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Independent Study Mentorship 2A

5 February 2020

Anti-Spoofing Methods

Assessment 14 - Research Assessment

Date: 5 February 2020

Subject: Anti-Spoofing Methods

Works Cited:

Parveen, Sajida, et al. “Face Anti-Spoofing Methods.” Current Science (00113891), vol. 108, no. 8, Apr. 2015, pp. 1491–1500. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=103058273&site=ehost-live.

Assessment:

In the world of computer vision, more specifically facial recognition there are many methods to spoof a device such as through photos, videos, and face masks. Fortunately, there are also several methods to counter these spoof attacks such as motion analysis, life sign detection, texture detection, and thermal sensing. Despite the wide array of methods, choosing the method that best fits your needs is absolutely central to the effective development of a product.

To start, motion analysis was considered. Motion analysis is effective in the low user interaction required such and so is nearly a nonintrusive liveness detection method. This is especially important to consider because a goal for this project includes making it a product that is easily usable for the average consumer. Therefore a low user interaction means it is easier to get the project actually working. The main disadvantage of going through this route is the high camera quality necessary. Not every user of this project will have a high-quality camera

accessible and therefore will not be appealing for most users. Additionally, motion analysis depends on the illumination of a room. There is no guarantee that the room will be in ideal conditions therefore the practicality of using motion analysis is rather low despite its obvious advantages.

Another method that was analyzed was by using life signs. This seems to be the most effective in terms of the types of attacks as it was resistant to all attacks. The two main limitations though applied specifically to my goal of making this a consumer product. Detecting life signs requires additional sensors and some sensors such as an optoelectronic sensor can be costly. Therefore, the very idea of using an external sensor would hinder the user from actually utilizing the software; Afterall, the goal is to make this as much of a software heavy project as possible. Additionally, this should be accessible to everyone and so higher costs deter people from actually using the product.

The final method that was explored was texture detection. Texture detection relied primarily on image processing algorithms and so is completely software dependent. Texture detection is completely nonintrusive as it functions as the face is being detected. Additionally, the costs are essentially none because image processing algorithms are all embedded into the software itself. The cheap costs, nonintrusive nature and no external hardware cause this to be the most ideal method in implementing a liveness system. To add to the advantages, texture detection seems to have good results in a variety of scenarios. The only disadvantages such as low textural attacks would rarely apply to a simple application such as a face detection application.

In synthesis, by analyzing all possible methods of antispoofing, I have discovered that the ideal method would be through texture detection. Additionally, through this research, there are new algorithms and classifications such as local binary patterns and classifications to research in order to improve the final product. Collectively speaking, the analysis of the different methods of antispoofing has set in stone the foundations for the next part of the development of the application.

Annotations