo or captured image orientation can be re-arranged or re-projected in vertical or horizontal

position, front facing as we required to be. Soft skill and good application are required for this technique. The method of image warping is shown in the following figure 6.



Figure 6: Method of Image Warping

5 IMPLEMENTATION

Based on the analysis, the author started to apply and test the two methods which have taken into approach for this research.

Author used a 48MP Samsung Galaxy A31 with LED Flash and 6.4 inches display to take picture of the sample objects. Supported by the sunlight and room lighting, author then choose one of the four standard ways to guide the flash light into a proper area. In figure 7 you can see that the camera focus light was guided to the upper side of photographed object which considered the best area for illumination. The position of the object and camera focus light could be shifted for finding the precise object illumination if needed. Here, author shifted the camera focus light manually by shifting the smartphone camera then took portrait.



Figure 7: Camera Focus Light was Guided to The Upper Side of Photographed Object

For image warping, author applied an application named Image Warp - Grid Modifier from Petales, Germany. Their other digital product that offers best result is Warp Labs – Free Transform. With this application, the captured source image went through an image processing as shown in figure 8 and can be re-projected into

straight-oriented image, a front facing perspective. An exact re-projection and smooth image was generated with the assist of manual grids programmed by the application as described in figure 9.



Figure 8: Applying the Image Warping Technique



Figure 9: An Exact Re-projection and Smooth Image Generated with Manual Grids

After several tests, as already expected, the implementation of the two methods ran well and gave perfect results. Light Guiding and Image Warping could remove the unwanted camera focus light. Some photos or captured images from smartphone camera taken during the research gave a good portrait and better-quality shot of image as shown in figure 10.

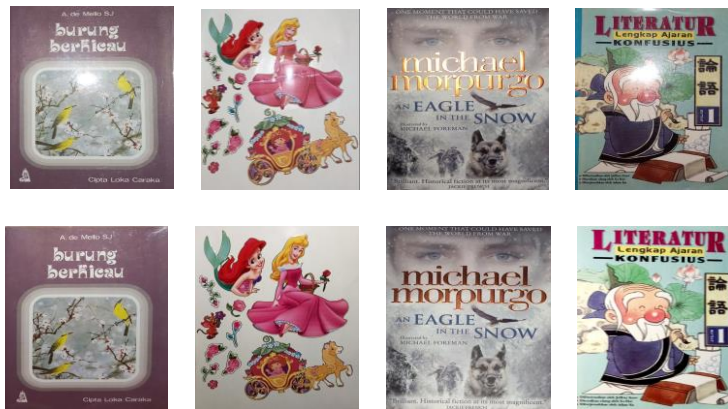


Figure 9: The Result Before and After Applying the Light Guiding and Image Warping

6 CONCLUSION

This research confirms that a bouncing or glossy surface reflects focus light from digital camera or smartphone camera, and it can be removed or avoided appearing on those surfaces by light guiding and image warping. Focus light helps create good-looking image and proper brightness of a glossy or bouncing photographed object when placed in the right area and warped in the right orientation.

The camera focus light was shifted manually, and the image warping technique was done later using a good application. The results were very satisfying, but it was expected that this procedure will be more efficient in the future where the focus light shift can be controlled and if necessary integrated with the image warping application.

Several future works can be done to improve the solution for quality of image, such as light intensity controller, light shifting technology, light beam expansion, and combining two or several parts of an object or photo into one enhanced image.

REFERENCES

- [1] Blaine Brownell. 2011. Light Field Camera Allows Focus Shift, Post Shot. Architect.
- [2] Limbran Sampebatu and S. Mahmud. 2017. Analisis Intensitas Cahaya Lampu Berwarna dalam Ruangan Putih pada Prodi. Teknik Elektro UAJM. Prosiding Seminar Nasional Riset dan Terapan ke-7. Kupang: Universitas Widya Mandira, p.173-180.
- [3] Emerson Olaya, Francois Berry, and Youcef Mezouar. 2014. A Robotic Structured Light Camera. IEEE/ASME International Conference on Advanced Intelligent Mechatronics. Available: <https://doi.org/10.1109/AIM.2014.6878165>
- [4] Peter Burt and R.J. Kolczynski. 1993. Enhanced Image Capture through Fusion. 4th International Conference on Computer Vision. Available: <https://ieeexplore.ieee.org/document/378222>
- [5] Huw Bowles, Kenny Mitchell, Robert Sumner, Jeremy Moore, and Markus Gross. 2012. Iterative Image Warping. EUROGRAPHICS. the Eurographics Association and Blackwell Publishing Ltd., Vol. 31, No. 2.
- [6] Chris A. Glasbey and K.V. Mardia. 1998. A Review of Image-Warping Methods. Journal of Applied Statistics, Carfax Publishing Ltd., Vol. 25, No. 2.
- [7] Jean Jiang and Li Tan. 2019. Digital Signal Processing: Fundamentals and Applications. Elsevier Publisher.
- [8] Hendi Hendratman. 2017. Computer Graphic Design. Jakarta: Penerbit Informatika.
- [9] Wilhelm Burger and Mark. J. Burge, 2008. Digital Image Processing, London: Springer, Ch 4. pp.37-52.
- [10] Dennis. P. Curtin. 2011. Digital Desktop Studio Photography: The Complete Guide to Lighting and Photographing Small Objects with your Digital Camera [Online]. Available: <http://www.shortcourses.com/tabletop/index.html>

Authors' background

Your Name	Title*	Research Field	Personal website
Lianly Rompis	Senior Lecture	1. Digital System 2. Information Technology Studies 3. Image Processing	-

3 This form helps us to understand your paper better, **the form itself will not be published.**

*Title can be chosen from: master student, Phd candidate, assistant professor, lecture, senior lecture, associate professor, full professor

● 16% Overall Similarity

Top sources found in the following databases:

- 16% Internet database

TOP SOURCES

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	scilit.net Internet	13%
2	ijsps.com Internet	2%
3	researchgate.net Internet	1%