New technology will make election voting more efficient

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Did you stay up all night to hear your local result during the recent election? Time-consuming manual vote-counts and ballot boxes could soon be consigned to the history books, thanks to innovative new secure voting technology.

The system is being developed by computer scientists at the Universities of Surrey and Birmingham, with funding from the Engineering and Physical Sciences Research Council (EPSRC), and in collaboration with the University of Luxembourg.

Combining speed with total vote-counting accuracy, the system is unique because it will integrate state-of-the-art optical scanning, data processing and encryption with the tried-and-tested process of manually writing on a ballot paper.

No other voting system either in use or currently under development uses such a combination, which will enable the new system to avoid the major drawbacks associated with both purely manual and purely electronic voting methods.

As well as eliminating the need for laborious manual counts and recounts, which are complex and expensive to conduct, it will remove the possibility of ballot papers being miscounted, mislaid or marked (and thus invalidated) accidentally or deliberately during a manual vote-count.

Similarly, although electronic voting could offer an alternative to manual

voting and vote-counting, and indeed has been tested in many countries, there are serious concerns over its reliability. Some voters have even claimed that the vote shown to have been registered on the voting screen did not tally with the button they pressed.*

The Surrey/Birmingham team's solution to these problems will retain the use of a ballot paper that looks almost identical to those used today, with the list of candidates on the left and the voting boxes on the right. There will, however, be two key differences.

First, the order of the candidates' names will be randomised, and will not be the same on every ballot paper as in current elections.

Second, a perforated line will run down the middle of the ballot paper, with the candidates' names on the left and the voting boxes on the right hand side. Each person, after casting their vote, will use this perforation to tear the ballot paper in half. They will then use a shredder provided at the polling station to destroy the left-hand half containing the list of candidates.

The voter will then feed the right-hand half into an optical scanner which will immediately feed all the information to a central database which will keep a count of all votes cast.

Bespoke cryptographic software being developed by the project team will ensure all data remains completely anonymous and safely encrypted.

Once the polls have closed several computers will work together to identify candidate placings.

The new system will allow also the voter to keep the right-hand half of their ballot paper as evidence of where they marked their paper. They will then be able to check that their vote has not been tampered with by

logging on to a bespoke website, entering a serial number unique to them, and viewing the scan of their ballot paper. They can therefore verify their vote without anyone else knowing how they have voted.

"Our system will combine the best of both worlds - providing secure electronic vote-counting that cuts the cost and complexity of running elections but doesn't require big changes to the actual voting process," says Dr James Heather of the University of Surrey. "This is vital as some people find touch-screen or push-button technology intimidating, and might even be deterred from voting as a result."

Not only could the new system prove enormously valuable in elections in the UK and elsewhere in the developed world, preventing controversies and multiple recounts such as those in the 2000 US Presidential Election. It could also play a key role in elections in developing countries, helping to prevent election fraud and ballot-rigging.

"Overall, the new system aims to deliver a completely trustworthy, 'right first time' voting mechanism that voters are comfortable using and that delivers rapid results which everyone can have complete confidence in," adds Professor Mark Ryan of the University of Birmingham. "Our objective is to develop the system to the point where it could be trialled in a local or mayoral election, for example, within about four years."

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