

# History, terminology and overview

Identification systems (IDFS)

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2<sup>nd</sup> lecture



# Contents

- Definition
- What is identification
- Identification characteristics
- Automatic identification systems

# IDENTIFICATION DEFINITION

# Different words / different meaning

## What does

- Identity (cz: identita)
- Identify, identification (cz: identifikace)
- Authenticate (cz: autentizace / ověření)
- Authorize (cz: autorizace)

mean?

# Definitions

## Identity (<http://dictionary.reference.com>)

1. the state or fact of remaining the same one or ones, as under varying aspects or conditions: *The identity of the fingerprints on the gun with those on file provided evidence that he was ...*
2. the condition of being oneself or itself, and not another: *He doubted his own identity.*
3. condition or character as to who a person or what a thing is: *a case of mistaken identity.*
4. the state or fact of being the same one as described.

# Definitions

## Identify (<http://dictionary.reference.com>)

1. to **recognize or establish** as being a particular person or thing; verify the identity of: *to identify handwriting*
2. to serve as a means of identification for: *His gruff voice quickly identified him.*
3. to associate in name, feeling, interest, action, etc. : *He preferred not to identify himself with that group.*
4. *Biology* . to determine to what group (a given specimen) belongs.

**Typically identification is 1:N**

# Definitions

## Authenticate (<http://dictionary.reference.com>)

1. to establish as genuine.
  2. to establish the authorship or origin of conclusively or unquestionably, chiefly by the techniques of scholarship
- Authentication is the process of verifying that "you are who you say you are"
- Typically authentication (verification) is 1:1**

## Authorize (<http://dictionary.reference.com>)

1. to give authority or official power to; empower: to authorize an employee to sign purchase orders.
- Authorization is the process of verifying that "you are permitted to do what you are trying to do".

# HOW AND WHY WE USE IDENTIFICATION



# How and Why we use identification

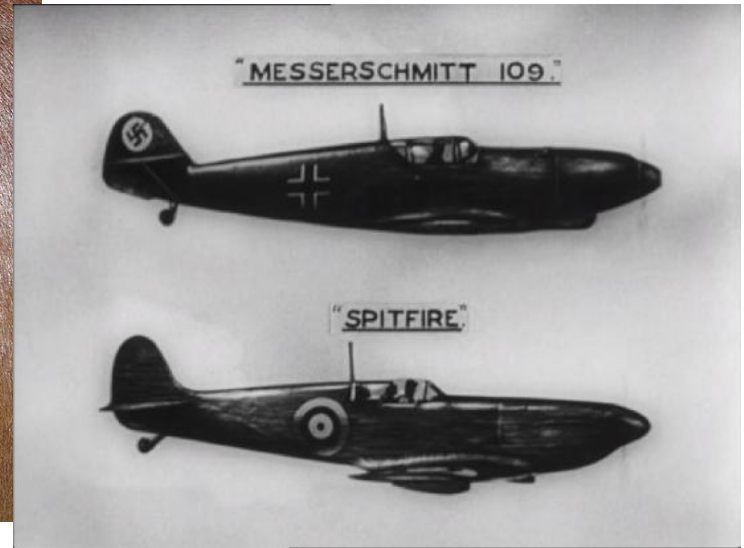
## **Identification / authentication is based on:**

- (Pre)shared knowledge / secret (password, pin)
- Possession of an object / token (IC card)
- Physiological features of an object / person (fingerprint)

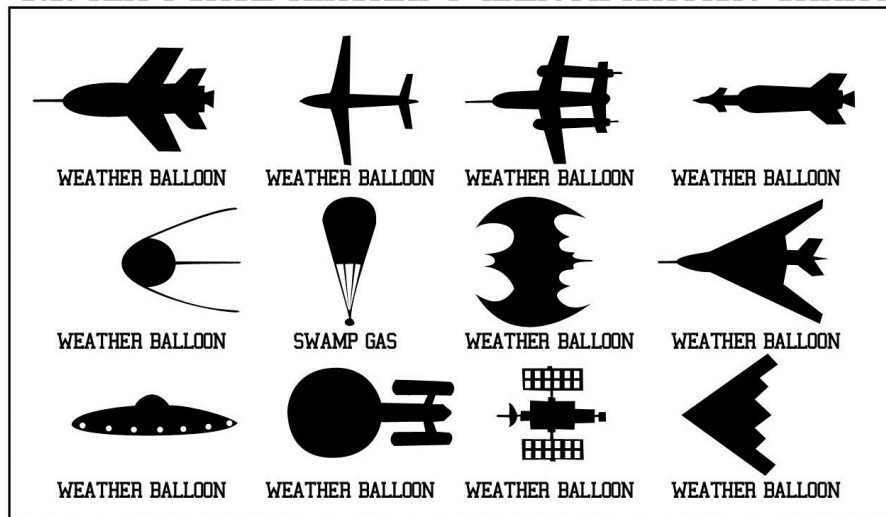
## **Used for 3 different levels of identification:**

- Recognition and classification (1 to N)
- pinpoint, count and sort (1 to 1, without a proof)
- Verify / authenticate / authorize (1 to 1, with a proof)

# Application of identification – recognize and classify



## U.S. AIR FORCE AIRCRAFT IDENTIFICATION CHART



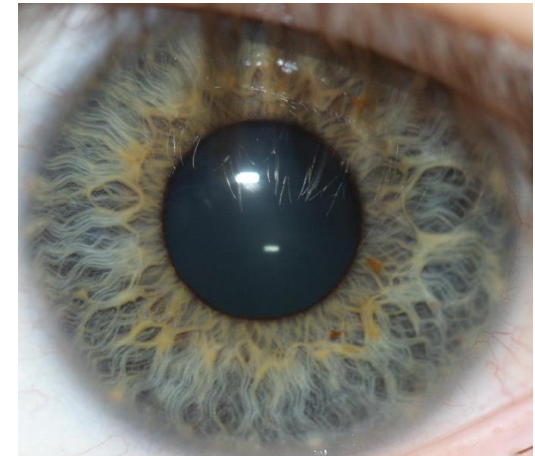
# Application of identification – pinpoint, count, sort





# Application of identification – Authentication

- **Authentication** is the act of confirming the truth of an attribute of a datum or entity. This might involve confirming the identity of a person or software program, tracing the origins of an artifact, ensuring that a product is what its packaging and labeling claims to be. (source: Wikipedia)

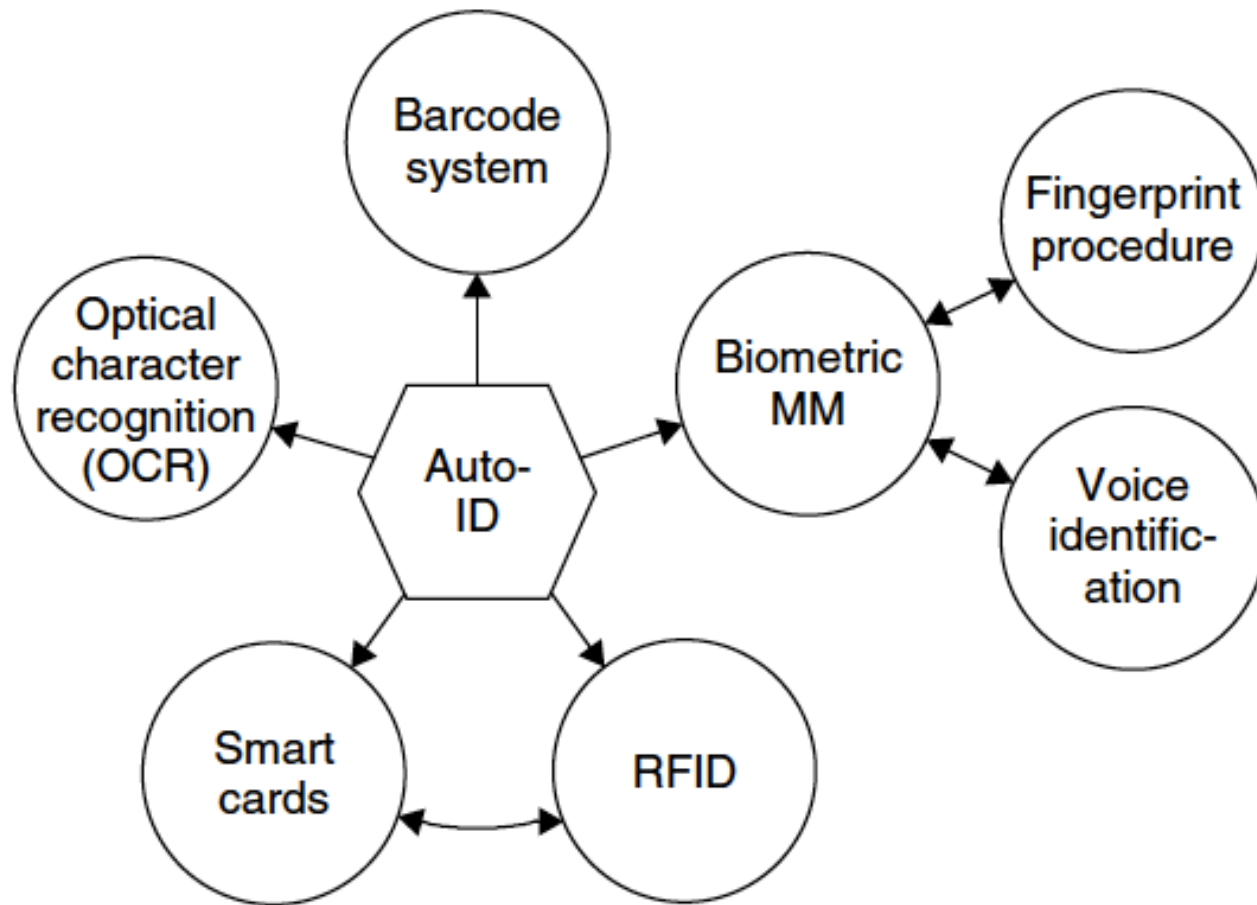


# **AUTOMATIC IDENTIFICATION SYSTEMS**

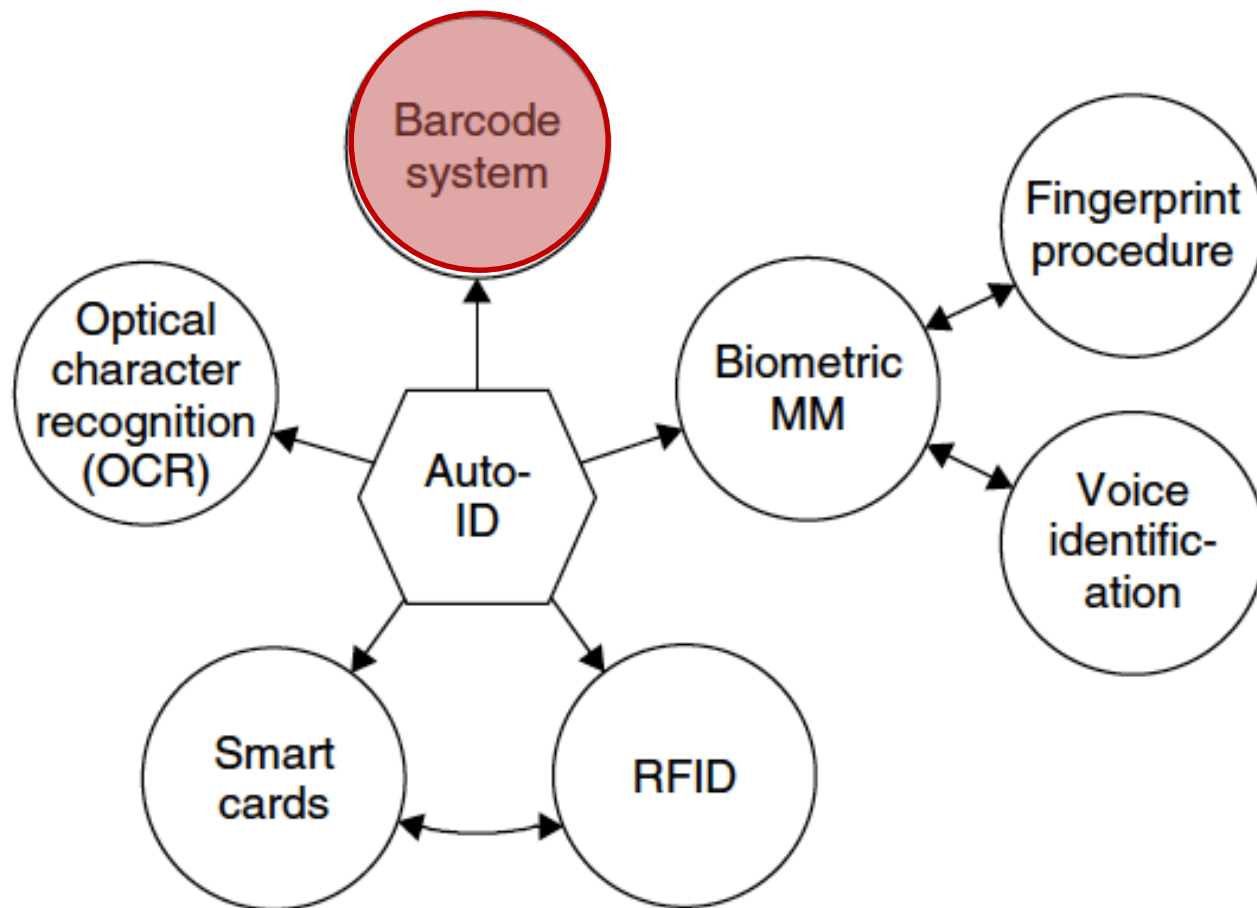
# Identification – Automatic identification systems

- Application independent - **Automatic ID-systems** -> use in many branches: logistics, material flow systems
- Providing information about people, goods, products in transit

# Most important auto-ID procedures



# Most important auto-ID procedures



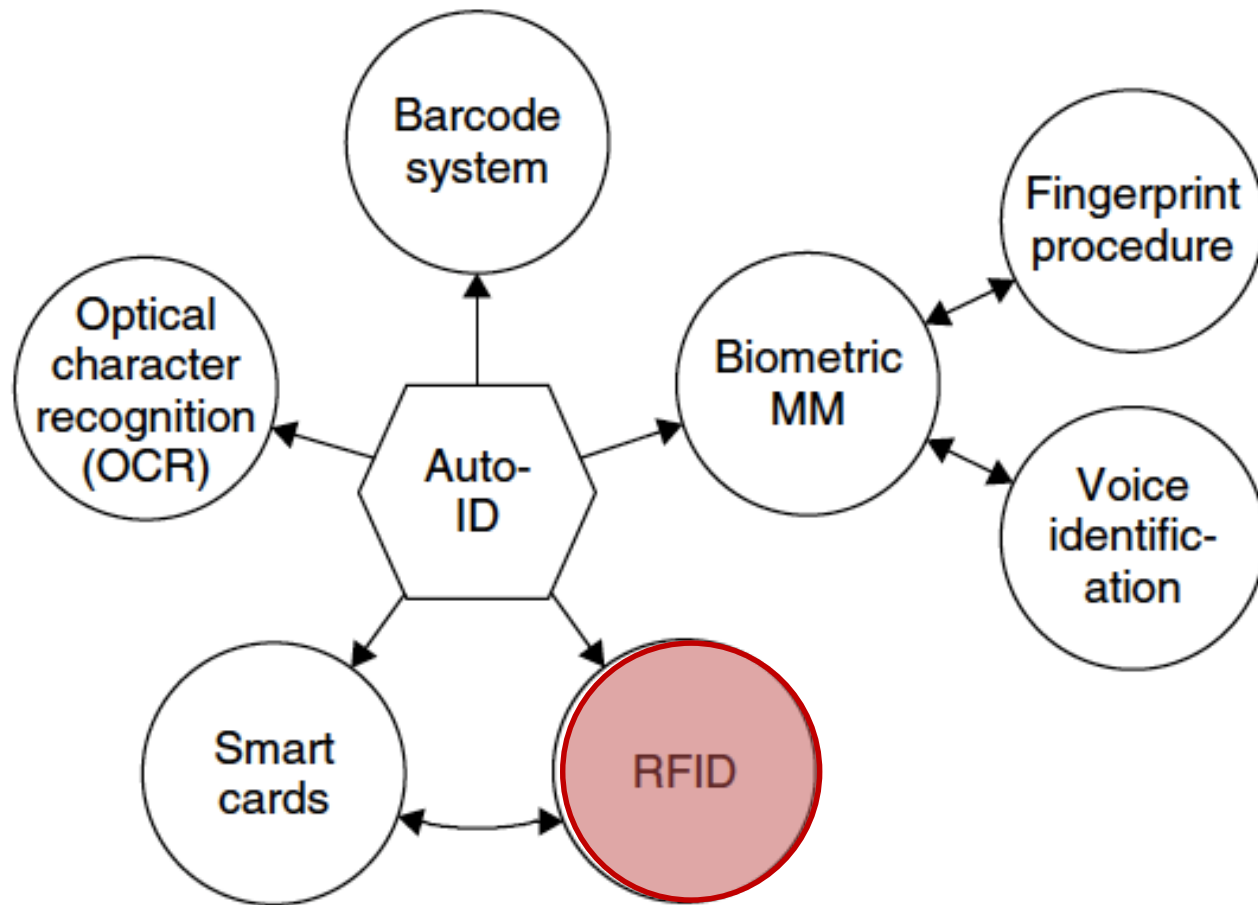


# Bar codes

## summary

- The most successful in past 20 years
- Binary code consisting of:
  - Field of bars and gaps in parallel configuration arranged in predefined pattern represent data elements that refer to an associated symbol
- Interpreted numerically and alphanumerically
- Read by optical laser scanning
  - By different reflection of a laser beam from the black bars and white gaps
- The most popular barcode is **EAN** (European Article Number) code and **UPC** (Universal Product Code)

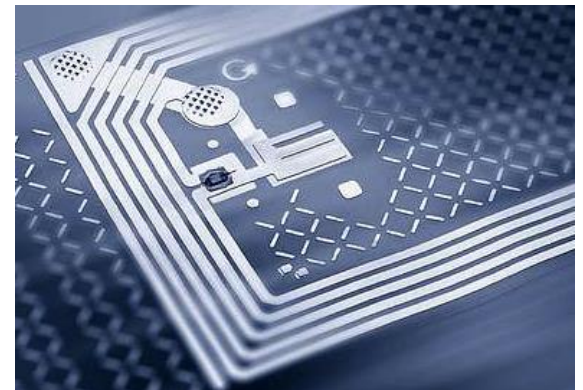
# Most important auto-ID procedures



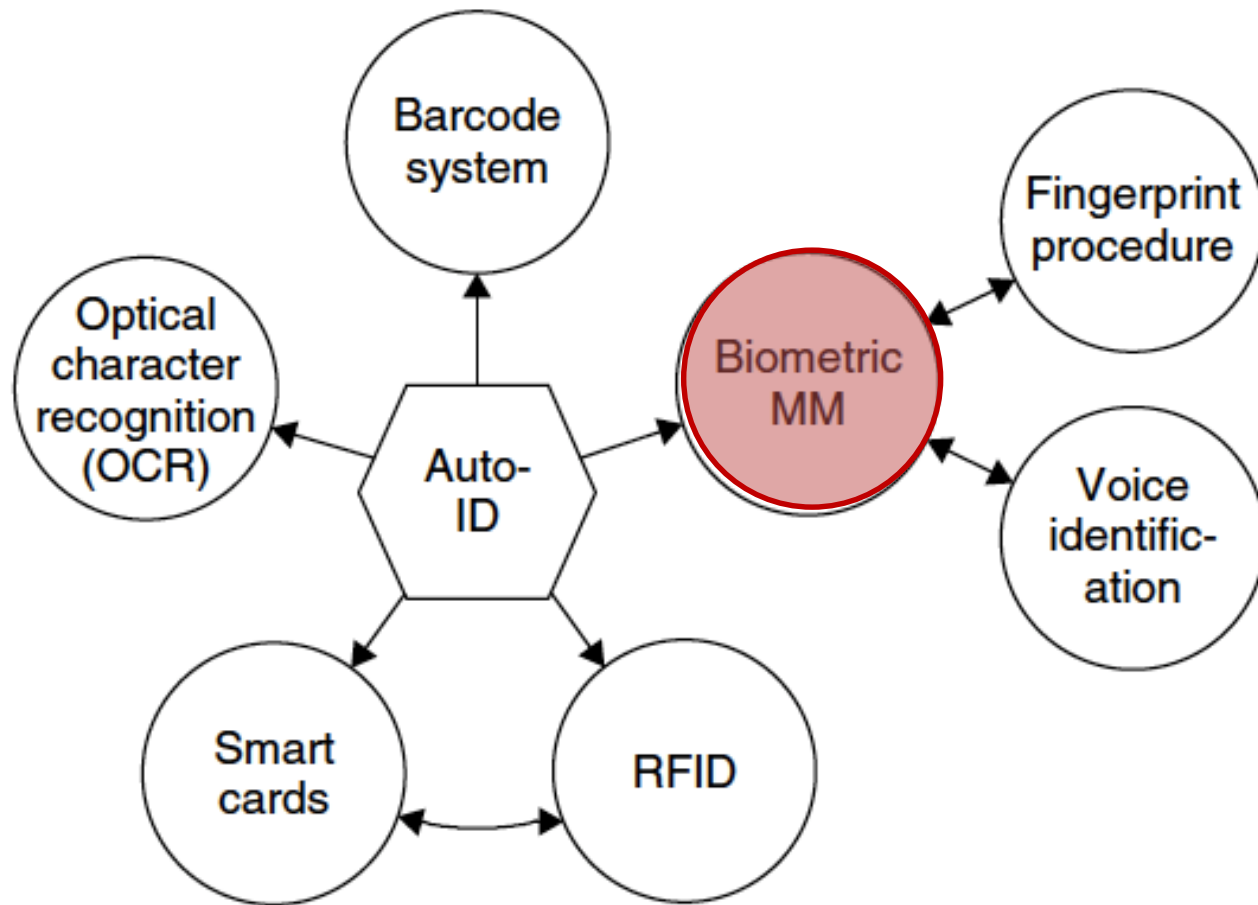
# RFID

## Introduction

- RFID is a general term for technology, that is using radio waves for automatic identification of goods, people, etc.
- For this purpose, there exist several methods,
  - the most common is storing the serial number of identified object, person and other possible important data in a electronic tag
- It is a successor specially of barcodes systems
- Initiator of the development: Wal-Mart (as well as for barcodes)



# Most important auto-ID procedures



# Biometrics

## Introduction

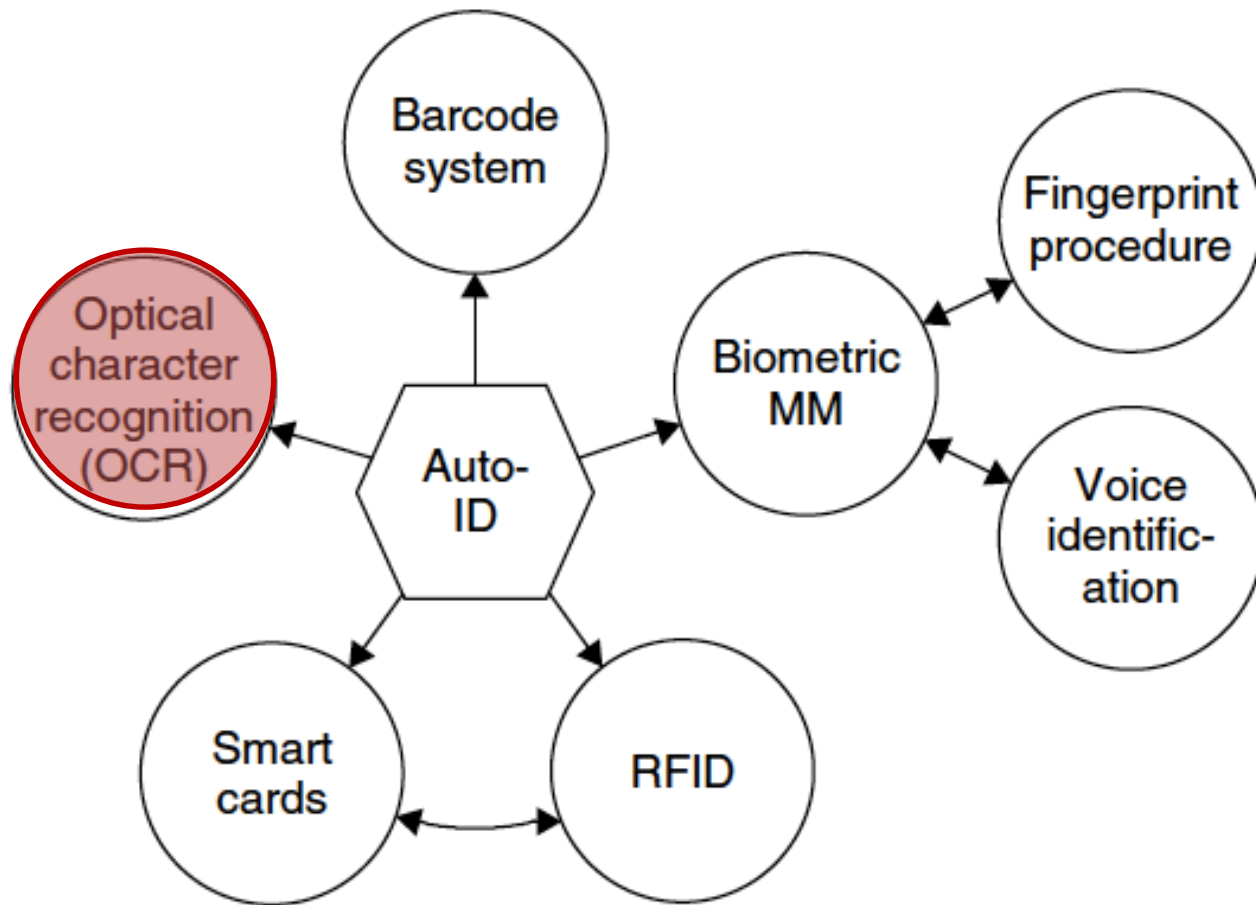
- Defined as the science of counting and (body) measurement procedures involving living beings



- All procedures that identify people by comparing unmistakable and individual physical characteristics
  - Fingerprinting
  - Hand printing
  - Voice identification
  - Retina identification

And many others

# Most important auto-ID procedures

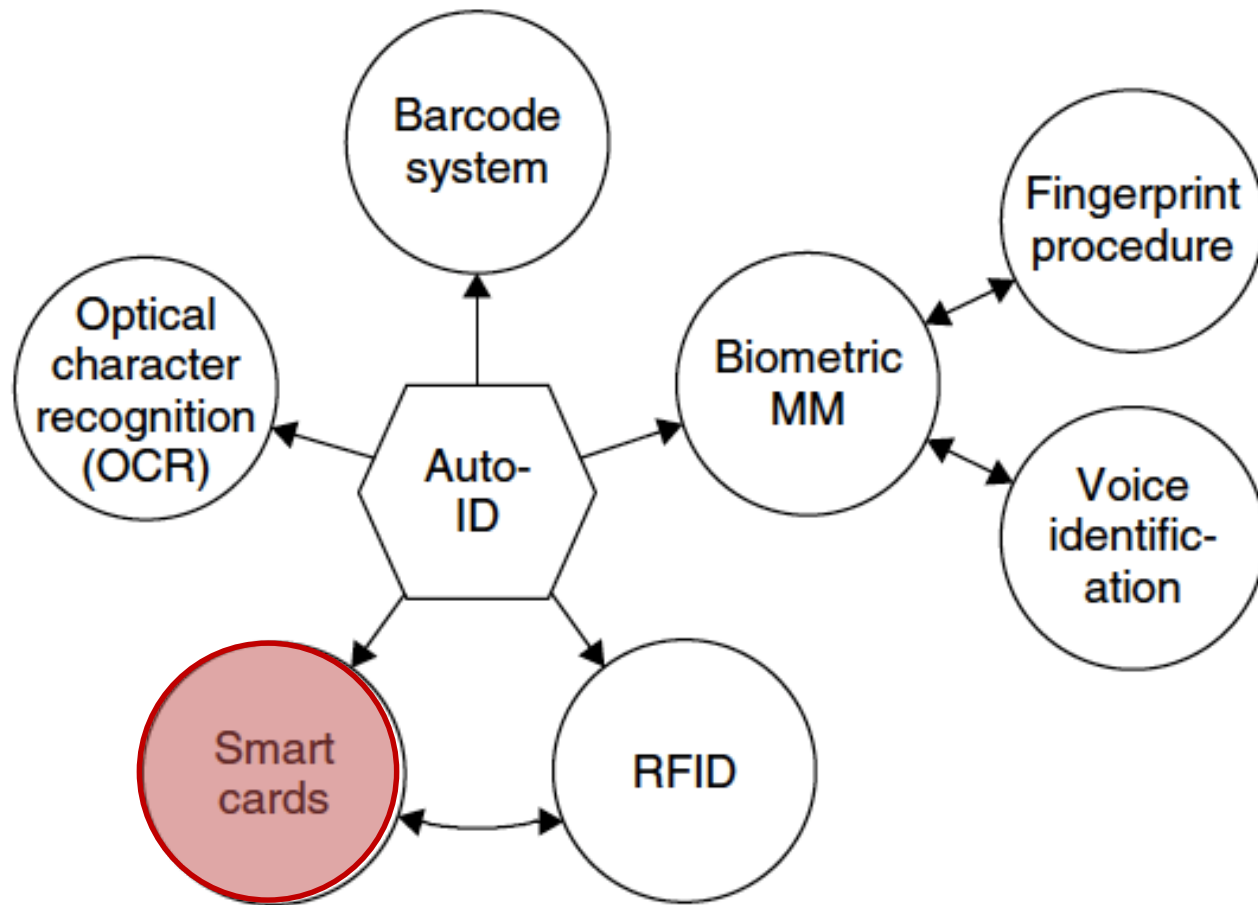


# Optical character recognition

## Summary

- Optical character recognition (OCR) introduced in the 1960's
- Special fonts – readable both by people and machines
- + High density of information
- + In case of emergency, visually checkable
- **Today's use:**
  - Service and administrative fields
  - Banks – registration of cheques (personal data, account nr.)
- Not universally applicable
- High price
- Complicated readers

# Most important auto-ID procedures





# Smart cards

- Electronic data storage system
- First in 1984 – telephone smart cards
- Cards are read in reader, through galvanic connection
- Two basic types:
  - Memory card
  - Microprocessor card (with additional computing capacity)
- + data stored can be protected against undesired access
- Vulnerability of contacts to wear, corrosion and dirt
- Readers are expensive to maintain

# Authentication processes

- Proof of someone's identity by exchange of information
- Must be protected against the manipulation
- By means of cryptography
  - Problem with exchange of a secret prior to communication
  - Symmetric cipher (DES / AES)
  - Hash function
  - Asymmetric cipher (RSA)
  - Quantum cryptography

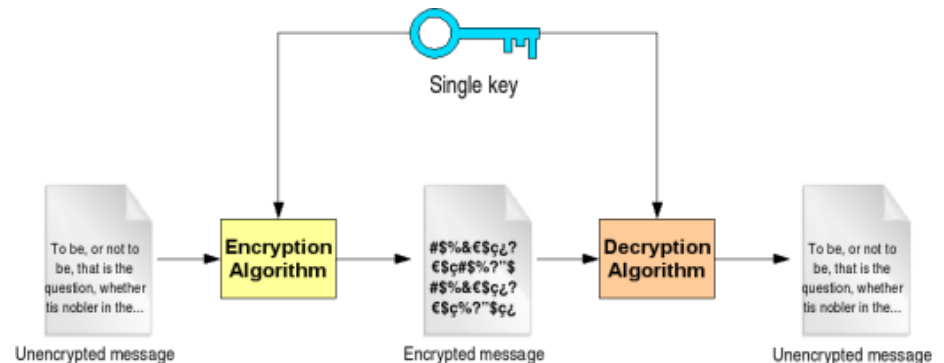


image: <http://www.tech-faq.com/symmetric-and-asymmetric-ciphers.html>



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