

Homework: Reflection on Detecting Fake Images

By: **Farzaneh Noroozi**

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How can digital forensic professionals and IS professionals create systems to catch or prevent cheating, considering that IS systems include software, people, business rules, and processes?

Making sure digital systems are secure and prevent cheating involves using different methods. It's like having many tools in a toolbox. First, we need strong ways to confirm and allow only the right people to access important data or systems. Think of it like having a special key or code to open a door. We also need to regularly check and monitor the system to catch any unusual or unauthorized activities.

For the computer part, we can use special systems that act like detectives. These systems watch the network traffic and can identify strange patterns or behaviors. If they see something not right, they can stop it before it causes problems.

People are very important too. Everyone using the systems should know about what's right and wrong, like in a game. So, training programs can teach them about good behavior and the consequences if they do something wrong. It's like everyone being on the same team and following the rules.

Setting up rules for the business is like creating a playbook. These rules make sure everyone follows security policies and does things correctly. For example, there are rules about who can access what and when. It's like having a plan to keep everything safe. Regular checks and processes for investigating issues should be in place to quickly deal with any problems that might come up. This whole approach helps create a safe and trustworthy environment for everyone involved.

Question 1

If National Geographic has hired you to consult on their yearly nature and wildlife photo competition, how would you approach the consultation?

If I'm helping National Geographic with their photo contest, I would use a smart plan. I'd use special computer programs to check if photos are changed and make sure the rules for the contest are clear. I'd also create clear steps to follow to keep the contest fair. The main aim is to find and stop any changes to photos, so the winning pictures truly show the beauty of nature.

what algorithms might you recommend?

I would recommend implementing algorithms such as Error Level Analysis (ELA) (Gunawan et al., 2017) and those designed for detecting image tampering based on noise patterns or pixel-level analysis. ELA can identify compression level discrepancies, while other algorithms can analyze subtle alterations in images. These tools would serve as valuable assets for initial screening, helping judges identify and investigate potentially manipulated photos.

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What competition rules or business rules might you recommend to help judges investigate if an image is modified?

Having clear and simple rules for the photo contest is really important. I suggest making specific guidelines for how photos should be real, saying what kind of editing is okay, and clearly saying what things photographers can't do. Photographers should also give information about how they edited their photos. The people judging the contest should know how to use special computer programs to check if a photo seems suspicious. This way, everyone can be sure the contest is fair and follows the rules.

What processes might you recommend to National Geographic for verifying the authenticity of submitted photos?

I would recommend implementing a systematic approach to image verification. This could involve random checks on a subset of submitted photos using forensic algorithms. In cases where concerns are raised, a well-documented and transparent investigation process should be in place. This process should include communication with the photographer, requesting additional information or original raw files for further analysis. The goal is to ensure a thorough and fair evaluation of all submitted images.

what processes you might recommend?

Referring to scholarly articles could provide valuable insights. For instance, the study titled "Detection of Copy-Move Forgery in Digital Images" by Fridrich, Soukal et al. (2003) could be relevant. While focused on a different type of forgery, the principles of detecting alterations in digital images are applicable. Incorporating insights from such research can contribute to the development of effective algorithms and processes for maintaining the authenticity of submitted photos.

Question 2

As a photographer, what steps might you take in advance of submitting your photo to a competition to avoid accusations of cheating or defend yourself if accused?

If I were a photographer entering a contest, I'd take steps to ensure my photo is genuine, especially considering the strict rules mentioned in the video that prohibit the use of any editing program, including cropping. Firstly, I would thoroughly understand the specific rules of the competition, paying close attention to limitations on editing practices, which, as per the video, might include restrictions on cropping. I would strictly adhere to these guidelines, ensuring that my creative process aligns precisely with the specified criteria.

In light of the no-editing program rule, I would adapt my approach to maintain compliance. Detailed record-keeping would remain essential, encompassing the entire process from capturing the image to any permissible adjustments. This would involve preserving the original, unedited files, documenting the permitted tools used, and noting down creative decisions within the confines of the competition rules.

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outlined in the video. Transparency about my process, coupled with meticulous documentation, would serve as a robust defense against accusations of cheating.

Given the limitations imposed by the competition rules, where even cropping is disallowed according to the video, I would ensure that my creative choices align with these restrictions. Regularly saving copies of the original files, staying informed about industry standards, and consistently adhering to the stringent rules for fair photography would collectively demonstrate my commitment to honesty and rule adherence, safeguarding my reputation in the contest.

References

1. Gunawan, T. S., Hanafiah, S. A. M., Kartiwi, M., Ismail, N., Za'bah, N. F., & Nordin, A. N. (2017). Development of Photo Forensics Algorithm by Detecting Photoshop Manipulation Using Error Level Analysis. *Indonesian Journal of Electrical Engineering and Computer Science*, 7(1), 131–137. <https://doi.org/10.11591/ijeecs.v7.i1.pp131-137>
2. Fridrich, J., Soukal, D., & Lukáš, J. (Year not provided). Detection of Copy-Move Forgery in Digital Images. *Department of Electrical and Computer Engineering, Department of Computer Science, SUNY Binghamton, Binghamton, NY 13902-6000*. [Link to the Article](#)