Group Identification at Border Crossing Points

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Abstract: Increasing Passenger flow at Border Crossing Points is an important issue at today's border crossing points (BCPs) of land, sea and airport. Group Access Control and utilizing biometrics information will help increase passenger throughput and reduce human error in handling passengers erroneously. Using multi modal information for (biometric) group id can provide more robust handling of passengers. On the other hand, connecting various BCPs will help solve some problems related to illegal entries from non-Schengen to Schengen space, laws and health. This paper presents the first relevant concepts and issues of using (biometric) group idea and connecting BCPs.

1 Introduction

A common challenge for customs and border control authorities is to improve the processes related to the increasing flow of cargo and people crossing borders, without undue delay and with minimal intrusion when meeting the same security requirement, whilst employing affordable technical and human resources. Each type of Border Crossing Point (BCP) presents particular challenges (for example, airports have constraints of available time and space, sea ports of available time and perimeter security, land BPCs of infrastructure/space availability and connection with land BCP/road network of neighbouring countries) which affects the workflows for performing checks. Moreover, the ability of border guards to perform checks will be constrained by the environment in which they work (human factors).

This Research Paper addresses the need to improve the design of land and maritime checkpoint infrastructure, technologies and processes at border crossings so that checks may be carried out in a more reliable, convenient and efficient manner. This paper identifies and analyses relevant constraints affecting security and efficiency of land and maritime checks (ID and detection) for each type of BCP and propose an innovative model solution for each and considers the combination of existing and new technologies and redesigned processes in order to solve several unsolved problems and new paradigms related to the detection of illicit material and to the introduction of new electronic travel documents and visas for third country nationals entering the Schengen space. A study [INDIGO] includes a human factors analysis of the ergonomics of equipment used and their effect on efficiency at each type of BCP (influence of quality of images from CCTV/scanning equipment on while e.g. realizing security background check of the person at the BCP by face recognition)

Identifying key infrastructure and ergonomic constraints at each type of BCP the ideal solution is to aid planning and efficient, speedy performance of border checks. The compliances of the proposed processes will be met with the privacy protection regulation and with the ethical principles.

One of the constraints affecting security and efficiency of land and maritime checks at the border crossing points is the unavailability of an infrastructure which connects various processes and ICT solutions at various BCPs in Schengen and non-Schengen countries. This is a challenging task to do since existing and new technologies as well as existing and newly designed processes need to be combined within such an infrastructure. The processes and ICT solutions are related to identification, detection of illicit material, and introduction of new travel documents and visas for third country nationals entering the Schengen space, using better ergonomic equipment and also how to offer mobile solutions.

Due to such a constraint, some problems occur and these problems are related to illegal entries, inapplicability of laws, undeliverable papers from police or court, and infectious diseases. These problems can be overcome if the travellers can be tracked for which BCP they have just entered or left and if this information can be passed onto other BCPs. Hence, our first aim in this paper is to introduce an overall concept of how various BCPs can be connected.

Our second aim is to introduce the concept of group based identification at BCPs while current practices are based on individual identification. A group id which represents an individual's connectivity to a group will save the corresponding border crossing police from asking group specific information to each member in the group repeatedly since this information will be known to the police officer from before due to pre-registration of the particular group. In such an approach, the time required for handling per passenger will be reduced and this will sum up to considerable time savings at border crossing point controls.

2 Connected BCPs

The loose or non-existing communication among various BCPs result in some problems and these problems can be grouped into three categories:

1) Problems due to illegal entries: These are problems resulting from attempts of non-Schengen country citizens to enter the Schengen space without the required permissions e.g visas, papers.

2) Problems due to inapplicability of laws or problems related to undeliverable papers from police or court: Several of the example situations that can occur within this category are as follows:

   a) A traveller commits a traffic crime in a foreign country, due to that, it is forbidden to use his driving license for 3 months due to international law. This information can be passed onto the other BCPs such that if the person leaves the foreign country and enters a new one, it will still be known to the authorities in the new country that he is not allowed to drive.

   b) A person has a work and residence permit in a foreign country. Loans money in the foreign country and leaves the country after a while. Never pays the money back and the foreign country does not know in which country the person is.

   c) A person buys a car and after a while leaves his country to live and work in a foreign country. Meantime a family member or a friend continues to use the car. The person who leaves for a foreign country still owns the car. The car receives a ticket for speed or another reason. The current user of the car neither pays the ticket nor informs the actual owner about the ticket.

3) Health related problems: A traveller has an infectious disease but noone is aware of the situation in the foreign country he visits and he spreads the disease.

3 A new concept: Group based identification

Currently, border crossing point controls for individuals require the identification of each individual either by an alpha-numeric id and/or by face and/or finger recognition. The same approach can also be used for group identification, either an alphanumeric id and/or an id based on the groups' social footprint (Figure 1 below).

BCP	Individual	Group
Application 1	Alpha-numeric id	Group footprint
Application 2	face and/or finger recognition	(biometric) group id

Figure 1: Individual and group identification at BCPs

The Social footprint[1] or the Sustainability Performance is defined by the quotient of 'a measure of impact on a vital capital' and 'a standard or norm for what the impact on the same vital capital ought to be in order to ensure stakeholder well-being'.

In an identity document e.g. passport, there is alpha-numeric id that describes some background information about the individual who holds the identity document. There is also biometric information stored in the identity document. At the BCP, the real time biometric information of the individual (e.g. face or fingerprint) is captured and compared against the biometric information of the individual stored earlier in the identity document. This way the verification of the alpha-numeric id for the individual is achieved. In the same manner, there is alpha-numeric id for a group which is called as group footprint in the identification document that each individual member of a group holds. At the BCP, the biometric information for an individual is captured and is compared against a stored group id. That is, a group id is constructed from biometric information of all individual members in a group.

The concept of the social footprint check is a more robust check and a more certain means of preventing people from pretending to be someone other than their true identity. Allied to other checks that are carried out in the normal process of an application for a travel document, it is a way of using the applicant's claimed biographical identity to check against their claimed identity. Social footprint evidence is evidence that an individual uses their claimed identity in the community; for example, this may include evidence such as driver licences and tax numbers. The social footprint is based on the premise that everyone has dealings with a variety of organizations in their daily life, many of whom maintain records about this engagement that are publicly available.

By integrating a social footprint check within the application process for a travel document, it is possible to deter potential fraudsters from attempting to make false applications. As the applicant does not know what information is held by the interviewing officer or the questions that they will have to answer, there is a greater likelihood that either the fraudster will not try to obtain a document by this means or their attempted deception will be picked up at interview.

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[1] The Quotients Approach – A General Specification for context-Based Sustainability Metrics
www.sustainableorganizations.org [2011]

The use of the social footprint is based on the availability of publicly available information about citizens.

Ordinarily, face and/or fingerprint recognition [1] is used at Automated Border Control Systems in addition to or in place of alpha-numeric id, in order to verify that the person who actually holds a passport or a travel document is actually the person him/herself. The same reasoning might apply also for group identification where a social footprint is given to each member in the group even from the time of applying for a travel document, or visa. It might also be possible to define a common footprint for a particular group. This social footprint is verified by biometric group id.

Such an approach based on group identification will be an augmentation to the existing ABC (Automatic Border Crossing) systems rather an alternative to it. Further vision is also to connect each augmented border crossing point with various others in order to make flow of information more efficient among various Schengen and non-Schengen country BCPs.

Developing an architecture for connecting BCPs in various countries and developing further the concept of (biometric) group id requires collaborating with various authorities, namely Border Crossing Point Police, research units which would further work on group biometrics as a means of improving flow of control at border crossing points and companies which understand the issues at border crossing points and can provide technical solutions and test equipment. Also, the involvement of cruise operators at sea borders, and transportation authorities (e.g. bus, train) are required. We have the collaboration with the mentioned authorizes and developed an architecture called "INDIGO" in order to assess and improve checks at Border Control Points (BCP). The architecture proposes a modular scalable system of the systems based on various sensors and intelligent algorithms that helps in escalating the current procedures for handling higher volumes of passengers and increasing flows of goods.

4 Conclusion

In this paper, we introduced two new concepts: connecting border crossing points for dealing with problems related to illegal entries, laws and health and using (biometric) group id. We suggest that using biometric group id might increase the throughput at the border crossing points which can be used to verify social footprints of pre-registered groups. These two concepts will be complementary to the existing ABC systems instead of being an alternative to them. Further research is required to define what kind of information can be representative of storing social footprint of individuals and groups and what can a (biometric) group id be like.

Literature

[1] Landais R., Bredin H., Zouari L., and Chollet G., "Vérification audiovisuelle de l'identité," in Proc. Traitement et Analyse de l'Information: Méthodes et Applications (TAIMA), Hammamet, Tunisia, 2007.