

COST

Domain Committee "Information & Communication Technologies"

COST Action IC1106

Start Date 14th March 2012

Integrating Biometrics and Forensics for the Digital Age

MONITORING PROGRESS REPORT

Reporting Period: from 14th March 2012 to 30th April 2013

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report** prepared by the COST Office/Grant Holder
- II. Scientific Report** prepared by the Chair of the Management Committee of the Action
- III. Previous versions of the Scientific Report;** i.e., part II of past reporting periods

The report is a "cumulative" report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter II.D. *Self evaluation.*

Based on the monitoring results, the COST Office will decide on the following year's budget allocation.

Executive summary (max.250 words):

One of the main goals of the COST IC1106 Action is to promote synergies between the biometrics recognition and the forensics science communities.

This was achieved by means of innovative networking and scientific exchange such as:

- The first Training School, held in Alghero, Italy, on June 10th to 15th 2012, which promoted a notable exchange among researchers of the Action and also participants from outside the Action, as well as a multi-disciplinary enrichment thanks to the 20 lecturers, all from the editorial boards of top-level scientific journals and conferences.
- The first Action workshop, "International Workshop on Biometrics and Forensics" (IWBF 2013), held on 4-5 April, 2013, in Lisbon, Portugal, allowed to bridge the Biometrics and Forensic science communities by means of scientific presentations, plenary and panel sessions by renowned experts from both scientific communities.
- The Working Group meetings and organized Special Sessions, which allowed an up-to-date exchange and discussion on the Action's research topics.
- STSMs which allowed the exchange of personnel and the starting of new research collaborations among the Action members. Notably two reciprocal STSMs were activated, producing a strong interaction with the Queensland University of Technology in Australia. This resulted in further scientific collaboration and joint projects.
- 173 scientific papers were published and 4 new EC-RTD proposals were submitted by the Action members, within the scope of this Action.

I. Management Report prepared by the COST Office/Grant Holder



I.A. COST Action Fact Sheet

- **COST Action IC1106 - Integrating Biometrics And Forensics For The Digital Age**
- **Domain ICT**

- **Action details:**

CSO Approval: (01/12/2011)

End date: (13/03/2016)

Entry into force: (14/03/2012)

Extension: N/A

- **Objectives**

"Forensics is the application of a broad spectrum of sciences to answer questions of interest to a legal system. This may be in relation to a crime or a civil action" [Wikipedia]. Since many such questions boil down to identifying, or verifying the identity, of people allegedly involved in some action, a clear relationship exists between forensics and biometrics. Biometrics developed a number of techniques which can clearly facilitate the identification of people involved in criminal actions or civil incidents. Thus, although the two communities have traditionally often operated in relative isolation, there are many scenarios where the synergic cooperation of multimodal biometrics and forensics can be successfully applied. To address such multifaceted areas it is important to develop an interdisciplinary network with complementary competences, to foster the birth of a new community which can develop novel technological solutions to crucial issues and new challenges in forensic science. The Action will promote new partnerships, will provide education and training, will contribute to develop new standards and best practices, will produce awareness of the potential benefits of advanced technologies for evidence analysis in forensic cases and will stimulate improved mutual understanding of collaborative working models linking the academic and industrial sectors

- **Parties:** list of countries and date of acceptance

Austria (23/01/2012)	Greece (23/01/2012)	Poland (02/02/2012)
Belgium (02/05/2012)	Hungary (date)	Portugal (30/12/2011)
Bulgaria (date)	Iceland (date)	Romania (date)
Croatia (11/01/2012)	Ireland (16/01/2012)	Serbia (date)
Cyprus (18/05/2012)	Israel (17/05/2012)	Slovakia (18/10/2012)
Czech Rep. (10/08/2012)	Italy (05/01/2012)	Slovenia (05/01/2012)
Denmark (19/01/2012)	Latvia (20/01/2012)	Spain (03/01/2012)
Estonia (date)	Lithuania (date)	Sweden (13/02/2012)
Finland (09/01/2012)	Luxembourg (date)	Switzerland (24/01/2012)
FYR of Macedonia (15/06/2012)	Malta (18/01/2012)	Turkey (04/07/2012)
France (05/04/2012)	Netherlands (17/01/2012)	United Kingdom (13/12/2011)
Germany (18/01/2012)	Norway (23/04/2012)	

- **Intentions to accept:** list of countries and date

- **Other participants:**

Institute of Automation, Chinese Academy of Sciences China - Beijing

Michigan State University United States of America – East Lansing

Queensland University of Technology Australia – Brisbane

The Hong Kong Polytechnic Univesrity China - Hong Kong

West Virginia University

United States of America - Morgantown

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• **Action Web site:** <http://ic1106.uniss.it>

• **Grant Holder Representative** Andrzej Drygajlo, andrzej.drygajlo@epfl.ch

• **Working Groups** (list of WGs and names and affiliations of participants)

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WG6: Ethical and societal implications of emerging forensic biometrics

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I.C. Overview activities and expenditure

1st year Budget

Total Action Budget (B+C):

172.269.24

Total Science Expenditure(B)

149799.35

Remaining Action Commitment:

Meetings

Meeting Type	Date	Place	Budget	Paid	Accruals	Total
Meeting 1	15/16/06/2013	Alghero	16869.93	16869.63	0.00	70326.31
Meeting 2		Coventry	3218.56	3218.55	0.00	
Meeting 3		Paris	23031.70	23031.70	0.00	
Meeting 4		Lisbon	30000.00	0.00	27206.43	

STSM

Beneficiary	Date	Place	Budget	Paid	Accruals	Total
T. Moeslund	23/02-04/03/2013	Barcelona (ES)	2500.00		1150.00	12540.00
L. Debiasi	31/03-14/04/2013	Beijing (CN)	2500.00		1700.00	
Y. Guan	15/04-31/05/2013	Alghero (IT)	2500.00		2500.00	
X. Wei	15/04-31/05/2013	Alghero (IT)	2500.00		2500.00	
F. Kelly	27/05-14/06/2013	Nijmegen (NL)	2500.00		2190.00	
Y. Sun	15/06-31/08/2013	Coventry (UK)	2500.00		2500.00	

Workshops

Title	Date		Place	Budget	Paid	Accruals	Total
	From	To					
ACM W MS	06/09/2013	07/09/2013	Coventry	1000.00	1000.00		
IWBF 2013	04/04/2013	05/04/2013	Lisbon	5000.00		5000.00	6000.00

Schools

Title	Date	Place	Budget	Paid	Accruals	Total
Training School 1	11-15/06/2012	Alghero	44596.76	44596.76	0.00	44596.76

Dissemination

Title	Date	Place	Budget	Paid	Accruals	Total
Website			2500.00		2500.00	4500.00
Proceedings			2000.00		2000.00	

Others

Action Total (Science): 137963.07

II. Scientific Report prepared by the Chair of the Management Committee of the Action, describing results achieved during the Action operation in this period, in no more than 3 pages (the report is “cumulative”). All items listed in Sections A, B, and C, below, must be addressed. Additional documentation such as extended scientific reports, proceedings of workshops, seminars or conferences may be provided separately as an annex to this report, and should be referenced in the report.

II.A. Innovative networking

- *Innovative knowledge resulting from COST networking through the Action. (Specific examples of Results vs. Objectives)*

One of the main goals of the COST IC1106 Action is to promote synergies between the biometrics recognition and the forensics science communities.

The first Training School, held on June 10 to 15 2012, promoted a notable exchange among researchers of the Action and also participants from outside the Action. The 42 participating ESRs and practitioners already started some fruitful collaborations and engaged in collaborative research. They had a chance to engage discussions and some common research with the 20 lecturers, all selected from the editorial boards of top-level scientific journals and conferences (**see Annex 1**).

The first annual IC1106 workshop, “International Workshop on Biometrics and Forensics” (IWBF 2013), held on 4-5 April, 2013, in Instituto Superior Técnico, Lisbon, Portugal, allowed to bridge the Biometrics and Forensic science communities. Innovative examples of the application of biometrics in forensic scenarios, were reported in IWBF 2013, by world leaders in this area who are members of the IC1106 Action or work in close cooperation with Action members, in two invited talks (Prof. Anil Jain and Prof. Niels Lynnerup). Also a panel session on “The Role of Behavioural and Soft Biometrics in Forensic Analysis” was chaired by Prof. Mark Nixon, involving not only a group of expert panellists, but also the experts present in the audience. In addition, the oral session on “Behavioural Biometrics” allowed presentation of innovative work being carried on by action members and other experts (**see Annex 2**).

Regarding the activities fostered by Working Group WG1, these lead to significant improvements in the methodology for validating likelihood ratios, with the proposal of algorithms, the development of software for use of forensic practitioners and the dissemination and teaching of these proposals.

Within the objectives of Working Group WG2, Warwick University is creating a novel video database of videos taken by over 20 imaging devices for supporting device identification based on the PRNU extracted from video. The main feature of this database is that there will be video clips taken by 10 CCTV cameras of the same model. This is intended to evaluate the discriminating power of PRNU at camera level, rather than just model level. This database will be made available to the public if successfully built.

Innovative networking during the special session on biometrics and forensics synergies at EUSIPCO 2012 chaired by Paulo Lobato Correia led to the identification of challenges for the assessment of new generation of contact-less sensors to acquire evidence from crime scenes and an exchange about acquisition devices and advanced image processing and recognition techniques to gather biometric evidence from palmprints.

A discussion about differences in error rates in science and forensics took place during the first WG meetings in Alghero. The important result was that usually scientific datasets do not correspond with real data used in forensic investigations. A discussion on currently used and novel sensor techniques (including a demonstration on NIR and UV cameras), databases and protection concepts took place at the ACM Multimedia and Security Workshop 2012, which also had two special sessions addressing innovative topics of the action.

- *Significant scientific breakthroughs as part of the COST Action. (Specific examples)*

Among the work being developed within the Working Group WG3, and reported in IWBF 2013, there have been concrete examples on the usage of behavioural biometrics as evidence in court, notably in Denmark. A highly innovative fingerprints matching scheme that operates on ISO minutia representations, has been developed within the Action members. This approach is based on geometrical matching using spectral graph matching followed by RANSAC, where the matching score is given by the number of matched inliers. The system will be submitted to the FVC-ongoing

international fingerprint matching competition.

- *Tangible medium term socio-economic impacts achieved or expected. (Specific examples)*

Besides the above mentioned example of behavioural biometrics being used in the court in Denmark, also an example in the UK has been published in a law journal "Solicitors Journal", resulting from work conducted in the scope of the Action. Other tangible examples include a cooperation initiated between the biometrics research team of IST, Lisbon and the Scientific Police Lab in Portugal.

A strong impact is expected by the offer of an STSM using the contact-less sensor equipment at the University of Magdeburg in Germany. Further, the experience of creating and maintaining structures that supports early stage researchers is expected to be of socio-economic value to the participants of the COST Action.

The first Training School allowed several PhDs to find research opportunities and collaborations with several labs for continuing their scientific work as ESRs.

- *Spin off of new EC RTD Framework Programme proposals/projects*

10 new EC RTD Framework projects/proposals were started by the Action members (**see Annex 3**).

- *Spin off of new National Programme proposals/projects:*

11 new National projects/proposals were started by the Action members (**see Annex 3**)

II.B. Inter-disciplinary networking

- *Additional knowledge obtained from working with other disciplines within the COST framework. (Specific examples)*

Clear synergies between biometric recognition research groups and investigation departments of police forces are being strengthened, e.g., with Italian, German, Danish, Dutch, Spanish or Portuguese polices. Also national labs like NFI (Netherlands Forensic Institute) in the Netherlands are actively involved in the IC1106 Action. Also a closer cooperation with ENFSI (European Network of Forensic Science Institutes) is being established.

A first cooperation and exchange of information has been started between German Partners and partners from Malta as well as with KENT University, UK regarding crime scene forensics and contactless acquisition techniques. Discussion of different trace quality simulations started between partners from Germany and Austria.

Within the first Training School experts and scientists from several disciplines, such as Computer Science, Neuroscience, Forensic Science, Bioethics were gathering together and allowing the participant ESRs to enlarge their knowledge for a multi-disciplinary approach (**see Annex 1**).

- *Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide scientific impacts. (Specific examples)*

The existing or newly created links between the two communities are promising, also in terms of the potential scientific impacts. The WG3 related cooperation with the Danish or the UK judicial systems are good examples of this trend, as well as the activated STSMs and the Training School.

- *Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide socio-economic impacts. (Specific examples)*

Warwick University has been networking with Forensic Pathways Ltd (UK), Videntifier (Iceland) and Interpol, and investigated the feasibility of strengthening Interpol's existing International Child Sexual Exploitation image database (ICSE) by using device and content fingerprinting in its retrieval system.

Warwick University organised the 14th ACM Workshop on Multimedia and Security, Coventry, UK, 6-7 September 2012. The workshop facilitated the exchange of ideas contributed by experts from the fields of biometrics, forensics, law enforcement and privacy (**see Annex 4 and 5**). The Action also sponsored two of the special sessions and co-located a working group meeting with the workshop. Dr Duncan Hine, former Executive Director of Integrity & Security of the Identity and Passport Service, the Home Office (UK) and the managing director of the security division of

QinetiQ PLC, was invited to present his work and exchange ideas at the WG meeting.

II.C. New networking

- In total 7 new MC members joined the action during its first year.
- A total of 80 (30% female and 60% male) individuals participated in the Action work.
- ESRs have been involved in the Action activities: 27 ESRs joined the first Action Training School; 6 STSMs were accomplished and 2 RSTSMs; 50 ESRs were involved in the Action's Working Group meetings and in the first Action Workshop.
- 8 researchers from 3 non-COST countries were involved in the Action's work, 30% were from one country with reciprocal agreement (Australia).
- In total 173 scientific papers have been published in the first year, within the scope of the Action (**see Annex 6**). The main outreach activities promoted by the Action members in the first year were:
 - The first Training School (**Annex 1**)
 - The first Joint COST-ENFSI Workshop on Biometrics & Forensics (**Annex 2**)
 - The organized Special session on Biometrics and Security at 14th ACM Workshop on Multimedia and Security (**Annex 4 and 5**)

- *Activities and projects with COST network colleagues.*

4 proposals were submitted within the scope of this Action and with COST partners (see the new EC-RTD projects listed in **Annex 3**)

- *The capacity of the Action members to raise research funds.*

11 National projects were reported from the Action members (**see Annex 3**)

II.D. Self evaluation

III. Previous scientific report(s)

Part II of past periods' reports are to be found here.