



Biometric Standards, Performance, and Assurance Laboratory



DEPARTMENT OF INDUSTRIAL TECHNOLOGY PURDUE UNIVERSITY

Skin and Environmental Temperature Effects on Fingerprint Image Quality

Jeremy M. Morton, Nathan C. Sickler & S.J. Elliott, Ph. D

Department of Industrial Technology, School of Technology, Purdue University, West Lafayette, IN 47907

Project Summary

With fingerprint technology becoming a more widely used application, the effects of environmental factors play an integral role in overall image quality. Image quality is used to determine whether the captured image is acceptable for further use within the biometric system. This study evaluates the effects that temperature and moisture have in the success of the fingerprint reader. While evaluating the fingerprints of a variety of subjects, tests will determine the role of temperature and moisture have in future fingerprint applications.

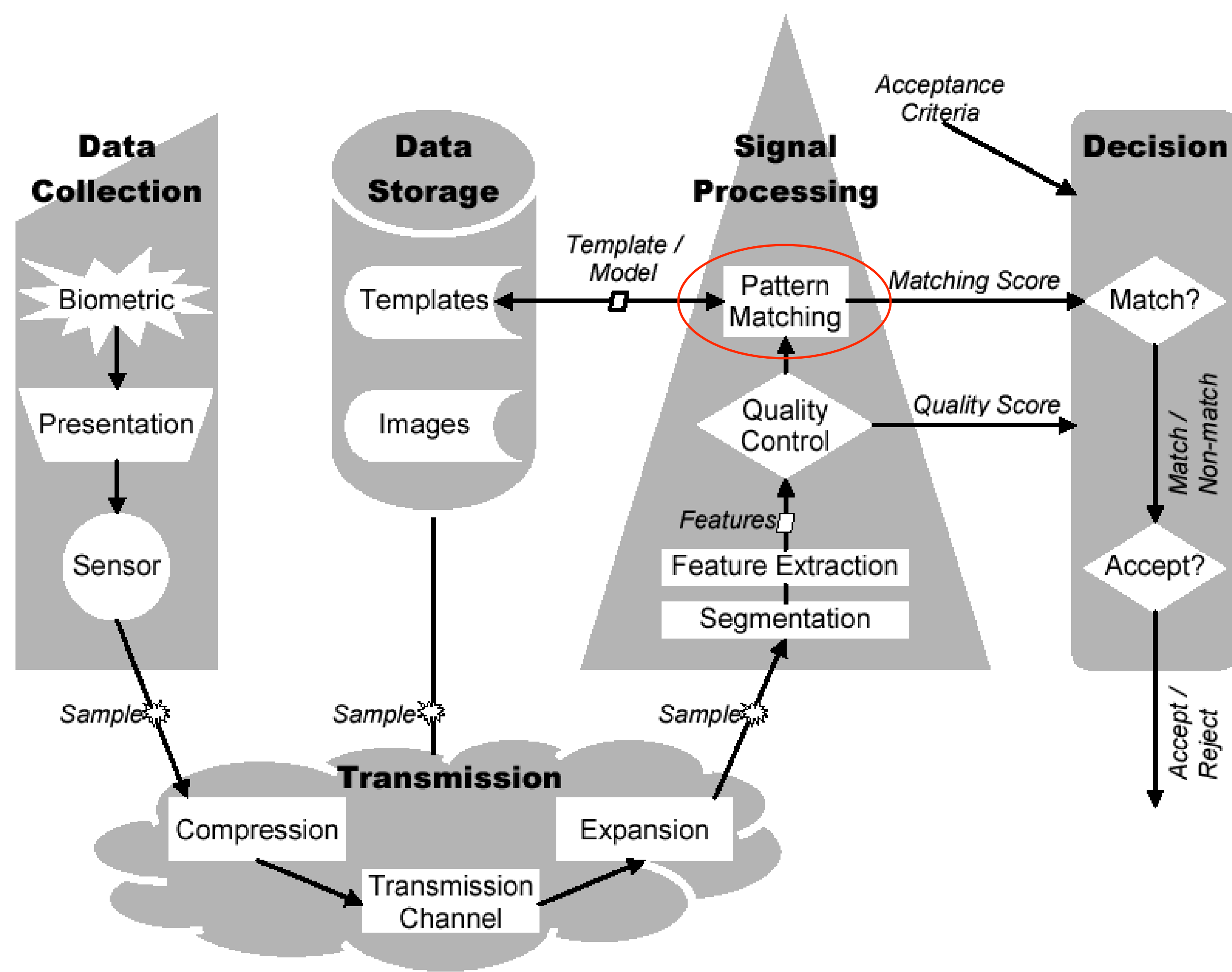


Figure 1 - General Biometric Model (Mansfield and Wayman - 2002)

System Classification

The evaluation took place in an outdoor environment where the temperature varied from 0- 30 °F.

The system was designed to be:

- Overt
- Attended
- Cooperative
- Unhabituated (Although some users may become habituated after enrollment process)

Subject demographics

- Finger number (left thumb, right index, etc.)
- Age
- Sex
- Ethnicity
- Moisture content
- Temperature

The target audience will be at least 30 subjects with varying ages, sex, ethnicity, moisture content, and skin temperatures. The study will determine what combination of these traits, if any, will play a role in the overall image quality.

Process used for enrollment

Using the fingerprint software from Authentec, subjects will be enrolled in an indoor environment at room temperature, and verified in an outdoor environment. The subject will then be verified after exposure to cold weather (30 °F or less). When verified, the subjects information was coded in to the their file name. Information such as skin temperature and moisture content were the two factors that were emphasized. Subjects were enrolled using two different sensors and were verified using both.

Technology used

Raytek MiniTemp for temperature readings, Authentec fingerprint sensors (2), and Scalar moisture checker to check moisture content.

