

I. INTRODUCTION

I write this in a time of global crisis. The decisions people and governments make during this time will have effects on populations, the economy, healthcare systems, and human rights for years to come. Moreover, these decisions must be made quickly and efficiently. This is the expectation people have of their government in times of emergency and panic. The people too have an important role in stopping a pandemic. In order to stop COVID-19 from spreading, it is imperative that people comply with the guidelines set for them.

Current technology makes it possible to monitor everyone all the time.¹ When your fingerprint unlocks your iPhone, the government would have access to the unique pattern that verifies your identity and provides them with your intrinsic physical characteristics. But with the coronavirus, the focus of interest has shifted. Now, it is more beneficial to know the temperature of your finger and the blood-pressure under its skin.

To confront the coronavirus pandemic, governments have already deployed new surveillance tools. The most notable case is China.² Chinese authorities are monitoring people's smartphones, making use of biometric technology, and are urging people to check and report their body temperature and medical condition. With this system of surveillance, suspected coronavirus carriers can be identified along with all of the people they came into contact with.

The current situation around the world is helping us understand the necessity of biometric identifiers and surveillance. However, in order to discuss the implications and lasting effects of

¹ Yuval Noah Harari, *The World after Coronavirus*, FINANCIAL TIMES, (Mar. 20, 2020). www.ft.com/content/19d90308-6858-11ea-a3c9-1fe6fedcca75?fbclid=IwAR0_hyBwCRZpIZB21k9sQnnZpfr5g_86y3DPhxM3O1MuVrk0tFYDFNncnOY.

² Paul Mozur and Aaron Krolik, *A Surveillance Net Blankets China's Cities, Giving Police Vast Powers*, THE NEW YORK TIMES, (Dec. 18, 2019). www.nytimes.com/2019/12/17/technology/china-surveillance.html.

this type of surveillance, we must also first understand the technology that allows it to function. This report will discuss the functions and uses of current biometric technology as well as the capabilities of second-generation biometrics. And as this technology becomes more readily available and complex, we must also discuss the ethical and legal issues surrounding its use.

II. ADVANCES IN EMERGING BIOMETRICS

For many years, biometric identifiers like fingerprints and DNA have been the most accurate. That being said, fingerprints can be altered and DNA can be difficult to collect and slow to process.³ Even retina and iris scanners can be made inaccurate by medical changes like astigmatism.⁴ These inaccuracies have led scientists to look for a better identifier.

Recent advances in sensor technology and widespread use of various electronics such as computers and smartphones has provided new opportunities to capture physiological and behavioral traits of human beings for biometric authentication and surveillance.

For example, palm vein readers are proving highly effective in Japan. The main benefit of these vein readers is that, unlike fingerprints which change during childhood, the palm and finger vein pattern is established in the womb and is constant throughout a person's life.⁵ Moreover, the scanners operate on near-infrared light to read the palm vein pattern, which lies underneath the epidermis and so can't be distorted by damage to the skin, age, or the wearing of gloves.⁶

³ Bryan T. Johnson & John A. J. M. Riemen, *Digital capture of fingerprints in a disaster victim identification setting: a review and case study*, FORENSIC SCIENCES RESEARCH, 4:4, 293-302, (Nov. 13, 2018) DOI: 10.1080/20961790.2018.1521327

⁴ Ratnam, et al., *Recent Advances in Emerging Biometrics*, INTERNATIONAL JOURNAL OF EMERGING TRENDS & TECHNOLOGY IN COMPUTER SCIENCE, vol. 2, no. 1, (Feb. 2013), pp. 96–101.

⁵ Id 4.

⁶ Id 4.

More developments are being made today, and biometric systems are expanding. Scientists and researchers claim there are two possibilities for true identifiers: brain waves and heart rhythms.⁷

⁷ Id 4.