

Biomedical research and better care

AI and computer vision analyze visual material to help uncover the mechanisms behind diseases, assist with diagnosis, predict health outcomes, and provide insights for more effective, individualized care. National Library of Medicine research has advanced techniques to help predict and spot health conditions, including heart dysfunction.

“Real-time echocardiography image analysis and quantification of cardiac indices,” *Medical Image Analysis*, Ghada Zamzmi, Sivaramakrishnan Rajaraman, Li-Yueh Hsu, Vandana Sachdev, and Sameer Antani, 2022

Courtesy National Library of Medicine

ARTIFICIAL INTELLIGENCE AT THE NIH

The National Institutes of Health (NIH) spearheads efforts that use AI in research and set the stage for AI to grow in biomedicine.



Learn about AI activities at NIH at <https://datascience.nih.gov/artificial-intelligence/>

We’ve rejected the harmful aspects of physiognomy, but efforts to gain information from physical characteristics continue with contemporary AI and computer science technologies that gather and interpret body data. These innovative techniques could benefit society in many ways.



Facial Recognition



Fingerprint Scan



Iris Scan



Voice Recognition

Security and surveillance

Contemporary biometric technologies reference databases of personal information to identify people and limit access to sensitive information and restricted places. They’re used in law enforcement and border security and help keep medical records, financial information, and smart devices safe.

Promising FUTURE, Complex PAST



Artificial Intelligence & the Legacy of Physiognomy

Technologies that gain information from physical appearance by interpreting body data are part of an enduring physiognomic legacy.



Criminal man, according to the classification of Cesare Lombroso, Cesare and Gina Lombroso, 1911

Courtesy National Library of Medicine

Artificial intelligence (AI) and computer science technologies involving the human face can identify a person, infer one's emotions, and uncover information about one's health. These approaches apply cutting-edge techniques to an age-old pursuit: to learn about a person's inner workings from their outward appearance. In the past, physiognomy, the pseudoscientific practice of assessing mental character based on facial and bodily features, sought to achieve a similar but often misguided goal.

Criminal looks

Nineteenth- and early-20th-century criminologists believed that criminals had telltale facial characteristics, like a sloping brow, large jaw, or thin upper lip.

L'Homme Criminel (Criminal man), Cesare Lombroso, 1887

Courtesy National Library of Medicine

Unnatural selection

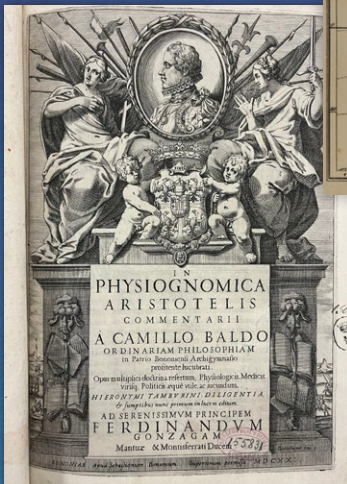
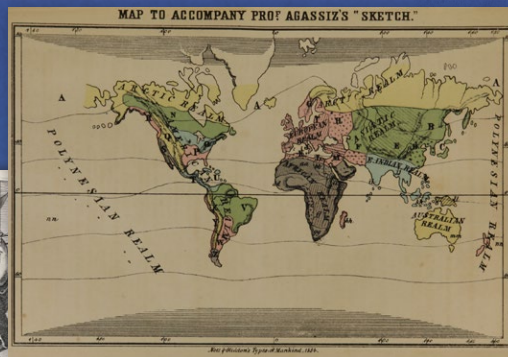
Physical anthropologists measured facial features to determine race and connected those facial features to intelligence and character. Eugenicists used physiognomy, among other techniques, to classify people and determine who was fit to reproduce.

A man is measured to determine his race at the Kaiser Wilhelm Institute of Anthropology, Human Heredity, and Eugenics in Germany, n.d.

Courtesy United States Holocaust Memorial Museum, National Archives and Records Administration, College Park

A world map of racial groups from *Types of mankind...*, Josiah Clark Nott, 1857

Courtesy National Library of Medicine



A work about physiognomy attributed to followers of Aristotle, *In Physiognomica Aristotelis commentii*, Camillo Baldi and Geronimo Tamburini, 1621

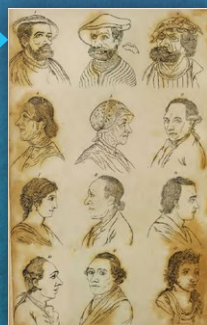
Courtesy National Library of Medicine

A champion for physiognomy

Physiognomy developed in ancient Greece. By the 16th century, it had been dismissed as occult. Eighteenth-century Swiss theologian Johann Caspar Lavater (1741–1801) attempted to give physiognomy scientific credence by systematizing concepts and techniques.

Essays on Physiognomy: Calculated to Extend the Knowledge and the Love of Mankind, Johann Caspar Lavater, 1797

Courtesy National Library of Medicine



In the 19th and 20th centuries, physiognomy became a form of biometric identification in urban areas. Early criminologists incorporated physiognomy into their theories about criminal behavior. Additionally, physiognomy served as a tool for scientific racism and eugenics.

The measure of a man

Governments and police precincts adopted new ways to keep track of citizens and document details of crime. They took standardized body measurements and maintained personal data in storage systems.

A demonstration of body measurement techniques from *The identification of criminals...*, Charles Felton, 1889

Courtesy National Library of Medicine

