Old vs. New Fingerprint Information Exchange

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The author of one of the first classification systems was Dane Hakon Jörgensen. In addition to the basic pattern, his system was already coded minutiae in the middle of the pattern. This system is also known as "distant identification" and is often associated with the "telegraphic" attribute. It was built on the basis of the Henry, Vucetich, Rocher and others systems, but also on the distant identification of Spanish Olóriz Aguiler.

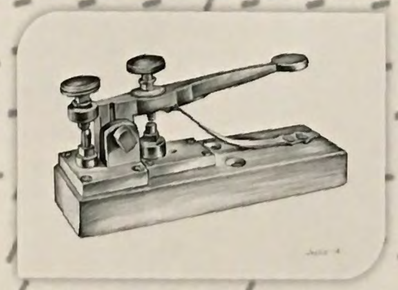
For the fingerprint encoding into the numeric codes was used a special measuring system engraved on the fingerprint magnifying glass. The position of the minutiae was recorded according to the angles and distances displayed on this measuring system.

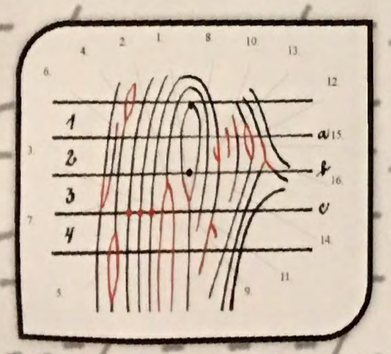
Jörgensen's classification consisted of several numerical codes that were built on the bases of other systems mentioned above. Each of these codes gave different information about fingerprints.

In the **GI code**, the basic patterns of all ten fingers were encoded.
(Example: **33335 14444**)
Inside the **GII code**, information about index fingers and middle fingers, and more information about right-hand fingers, has been encoded.
(Example: **212.18.5.15.7.14**)
The **NB code** consisted of four digits and has been used for quick identification. It has contained information about a distinct and rare fragment and its exact location on a particular finger.
(Example: **5101**)
In the formula for **one finger identification**, the exact position information of the minutia has been encoded. Each minutiae has had its own numeric code. Coded were only those minutiae that were in the detail zone - an area defined by two segments spaced 4 mm apart.

The numeric code which coded the second level details contained in fingerprints, could be sent telegraphically not only within a country but also to other states. By decoding the telegraphic report, forensic experts in another country knew how to draw some part of fingerprint. Since 1922, thanks to this method of coding, they did not have to send latents and fingerprints in natura. By using a telegraph they could have excluded the offender very quickly. The Jörgensen´s classification system has made "International fingerprint exchange" possible. Combination of all of these codes had enough information for individual identification.

We can claim that **Jörgensen was one of the pioneers who laid the foundations for international exchange of fingerprint identification material**.





One finger identification

33.2–.3––1.1–.61.33 × 33.74.62.52.44.74.75.9–.61.73.1–.22

Telegraph message with minutiae information

...--|.-.-.-|..---|...--|-..-.|.....|.-.-.-|...--|||.----|-..-.|-.--.||...--|-.--.-|.----|.-.-.-|.----|....-|-..-.|.....|.-.-.-|-....|.----|.-.-.-|...--|||...--|.-.-.-|--...|....-|.-.-.-|-....|..---|.-.-.-|.....|..---|.-.-.-|....-|.-.-.-|--...|....-|.-.-.-|--...|.....|.-.-.-|----.|.----|-..-.|..---|.-.-.-|-....|.----|.-.-.-|--...|...--|.-.-.-|.----|-..-.|..---|.-.-.-|..---|

VS

1+157+85+9+1+14=2+121+99+108+0+31=3+226+105+90+0+31=4+150+110+7+0+31=5+175+116+95+0+31=6+214+119+0+0+31=7+77+149+23+1+14=8+234+153+91+1+14=9+201+163+4+1+14=10+188+199+105+1+8=11+144+203+113+1+14=12+243+203+88+1+14=13+200+207+7+1+14=14+159+220+21+0+31=15+201+221+102+2+14=16+108+229+23+2+14=17+100+232+119+1+14=18+227+240+175+1+14=19+145+244+122+2+14=20+180+246+15+1+14=21+220+262+178+1+14=22+157+279+35+1+14=23+122+283+32+1+14=24+194+289+23+2+14=25+195+315+29+2+14=26+264+335+144+2+14=27+241+336+145+0+31=28+219+347+23+1+12=29+149+362+32+1+14=30+73+383+29+1+14=31+184+389+113+1+14=32+112+403+26+1+14=33+193+404+26+2+14=34+193+424+21+1+14=35+141+428+18+1+14=36+177+442+12+2+13=37+160+445+15+2+7=38+140+453+9+1+14=39+171+460+7+1+14=40+128+462+1+2+11

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In case of fingerprint data, finger and palm prints of people with known identity (fingerprint cards), as well as finger and palm prints from unsolved crimes, from the AFIS database, are sent. Since these data are quite large and sending the whole database could cause the transmission network to overload, the EU Member States have determined the maximum number of each type of data that can be sent and received by them.

Nowadays, we can use data exchange thanks to ANSi - American national standard for information systems.
The standard that describes how to encode or merge multiple heterogeneous information (images, minutiae, text information, etc.) into a single file. Defines the structure for each type of record, for example:

type 1 - Total descriptive file data (size, contents, when it was created, etc.)
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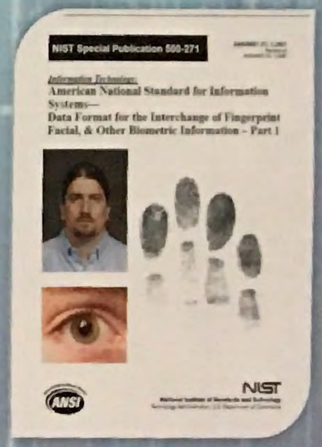
NIST Special Publication 500-271
American National Standard for Information Systems—
Data Format for the Interchange of Fingerprint Facial, & Other Biometric Information – Part 1
NIST
ANSI

Latent print encode:
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Second minutiae
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Fourth number– angle (minutiae direction)
Fifth number- type of minutiae – (0 – other, 1 – ending ridge, 2 bifurcation)
Sixth number - quality 1 - 100

Literature: 1) JÖRGENSEN, H.: Distant identification, 1922 2)ANSI/NIST-ITL 1-2007, Revision of ANSI/NIST-ITL 1-2000, ANSI - American national standard for information systems. Definition of data format for fingerprint, facial and other biometric data exchange 3) PRUM – Best Practice Manual, Bratislava 2012

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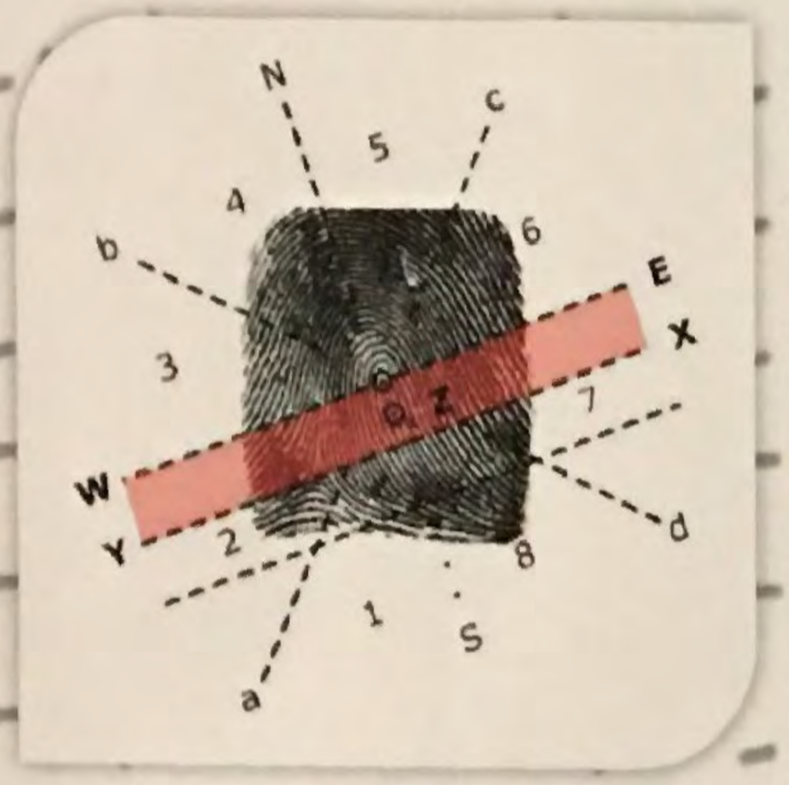

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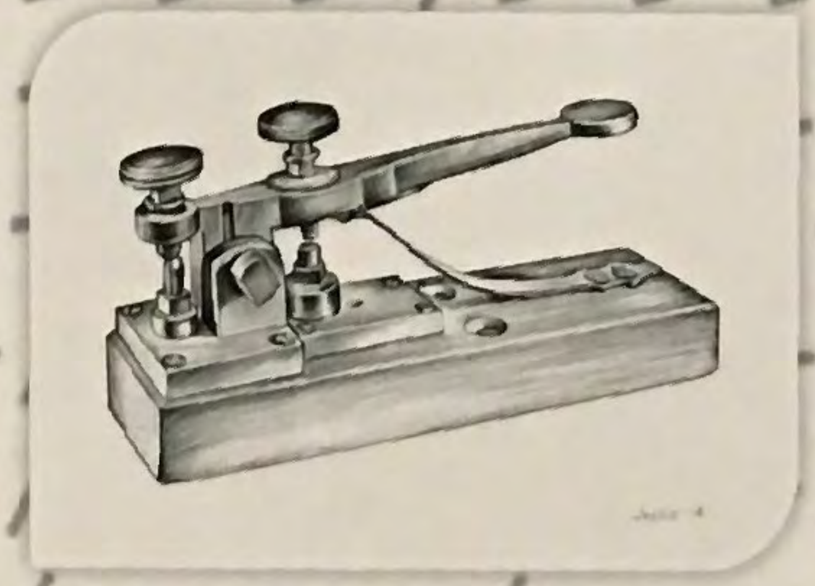

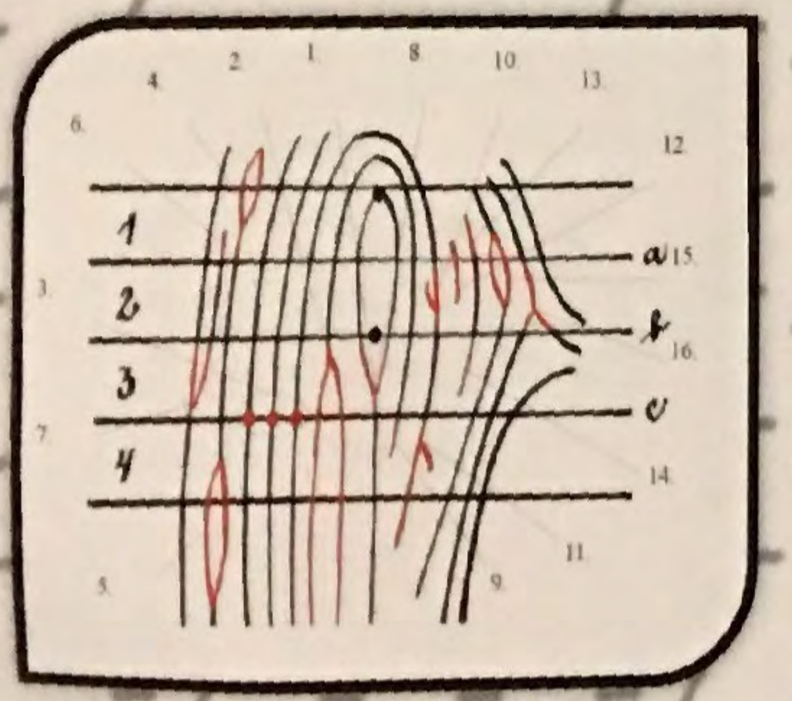

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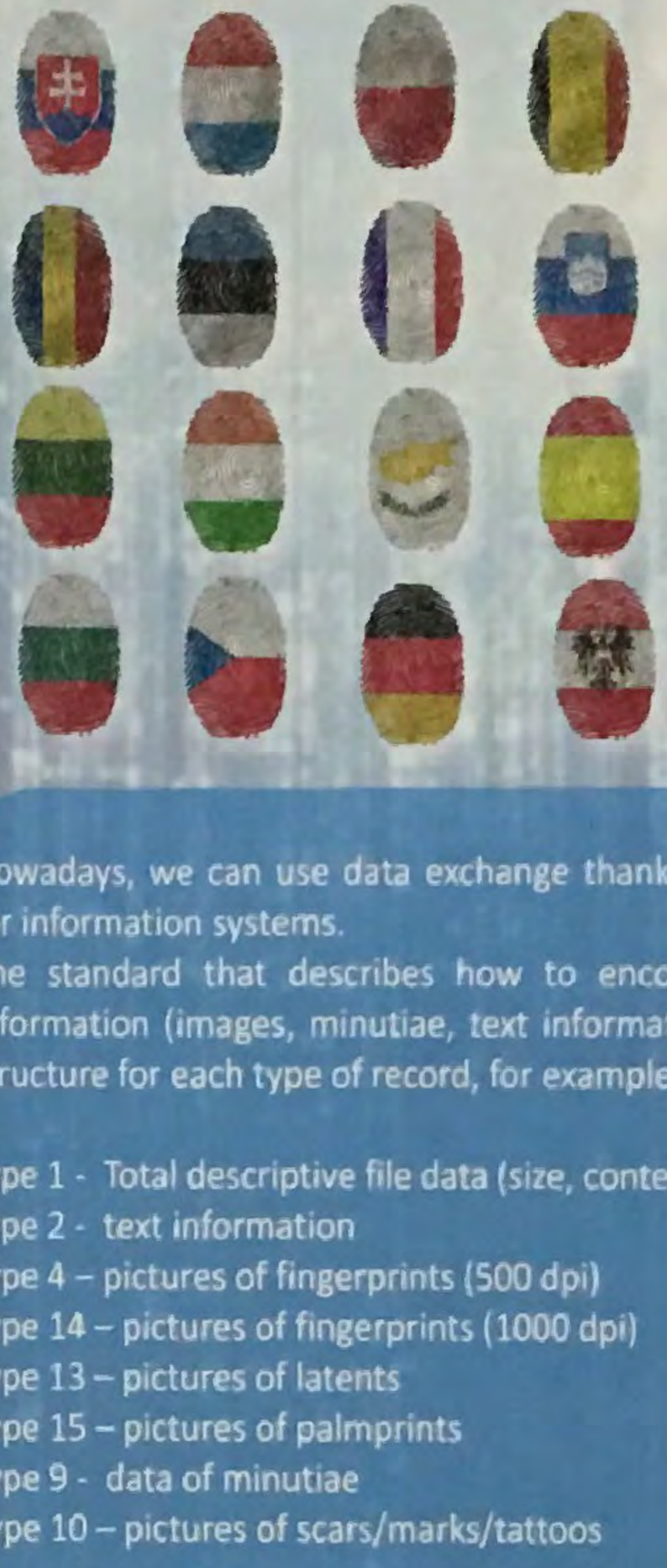
.-|.----|.-.-.-|.----|....-|-..-.|.....|.-.-.-|-....|.----|.-.-.-|...--|||...--
|.-.-.-|--...|....-|.-.-.-|-....|..---|.-.-.-|.....|..---|.-.-.-|....-|.-.-.-|--
...|....-|.-.-.-|--...|.....|.-.-.-|----.|.----|-..-.|..---|.-.-.-|-....|.----|.-.-
.-|--...|...--|.-.-.-|.----|-..-.|..---|.-.-.-|..---|



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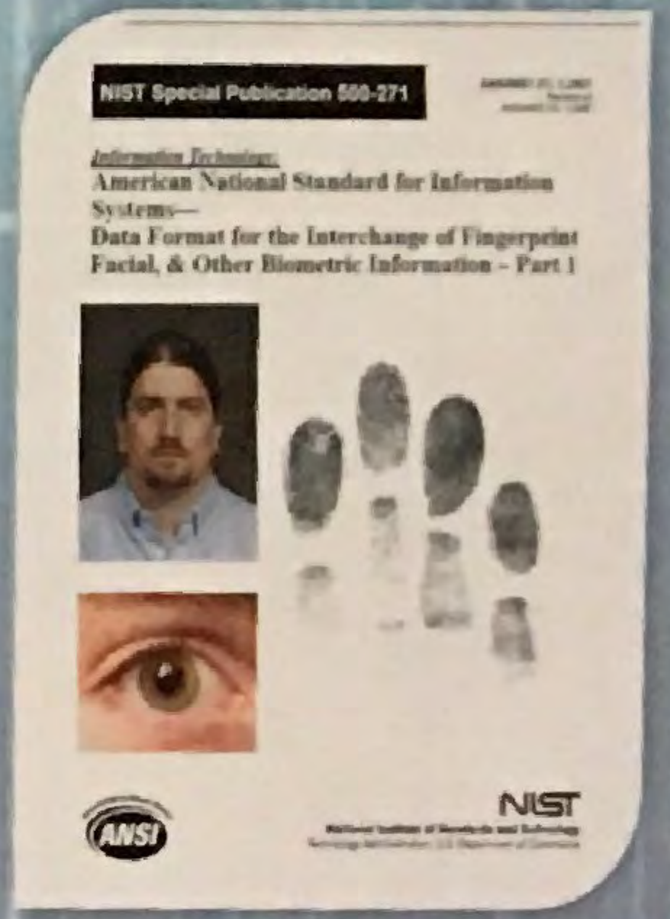

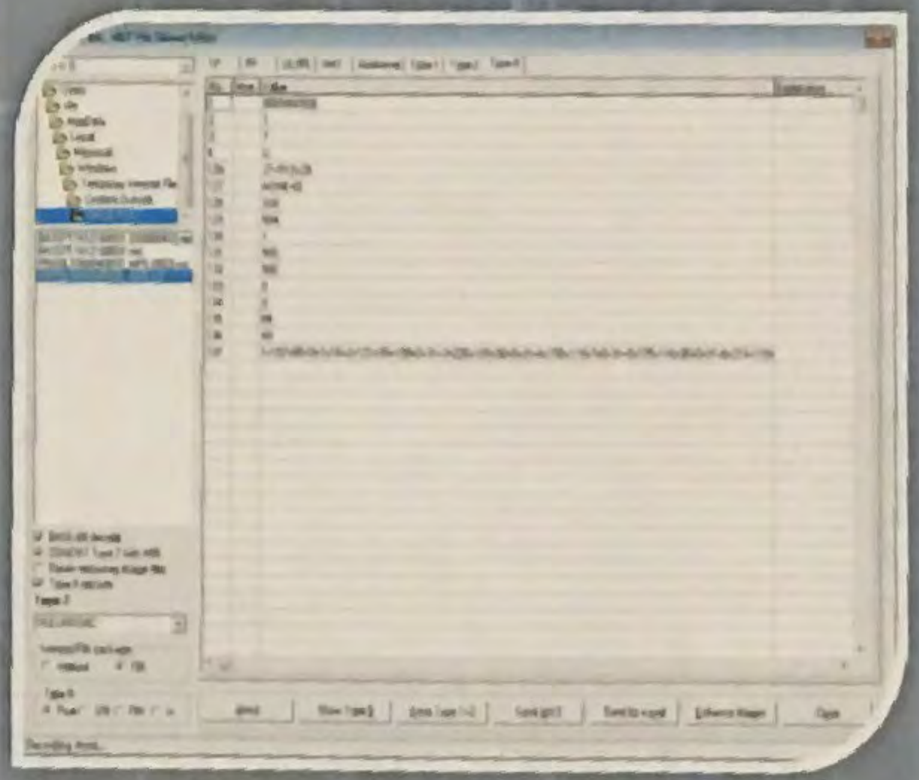

Latent print encode:
Sign = divided individual minutiae
First minutiae:
1+157+85+9+1+14
Second minutiae
2+121+99+108+0+31 ...until the last one (40 in this example)

First number – serial number
Second number– x ordinate of minutiae at the picture
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+153+91+1+14=9+201+163+4+1+14=10+188+199+105+1+8=11+144+203+113
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5+201+221+102+2+14=16+108+229+23+2+14=17+100+232+119+1+14=18+22
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