

NRC-CNRC

*Institute for
Information
Technology*

Societal Aspects of Biometrics

Andrew Patrick, Ph.D.

Information Security Group

Institute for Information Technology

<http://iit-iti.nrc-cnrc.gc.ca>

Andrew.Patrick@nrc-cnrc.gc.ca

<http://www.AndrewPatrick.ca>



National Research
Council Canada

Conseil national
de recherches Canada

Canada



British Government Believes ID Cards Help Security

By Charlie Sorrel  August 10, 2007 | 6:13:07 AM Categories: [Law](#), [Security](#)

In politics, you'd expect the right wing party to be all over compulsory ID, with opposition from the left, right? Not so in Britain. Yesterday the Labour Government began the selection process to choose which companies will make the new privacy-killing national ID card, while in an unexpectedly lucid moment, right wing Conservative party spokesman David Davis said "This project will do nothing to improve our security". The Conservatives promise to abolish the scheme if they ever return to power.





Consumers Resist Retail Biometrics

Written by **Evan Schuman**

January 30, 2006



As assistant director of information systems for the \$700 million Piggly Wiggly grocery chain, Rachel Bolt has been one of the most vocal proponents of biometric retail authentication systems. At Piggly Wiggly, that system—like almost every other retail biometric system being tested today—is based on fingerprints.

But although Bolt saw initially strong consumer interest and support for the system, that support has lately seen a serious drop.



<http://blackstarnews.com/>

GeoSlavery: Big Brother

This type of surveillance constitutes an invasive and unnecessary intrusion into the privacy of our municipal workforce. It is also an attack on working class people because it only applies to those at the lower end of the pay scale—managers and supervisors are exempt.

By Nayo Joy Simmons

September 5th, 2007

[Political Pulse]

"Big Brother" has its eye on New York City.

The Bloomberg Administration has implemented a program that requires hundreds of New York City Employees to place their hand in a machine called a biometric hand scanner, to record their start and end of work time.



Nayo Joy Simmons

Tuesday, September 4, 2007

Students use fingerprint scanners to pay for lunch

*By Bob Driehaus
Post contributor*

The speed-walking herd of ravenous Covington Catholic High School students hits the doors of the cafeteria seconds after the 11:20 a.m. bell signaled that the soup was on.

By 11:35, all 170 students in the first of three lunch periods were through the food line, paid up and in their seats inhaling the hot chicken quesadillas, corn and nachos on Friday's menu.

The scene might have been a typical one in any high school



ZOOM

MELVIN GRIER/The Post

Ryan Shouse, a Covington Catholic senior, pays for his lunch by having his index finger scanned by cashier Marty Davey.



chicagotribune.com

High technology off menu

After 1 day, Wilmette district's use of pupils' fingerprints to pay for lunches is put on hold because of privacy and legal concerns

By Lisa Black

Tribune staff reporter

September 7, 2007

Shortly after rolling out a new lunch program that allows pupils to pay for hot meals with a scan of their fingerprint, Wilmette school officials put the system on hold after learning that a new Illinois law limits the use of biometric information to protect children's privacy.

That, and the system didn't work, perhaps because of grubby fingers or a computer glitch, said officials from Wilmette Elementary School District 39.



FINGER-PRINTING IS OVER THE TOP

Date : 21.08.07

It is more like a scene out of a sci fi thriller than real-life practice in everyday Gloucestershire. Children as young as nine are being finger-printed. The reason? Links to criminal activity? To gain access to a high-security area like GCHQ? No, to take out a school library book!



Iraq's Biometric Database Could Become "Hit List": Army

By Noah Shachtman [✉](#) August 15, 2007 | 1:56:05 PM Categories: [Biometrics](#)



The U.S. is building on [Saddam's databases](#) to assemble [biometric files](#) and national ID cards for hundreds of thousands of Iraqis. American military officials say it's a crucial step towards getting a handle on who the bad guys are in Iraq. But groups like the Electronic Privacy Information Center (EPIC) spooked -- in a sectarian civil war, they argue, a biometric identification can suddenly become a death warrant.

Today, in a blogger's conference call, Lieutenant Colonel John Velliquette, the biometrics manager in Iraq for the "Coalition Police Assistance Training Team," said he was worried, too.



Major Issues

- **technology-driven rush to deploy**
- **lack of technical and social debates**
- **true value for national security**
- **performance and reliability**
- **universal access**
- **purpose limitation**
- **erosion of privacy**
- **commercial exploitation**
- **covert or involuntary use**



Examining Societal Aspects

- **ISO JTC1/SC37 Biometrics Committee**
 - Draft Technical Report on *Jurisdictional and Societal Considerations for Commercial Applications (General & Specific Technologies and Applications Parts)*
- **Privacy Commissioners**
- **research projects**
- **various organizations and groups**



concerns are often not with the biometric system, but with the back-end processes and policies



Acceptability Polls

Citizenship & Immigration Canada, 2003

- **90% don't know what "biometrics" mean**
 - when reminded, 56% recall hearing something on TV, newspapers, magazines...
- **80% worried about fraudulent ID documents**
- **85% think adding biometrics will help (better than other measures)**
- **68% support use of biometrics by government to reduce ID fraud**
- **but there are concerns**
 - 49% think cost will be too high
 - 48% worried about privacy
 - 46% think that criminals will get around it
 - 45% fear the government will misuse it
 - 37% think it is contrary to principles of freedom and fairness
- **80% think biometrics are coming within 10 years**



TNS-TRUSTe data, 2005

- **71% think criminals will find a way around biometric ID**
- **64% think there is a high potential for the government to misuse biometric ID information**
- **61% think that biometric ID will reduce privacy and allow tracking**
- **21% "don't trust" the technology**

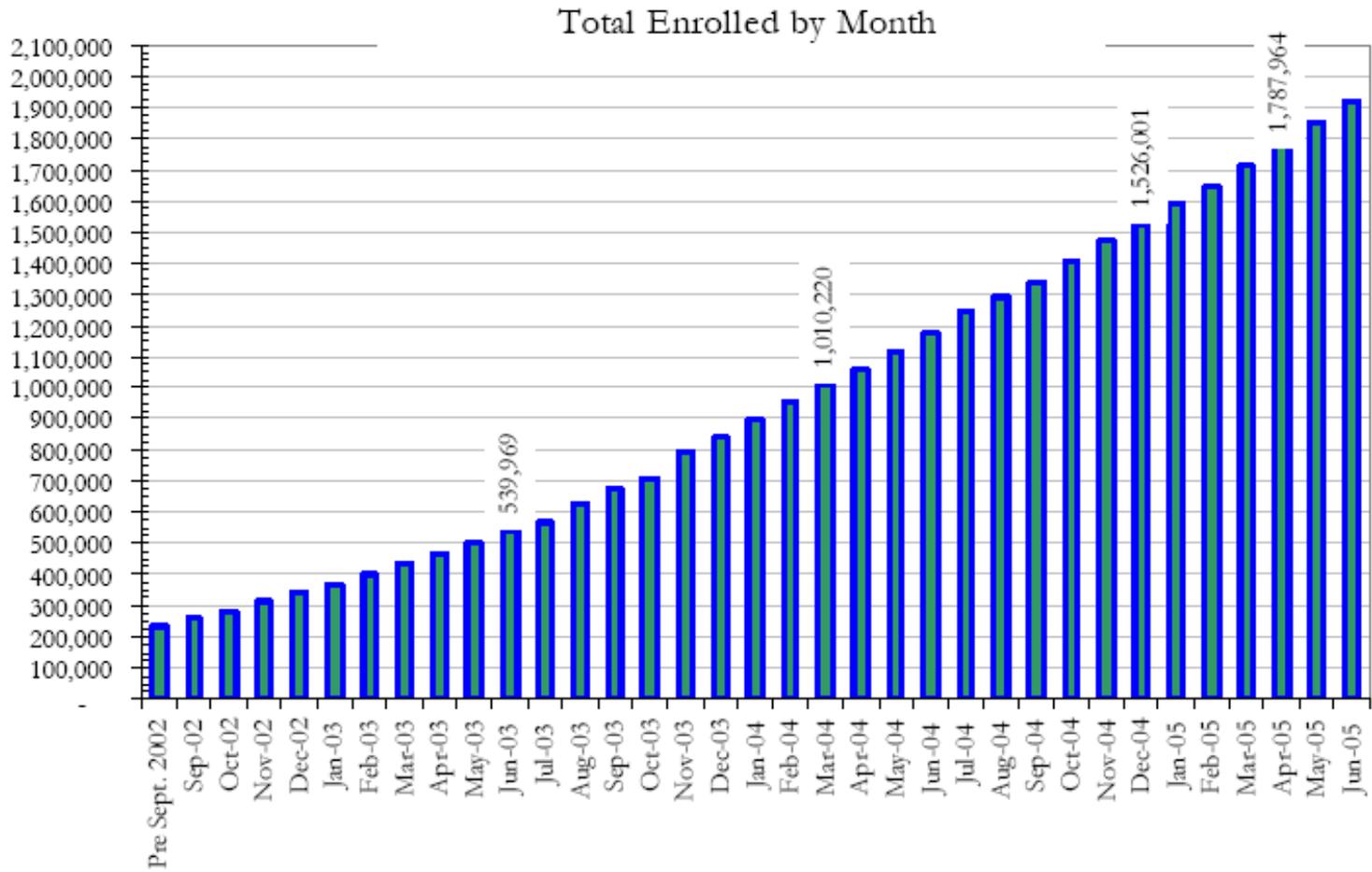


**Deloitte & Touche
survey in 2007 found
little interest in
Registered Traveler
Program, with 75%
citing privacy
concerns**





BioPay Enrollment





340
LEAVE THIS SPACE BLANK

Name: MALCOLM LITTLE
Classification: 92Aa 10
Ref: 1aR

No. _____ Color: BLACK Sex: MALE

| | | | | |
|---------------|-------------------|--------------------|------------------|---------------------|
| 1—Right Thumb | 2—R. Index Finger | 3—R. Middle Finger | 4—R. Ring Finger | 5—R. Little Finger |
| 6—Left Thumb | 7—L. Index Finger | 8—L. Middle Finger | 9—L. Ring Finger | 10—L. Little Finger |

Four fingers taken simultaneously

Left hand

Amputation: *None*

Right hand

Left Thumb Right Thumb

Impressions taken by: *John P. ...*

Prisoner's signature: *Malcolm Little*

Classified by: _____
Verified by: _____





context



Micro-Study of Context

Rosa Heckle (UMBC)

with

Andrew Patrick (NRC)

and

Ant Ozok (UMBC)



Method





Tasks

- **Task 1:** Order a book for a project at your office. You will use the corporate account to purchase the book.
- **Task 2:** Order a book for a project at your office. You will need to use your personal credit card to purchase the book, and the company will reimburse you for it.
- **Task 3:** Order a book for your private collection. You will need to use your personal credit card to purchase the book.



| | Company/ Corporate | Company/ Personal | Personal/ Personal |
|-----------------------|-------------------------------|------------------------------|-------------------------------|
| Beneficial | 67% | 21% | 88% |
| Comfortable | 25% | 25% | 46% |
| Prefer ID/Pass | 58% | 46% | 33% |



culture

Cultural Differences

- attitudes towards technology
- attitudes towards authority
- clothes, ornaments, and traditions





Article published Aug 8, 2007

Workers claim 'mark of beast' in time-keeping, file protests on city ID system

Work can often be a bear, but can it be the beast?

About a dozen employees of the City of Wilmington have filed religious protests against a new time-keeping system that uses finger measurements to track workers' hours.

"As my divine ... right, I request that you, my employer, accommodate my sincerely held religious belief by not requiring me to submit to the use of a thumbprint, DNA or any other biological identification device," one employee wrote.

The city has declined to name the workers, making it hard to discern the theology behind the protest. And the few whose names could be determined by other means would not discuss the matter with a reporter.



privacy



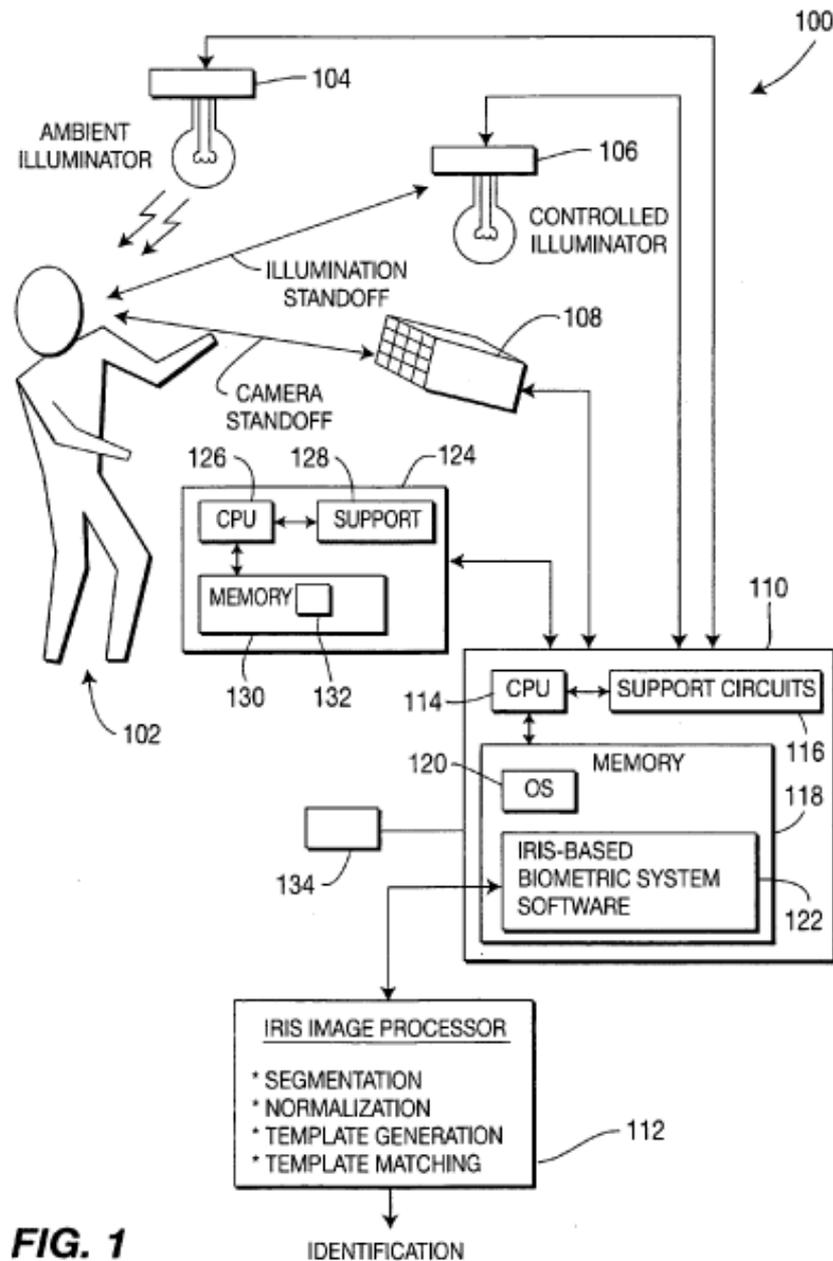
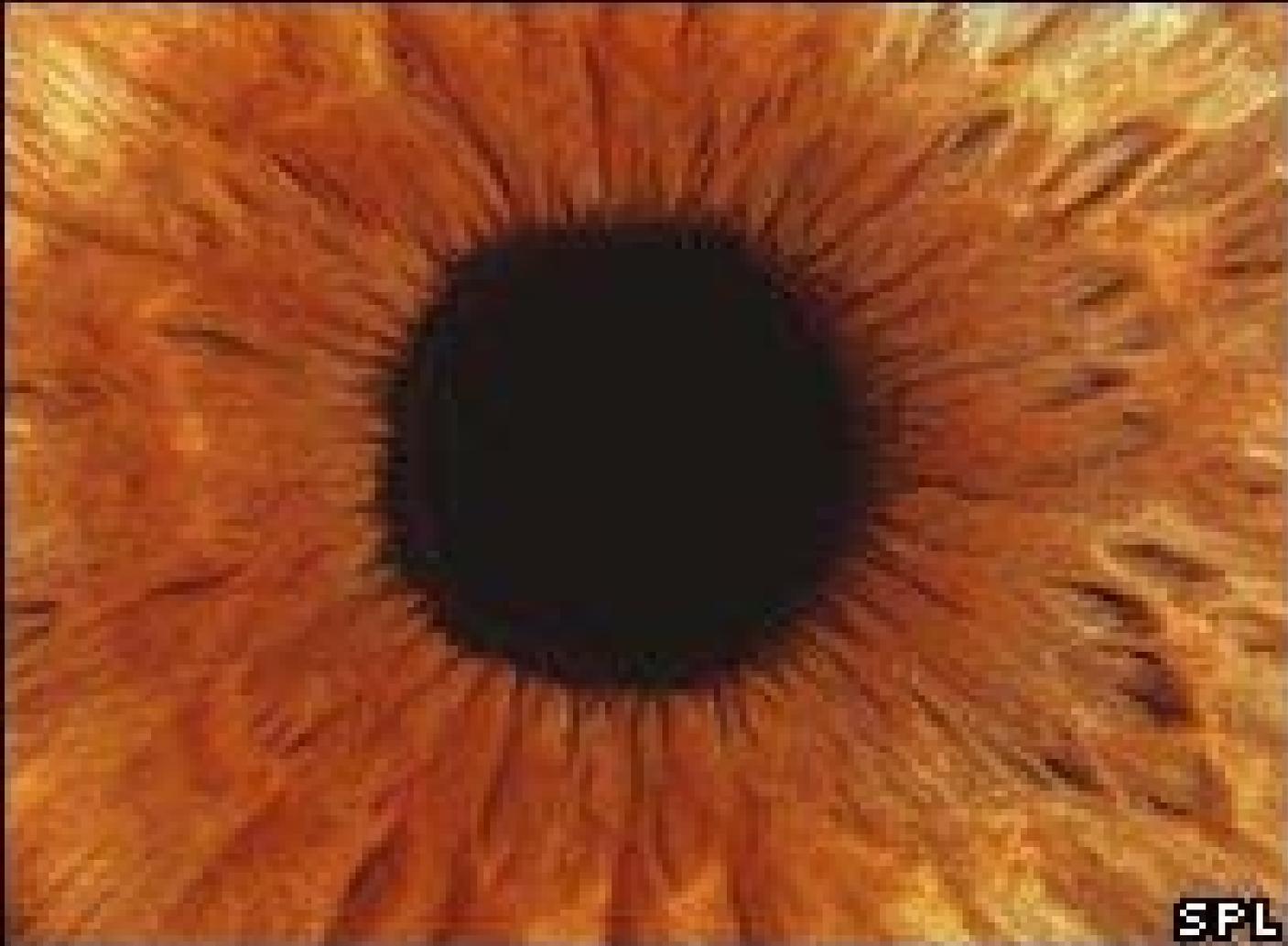


FIG. 1





Ontario Privacy Commissioner on Biometrics for Welfare Fraud

- **encrypted storage**
- **restricted use**
- **reconstruction impossible**
- **match to latents impossible**
- **fingerprint cannot identify individual**
- **strict access controls**
- **warrant or court order for access by external agencies**
- **benefits data (e.g., amounts) separated from personal identifiers**



Privacy Commissioner of Canada on LSAT and Fingerprints

- thumbprints collected during LSAT testing to deter fraudulent test taking
- analog prints saved and could be compared with previous test takers later
- LSAC admitted that this has never happened in practice
- LSAT testing found to be a commercial activity and subject to Canada's privacy laws





LSAT Four-Point Test

- **Is the measure demonstrably necessary to meet a specific need?**
 - lack of evidence for widespread fraud
 - photo ID is sufficient
- **Is it likely to be effective in meeting that need?**
 - no evidence of deterrence effect
 - no actual use to detect fraud
- **Is the loss of privacy proportional to the benefit gained?**
 - not public safety or national security
 - collection with no future use
 - fingerprints could be accessible to law enforcement (in USA and Canada)
- **Is there a less privacy-invasive way of achieving the same end?**
 - photo ID is sufficient



Biometrics Can Enhance Privacy

- **protecting personal data (e.g., laptop encryption)**
- **proving entitlement without revealing identity (e.g., anonymous fingerprint in the members database)**



Ontario Privacy Commissioner and Biometric Encryption

Biometric Encryption technology not only holds the promise of superior privacy and personal control for individuals over their own biometric data, but also stronger information security and greater user confidence and trust in biometric identification systems.



Privacy Protection Principles

- transparency
- consent
- opt-in
- purpose limitation
- collection limitation
- retention limitation
- system performance
- access rights
- data protection
- auditing
- transfer limitation
- automated decisions
- accountability
- data accuracy
- anonymization

accessibility



Accessibility Requirements

- **absence of body parts or behavioral feature**
- **unusable parts or features**
- **lack of bodily control (e.g., tremor, speech impediment)**
- **changes over time**
- **physical access to device**
- **cognitive impairments**
- **avoiding timeouts**
- **over/under sized parts (e.g., children)**



Legal Issues

- US Fourth Amendment protections based on reasonable expectations of privacy
- **but do expectations of privacy apply to biometrics?**
- gathering fingerprints, iris, & retina characteristics likely protected, for now
 - this may be acceptable if there is a reasonable suspicion of criminal activity and fingerprints would help investigation
- behavioral characteristics (voice, gait) have not been protected
- tests of reasonableness will change as biometrics are adopted, and will probably be related to measures of common use and invasiveness
- different criteria in cases of national security