GCU’s Interactive and Trustworthy Technologies Research Group, based within the Institute for Sustainable Engineering and Technology Research, pools expertise in computing technology and policy in industry, government, and academia; human computer interaction with research interests including novel touch based interfaces, interactive information retrieval and intelligent user interfaces; digital security and forensics; the development of technological solutions to support students; and computer security.

GCU’s Dr Michelle Govan has research interests in biometrics, digital security and digital forensics techniques. Working with colleagues Dr Mike Just and Professor Lynne Baillie, she has researched a range of trustworthy security technologies, applicable to a wider range of markets, including authentication technologies and finding solutions that balance security, usability and efficiency, addressing the common weakest links, individual passwords and the limitations of people.

The research group has a wealth of expertise in working with industry and research partners. Projects on methods of biometric authentication have included a Knowledge Transfer Partnership (KTP) project and subsequent research fellowship with smartcard technology company Ecebs Ltd. The project involved the development of multimodal biometric algorithms for authentication within embedded systems, and used control theory to develop novel feedback and feed forward approaches for fingerprint authentication.

Cyber Security and Networks
Case Study: Biometrics and forensics for new security solutions

Research commissioned by the Government’s Department for Business, Innovation and Skills (BIS), revealed that the number of cyber attacks hitting businesses has increased over the last year, with some attacks causing more than £1 million of damage. 87% of small firms experienced a cyber-security breach last year, an increase of 10%.
The work resulted in patented technology on smartcard devices that was used to enter new markets with a competitive advantage. Ecebs saw increased turnover of £530k per annum, and eventual acquisition by Trainline Investment Holdings Ltd and subsequently Bell ID. The research proposed identifying the key components of a fingerprint, the “minutiae”, by their relative spatial relationships, rather than the normal practice of using global position coordinates and orientation.

These advanced biometrics authentication processes and algorithms for embedded systems led to the development of new security solutions to offer increased protection of smartcard data. The research also extended biometrics beyond traditional authentication, and utilised biometric characteristics as a gauge for physical state. In particular, research improved the efficiency of data processing, lessening the impact on smartcard users and enabled Ecebs Ltd to develop an advanced multi-modal biometric based security solution.

The authentication research of the Interactive and Trustworthy Technologies research group has included the development of underlying technologies for biometrics on smartcards, multimodal sensors on smartphones, and online knowledge-based information. In each case, the intended goals related to improved security, usability, and effectiveness for cost reduction and increased market potential. Research also includes models of authentication for online banking, which is being used to develop new solutions for making effective choices as to which forms of authentication should be used, and which parameters should be selected in order to support better informed choices of security protection.

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