

A Biometric for Life Potential for a Lifetime Breeder Document?

Christian Rathgeb

da/sec – Biometrics and Internet-Security Research Group
University of Applied Sciences
Darmstadt – Germany

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Agenda

- 1 Introduction
- 2 European FIDELITY Project
- 3 Harmonized Breeder Documents
- 4 Integration of Biometrics
- 5 Conclusions and Outlook

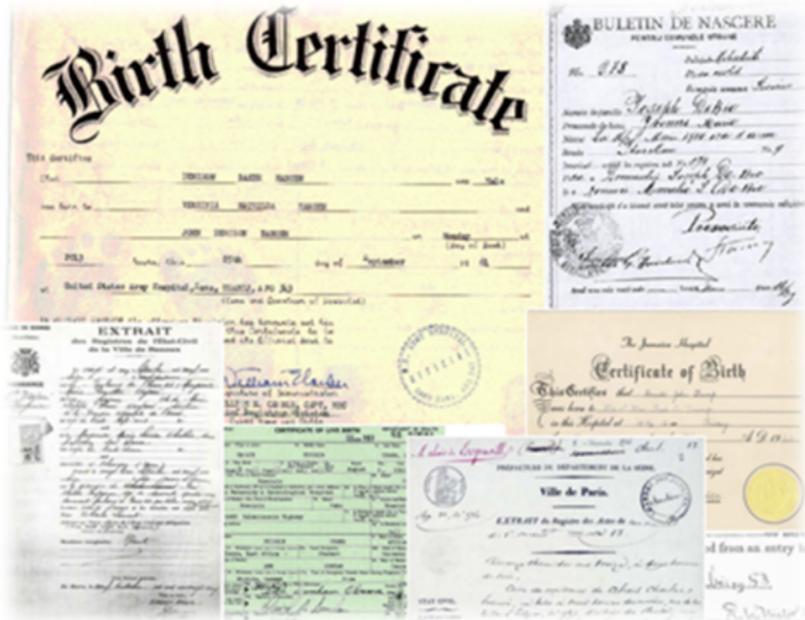
Introduction – Motivation

- A birth certificate is an example of a **breeder document** which is used to apply for other personal documents like e-Passports but also national ID cards or Bank ID.
- The issuance of a birth certificate must be **trustworthy** and **fraud prone**, otherwise issued documents that are issued on the basis of a falsified foundation (birth certificate)
- It is essential that the breeder documents are uniquely and permanently **linked to the individual** to whom it was issued.

Possible Solution?

Biometrics provide a strong link between an individual and documents!

Introduction – Motivation



- There is a **need for harmonisation** of breeder documents (especially birth certificates) as well as their issuing processes!

Introduction – Research Questions

- Does **biometric ageing** hinder the integration of biometrics to breeder documents (e.g. birth certificates)?
- Which biometric characteristics are **most stable** over a long (life-time) time-span?
- Which biometric characteristics are most suitable to be captured at early ages from an **ethical** point of view?
- Can potential ageing effects be modelled and systems be parametrized to actively handle ageing?

European FIDELITY Project – Facts



- FIDELITY is a project funded by the European Commission, under the Security theme of the Seventh Framework Programme
- Duration of the project: 2012 – 2016
- Nr. of Partners: 19 (University of Bologna, Gjøvik University College, MORPHO, KU Leuven, Hochschule Darmstadt, etc.)
- Funding: > €12 Million

European FIDELITY Project – Goals

Major Goals of the Project:

- 1 Develop solutions for **fast and secure** authentication of individuals at border crossings, while **protecting individual privacy**.
- 2 Propose solutions to **improve the issuance process** of breeder documents in order to reduce fraud.

Focus

The FIDELITY project covers the whole trust chain in the travel document based identity authentication scenario!

European FIDELITY Project – Goals (cont'd)

- Increase security of the physical document.
- Propose a harmonised layout and data set structure.
- Link the document to the bearer.
- Establish a standardised verification process.
- Standardise issuing processes.
- Feed project results to relevant international standardisation committees (e.g. ICAO, ISO/IEC JTC1 SC37).
- Proposing technically-viable solutions that are acceptable within the ethical and legal contexts of the larger European Union.

Harmonized Breeder Documents – Proposal

Based on an analysis of birth certificates in Europe with respect to security features, data entries, dissemination processes and administration processes aims are identified:

- 1 Cover **backward compatibility** to existing processes,
- 2 Enhance **privacy** and improve document and system **security**,
- 3 Optimize processes with respect to **effort**, **costs** and **security**, and
- 4 **Harmonize** breeder documents by using a common layout and common data entries.

Harmonized Breeder Documents – Proposal (cont'd)

BIRTH CERTIFICATE
Geburtsurkunde / Certificate of Birth

00 DOCUMENT NUMBER: D0014568ABCD123

01 DATE OF BIRTH: 15.12.1990

02 PLACE OF BIRTH: Brandenburg

03 SEX: M

04 SURNAME OF THE PARENT: Mustermann

05 SURNAME OF THE CHILD: Müller

06 SURNAME OF THE SPouse: Schmidt

07 DATE OF THE FIRST ENTRY: M

08 DATE OF THE SECOND ENTRY: M

09 NUMBER OF P.F.F.: M

10 NUMBER OF P.F.F.: M

11 NUMBER OF P.F.F.: M

12 NUMBER OF P.F.F.: M

13 NAME OF THE ISSUING OFFICE: Standesamt MM

14 DATE OF ISSUE: 22.12.1990

15 PLACE OF ISSUE: Berlin

16 DATE OF COPY OF THE FIRST ENTRY: 01.02.1990

17 DATE OF COPY OF THE SECOND ENTRY: 01.02.1990

18 DATE OF COPY OF THE P.F.F.: 01.02.1990

19 DATE OF COPY OF THE P.F.F.: 01.02.1990

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01 SEX: none

02 SURNAME: none

03 DATE OF BIRTH: none

04 PLACE OF BIRTH: none

05 SURNAME OF THE PARENT: none

06 SURNAME OF THE CHILD: none

07 DATE OF THE FIRST ENTRY: none

08 DATE OF THE SECOND ENTRY: none

09 NUMBER OF P.F.F.: none

10 NUMBER OF P.F.F.: none

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- Double ID3 format, 125 x 176 mm, machine readable by ordinary full-page passport readers, translations on the backside

Harmonized Breeder Documents – Proposal (cont'd)

- Harmonised **design** and **data entries** in all EU member states (with additional country-specific information).
- A Europe-wide harmonised **numbering system**:

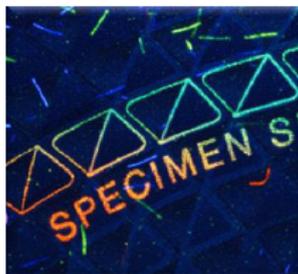
Country code	Issuing authority	Serial number
ABC	12345	XYZ678

- Machine-readable documents can be read **without errors** in a **fast and efficient** way!

Harmonized Breeder Documents – Proposal (cont'd)



(a) Background printing



(b) UV-fluorescent overprint



(c) IR-visible/invisible regions

- European Union-wide harmonised **minimum standard** set for breeder documents.
- Allows for **offline verification**, avoids **counterfeits** and **falsifications**, security features are **easily checkable**.

Harmonized Breeder Documents – Proposal (cont'd)



- **Datamatrix** or **QR-Quode** contains data entries reference by numbers to document legend (Barcode standard to be decided)
- Barcode for mandatory data entries (and optional including recommended data entries)
- Optional use of barcode for **future biometrics!**

Integration of Biometrics

- Physiological biometric characteristics represent **dynamic biological systems** and, thus, are potentially affected by ageing.
- Biometric ageing focuses on questions related to permanence of biometric features, including
 - 1 the **stability** of features in templates,
 - 2 the resulting impact in terms of recognition **accuracy**, and
 - 3 the impact of template owner's **age** on distinctiveness and performance.
- Distinguish between **physical** ageing and **template** ageing.

Integration of Biometrics (cont'd)

Characteristic	Ageing effects	Countermeasures	Advantage
Fingerprints	Growth of fingers, loss of collagen, injuries, etc.	Modelling of fingerprint growth	Usability
Iris	Hardly any observed effects (no visual proof)	–	Protected organ, compact repr.
Face	Wrinkles, ageing of the facial skin, morphological changes, etc.	Modelling of facial ageing	Usability

- **Important factors:** cost, acceptance, performance, quality of captured data, ethical issues, etc.

Integration of Biometrics (cont'd)

Research Issues:

- So far research on biometric ageing is limited and,
- there are hardly any large publicly available datasets.

Legal Issues:

- Privacy regulations need to be taken into account when integrating biometrics into breeder documents.

⇒ The vast majority of privacy preserving biometric template protection schemes suffer from biometric performance degradation

Conclusions and Outlook

- The integration of biometric information to breeder documents is **essential** to provide a **strong link** between bearer and document.
- However, so far it is not clear which (if any) biometric characteristic is stable for (very) **long time-spans**.
- Addressing the requirements on **privacy protection** and **ethical issues** is a **precondition**, before biometric reference can be integrated in breeder documents.
- These requirements make an integration of biometrics to breeder documents more challenging!

End

Thank you for your attention!

contact: christian.rathgeb@h-da.de