

If You Give a Mouse a Cookie: The Ethical Implications of Progressively Giving Ourselves to Biometrics

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Introduction

Biometrics has made it significantly easier to access information (e.g. unlocking our cellular phones or electronic health records), serve as an electronic signature and authentication among other functions. Just by using our fingerprints, irises, or even the way we walk can facilitate several of the aforementioned actions. However, discourse on its safety (namely the privacy of the user's data) and ethicality has caused for opponents of biometrics to strongly urge against using these technologies. Given the widespread use of biometrics, it would not be surprising if consumers have more than 1 form of these identifiers. Therefore, if consumers are already giving away common identifiers, how much more are they willing to give up in the name of innovation?

Research Questions

1. What ethical issues arise with biometrics?
2. What are the long-term effects of using biometrics?

Forms of Biometrics

- **Visual**
 - Fingerprints
 - Iris recognition (**figure 1**)
 - Face recognition
- **Behavioral**
 - Gait (**figure 2**)
 - Typing recognition
 - Signature recognition
- **Chemical**
 - DNA matching
- **Auditory**
 - Voice recognition
 - Voice authentication

Methods

A literature review was conducted to understand the current nature and future of biometrics as well as the ethical concerns surrounding this technology. Articles, grey literature, and books were found by using search engines (Google and Google Scholar) and electronic databases (ScienceDirect, Springer Nature Journals, and ProQuest). The specific search terms involved "ethical issues with biometrics", "ethics and biometrics", and "data on biometrics use". Given the scope of this topic, the only limiting factor set was that the sources discussed biometrics broadly rather than focusing on a specific area of biometrics (e.g.) fingerprints or DNA matching). To be included in the research, articles, grey literature, and books were chosen based on their relevance to the topic and had to be written in the English language.

Results

Based on the inclusion criteria established, 10 resources of various types were selected and analyzed. Of the 10 resources, 7 were journal articles, 1 was a dissertation, and 2 were books. The sources ranged from 2003 to 2020, which allowed for a close examination of biometrics in the past in comparison to present conditions.

From the literature review, some ubiquitous ethical issues identified include:

- **Privacy & Security**
 - Insufficient measures to protect sensitive data can harm consumers
 - Selling of data and data breaches are common problems associated with weak security measures for data protection
- **Autonomy**
 - Loss of individualism when biometric data is combined with other similar groups and used for research
 - Issues of informed consent and minors
- **Transparency**
 - Vague consent forms regarding data collection
 - Data used for biometrics might be used for other, non-consented purposes
- **Fairness**
 - Not everyone has access to biometrics
 - Biometric data could be used to discriminate consumers

Long-term effects from biometrics:

- The more biometrics data an individual gives, the higher their chances of encountering ethical problems
- Consumers become desensitized to biometric data collection
- Accumulation of biometric data can lead to greater surveillance

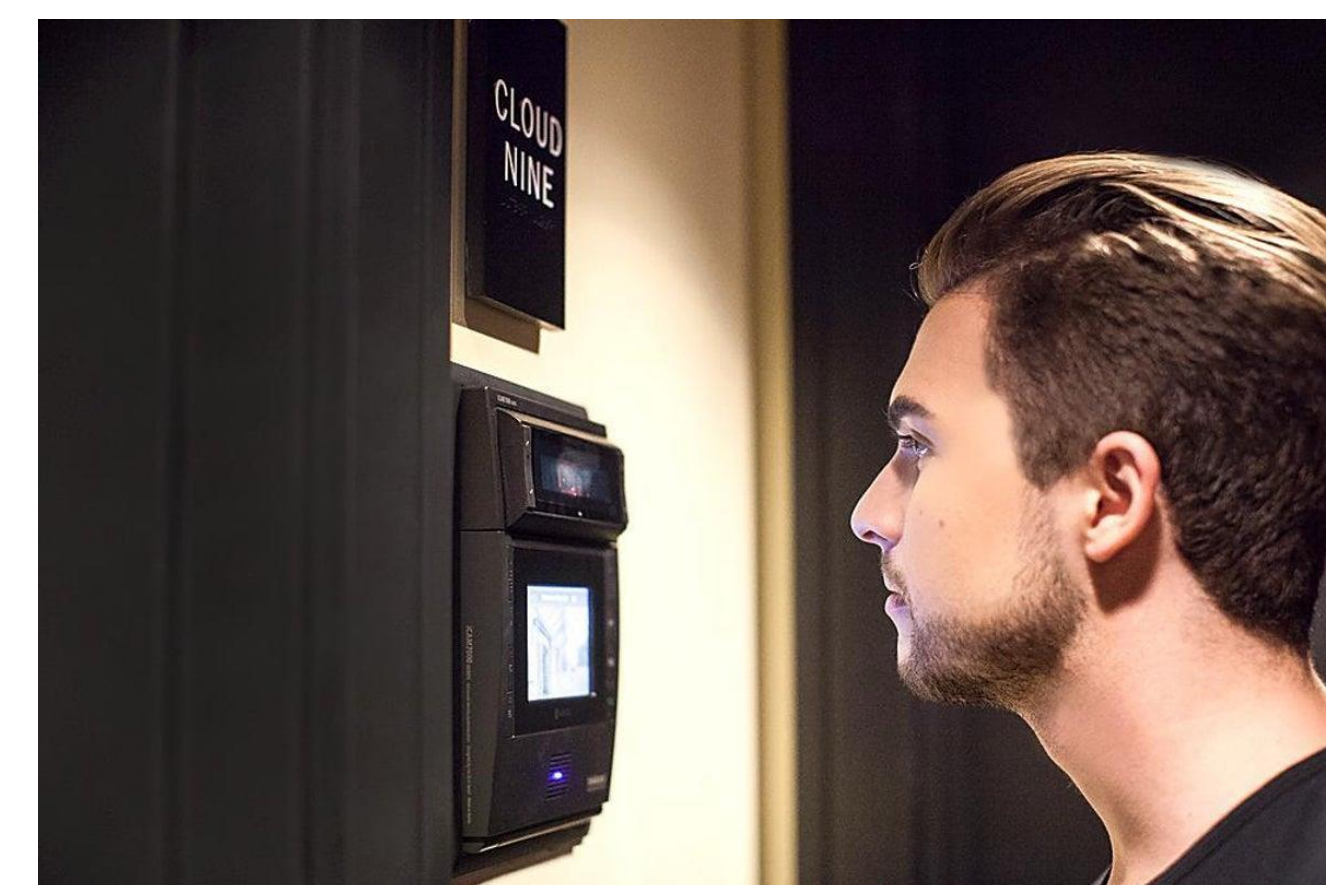


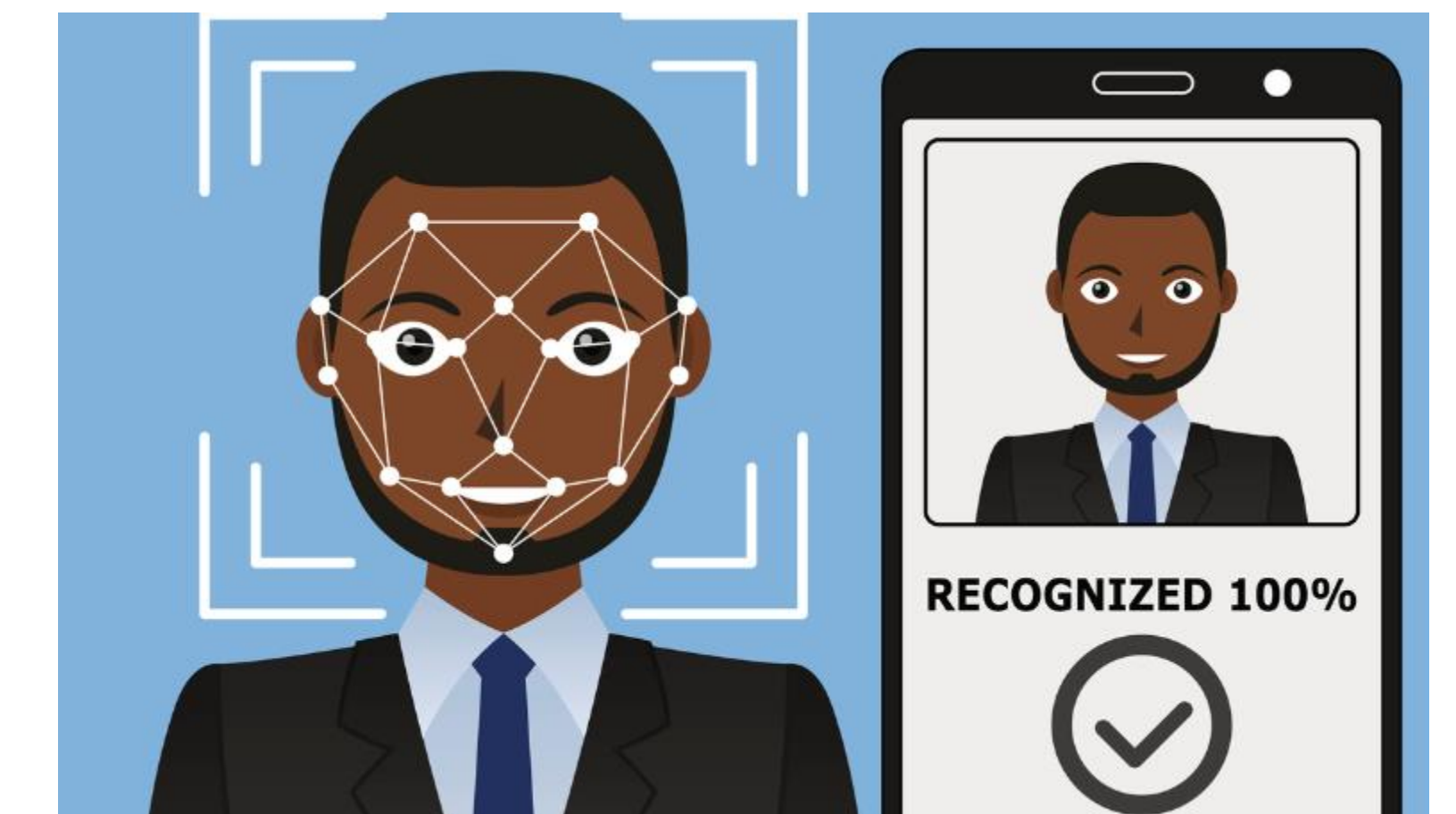
Figure 1. Iris recognition



Figure 2. Gait recognition

Future Considerations

1. Statistics on individuals using more than 1 type of biometrics
 - Currently, there is little to no data available about biometrics use in general
2. Concrete ways to address the proposed ethical issues
3. Focus on one area of biometrics and what issues pertain to that specific area



Conclusion

In conclusion, biometrics serves as an efficient method for authentication and is meant to uphold privacy due to the distinctness of biometric data. However, privacy and security concerns among other ethical issues, such as autonomy, transparency, and fairness. Additionally, the long-term effects of biometrics leads to over compliance and to an even detrimental extent robust surveillance. While there are no concrete action steps to curtailing the ethical issues or the mass implementation of biometrics.

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References

1. Alterman, Anton. "A Piece of Yourself": Ethical Issues in Biometric Identification." *Ethics and Information Technology* 5 (2003): 139-50. <https://doi.org/10.1023/B:ETIN.000006918.22060.1f>.
2. Whither Biometrics Committee and National Research Council. *Biometric Recognition: Challenges and Opportunities*. Edited by Joseph N. Pato and Lynette I. Millett. Washington, D.C.: The National Academies Press, 2010.
3. Blanco-Gonzalo, Ramon, Chiara Lunerti, Raul Sanchez-Reillo, and Richard Michael Guest. "Biometrics: Accessibility Challenge or Opportunity?" *PLOS One* (2018). <https://doi.org/10.1371/journal.pone.0194111>.
4. Cooper, Isaac, and Jimmy Yon. "Ethical Issues in Biometrics." *Science Insights* 30, no. 2 (2019). <https://doi.org/10.15354/si.19.re095>.
5. Deliversky, Jordan, and Mariela Deliversky. "Ethical and Legal Considerations in Biometric Data Usage—Bulgarian Perspective." *Frontiers in Public Health* 6, no. 25 (2018). <https://doi.org/10.3389/fpubh.2018.00025>.
6. Morrow, Nicola. "Defining Biometrics: Toward a Transnational Ethic of Personal Information" (2017). *International Studies Honors Projects*. 26. http://digitalcommons.macalester.edu/intstudies_honors/26.
7. Olorunsola, Olufunso Stephen, Francisca Nonyelum Ogwueleka, and Abraham E. Ewiekpaefe. "Assessment of Privacy and Security Perception of Biometric Technology Case Study of Kaduna State Tertiary Academic Institutions." *Security and Privacy* 3, no. 124 (2020). <https://doi.org/10.1002/spy2.124>.
8. North-Samardzic, Andrea. "Biometric Technology and Ethics: Beyond Security Applications." *Journal of Business Ethics* (2019). <https://doi.org/10.1007/s10551-019-04143-6>.
9. Sutrop, Margit, and Katrin Laas-Mikko. "From Identity Verification to Behavior Prediction: Ethical Implications of Second Generation Biometrics." *Review of Policy Research* 29, no. 1 (2012). <https://doi.org/10.1111/j.1541-1338.2011.00536.x>.
10. Datta, Priyanka, Shanu Bhardwaj, S. N. Panda, Sarvesh Tanwar, and Sumit Badotra. "Survey of Security and Privacy Issues on Biometric System." In *Handbook of Computer Networks and Cyber Security: Principles and Paradigms*, edited by Brij B. Gupta, Gregorio Martinez Perez, Dharma P. Agrawal and Deepak Gupta, 763-75. Switzerland, AG: Springer Nature, 2020.