

Information and Freedom

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17th March 1992

The digital computer is the most powerful tool invented. Other tools manipulate things; computers process information. Their ability to gather and analyze data, and act on the results, enables them to perform complex tasks under varying conditions unsupervised, controlling other tools and computers. Yet few people consider their effects on society. Perhaps this is because they are often hidden inside other machines, or because of the mystique that shrouded them until recently, and which still deters people from using them; nevertheless, it is strange that there has been so little debate during their rapid penetration of society. Until recently, the only issue debated seriously was automation and its effects on employment, but it was primarily an economic rather than a social debate.

The computer's greatest potential lies in the management and communication of information, and it was in this area that social debate started, over how the storage and use of personal information should be regulated. In this country, the debate led to the Data Protection Act (1987). However, this debate was only the beginning, as it arose out of a side effect of computing, the ability to disseminate information much more readily, and did not concern the qualitative differences between computers and other tools. Issues concerning these differences are now being debated within the computing industry, and legislated upon, with little public discussion. Because computers so pervade society, this legislation will have social repercussions, and ought to be discussed more widely, in order to ensure that it reflects the values of a democratic society.

At the centre of the current debate is the idea of a computer program. Conventional machines are dedicated to one task, but computers can be programmed to do a wide range of things. Thus, computer systems have two components: the physical part, comprising the main processing unit and optional extras such as monitors, keyboards, and robot arms, called the hardware; and the instructions which tell the computer how to perform a particular task, called the software, or program. The hardware determines the capabilities of the computer, and is just a series of machines. The software is rather more complex.

A computer program is a series of statements written in a special programming language. There are two elements to a program: the data on which it acts, and the way it acts on the data, called the algorithm. It is algorithms which have caused the current debate within the computing industry. Until recently, only programs could be protected from copying, under the usual copyright laws applying to books and music. However, in programming, it is not the expression, but the content which matters. The same algorithm can be expressed in different ways; to double a number, you can either add it to itself, or multiply it by two. Companies which invested in developing new algorithms to perform tasks better and faster were parasitized by others, who analyzed their programs by a process called reverse engineering to discover the algorithms used, and then rewrote them in a slightly different form for use in their own programs. This led to calls for algorithms to be patentable, like industrial processes and machines. In the USA, patent applications for algorithms are now accepted.

This caused new problems. Algorithms previously available for anyone to use were patented, and there have been instances of companies patenting algorithms first invented in universities, in a similar way to other inventions made in academia. As royalties are expensive, this effectively removed the algorithms from general use. Some of the patented algorithms had been in such widespread use that patenting them was akin to patenting the brick. In the same way as patenting the brick would cause construction standards to fall as companies cast about for new methods, the quality of computer programs was threatened. This is serious, as computer programs are fragile; they either work or do not work, and as they are often used in critical applications such as the stock exchange and nuclear power stations, it is imperative that they work.

It was mainly large companies which gained from the patentability of algorithms. Their investment in research was protected, and, because of their financial and legal resources, they remained invulnerable to prosecution for reverse engineering, which only they had the resources to operate on a large scale. Despite opposition from organizations such as the Free Software Foundation, this protectionist attitude has gained ground, and is worryingly strong on the eve of EC legislation. There are currently two main lobbies; the proprietary lobby, and the open systems lobby. The former consists of companies such as IBM and Microsoft who currently control the market by forcing conformity to their own computing standards; the latter is made up of others, such as DEC and Fujitsu, who advocate common agreed standards, which are not owned by any one company, and aim to promote themselves by supplying better computers and software cheaper than their competitors. The standards are ways of ensuring that computers and programs from different companies will work together, like standard screw threads. Just as the market would not accept proprietary thread sizes, changed at the whim of one manufacturer, it should not accept proprietary computer systems. To accept proprietary systems is to abrogate freedom. There are benefits to be reaped by computer users for supporting open systems, and more are starting to do so.

But the issue also has implications for the rest of society. It applies to all information, not just computer programs. The argument over program copyright is connected with the argument over photocopying. At the moment, publishers are the primary means of organizing and spreading information. The only way they can recoup their costs is to charge for each copy of a particular work made. Since they cannot keep track of photocopies, these must be made illegal. This seems reasonable, but it creates the illusion that people are paying for the book, magazine, or score, whereas they are actually paying for the information. If they could be charged for the information separately from the materials, the problem would not arise. This is already starting to happen, with systems such as the recently defunct Micronet, an extension of Ceefax for computers, where each screen of information was charged over and above the cost of transmitting it, which was merely the user's telephone bill. As information becomes increasingly based on electronic media, the viability of operating such systems for books and music will increase. Subscription television channels are another primitive example.¹ Charging for copies automatically will lower costs, as publishers will not have to print, but only organize the information they publish, and consumers will be able either to print their own copies, or to order from mass-printers, who themselves will be free to print what the market demands.

This solution has one major disadvantage: it would be difficult to implement without going against the ideals of liberal democracy, by increasing the influence of

¹ Another way of funding publication is advertising, and many media use this channel. However, it is unlikely to become popular for books and music, where the 'playback' is entirely controlled by the user, and advertising material may be ignored, even more easily than in magazines. Indeed, television and radio advertising may also decrease if programming schedules are reduced to live material, other programmes being held in a library for discretionary viewing.

large organizations in society. This ‘nanny state’ tendency, which reduces people’s ability to think and act independently, and could lead in the extreme to totalitarian government, has been increasingly noticeable in western democracies in the past decade: apart from the centralization of government under Thatcher in Britain, and the corporatist backlash against her free-market policies in the early 1990s, there have been many smaller instances such as seatbelt legislation², the increasing powers of social workers, and the proposed tobacco advertising ban. Other dangers include cultural stagnation, as the *status quo* is enshrined, and an increase in types of discrimination such as racism, which make the majority feel more secure at the expense of the excluded minority.

The alternative which I suggest is comprehensive freedom of information. Information should be both freely available, and without price. This would itself present difficulties, but not without solutions, and above all it would help to ensure our democratic freedoms.

Such a sweeping change would have wide ranging side-effects. Without any protection, there would be no incentive for firms to pursue research, knowing that their efforts would be poached by their competitors, who would not need to invest in research themselves. This would be solved, as it is more economic to research than not to research. It could be done by groups of firms cooperating, but this would still leave the risk of others using the results of such joint efforts. Better, research could return to its rightful place in the universities. Hopefully, a voluntary system of funding would arise to supplement state funding, but if not, companies could be taxed, which would help to sustain research at a higher level than would be reached naturally, and ensure that information parasites would not flourish. Overall, many of the inefficiencies in research due to duplication of effort and secrecy would disappear, and it could progress faster than before.

Although information might now be free, there would still be a need for people whose sole function is to process information. To pay them, a ‘handling charge’ could be made for access to databases, in the same way as libraries make charges. Currently, Public Domain computer programs, which may be freely copied, are held in such libraries, which charge for the service of organizing the programs, producing catalogues, and making copies for people, but not for the programs themselves. These could be regulated, but this might not be necessary, as libraries would be in competition with one another, with much of the information handled common to many libraries.

It might seem at first that everyone who currently works purely in information, such as actuaries, accountants, and so on, would now be largely unpaid, but this would not be the case, as they would still be paid for the services which they rendered; the only change would be that the results of their work would be made public, and they would not be able to sell the information many times over. This might lead to beneficial increases in efficiency in such fields.

To guarantee the freedom of information is difficult, but no more so than ensuring other liberties; it is a matter for individual countries to decide, based on the structure of their constitutions. In essence, the government should police it as it does everything, watched by an independent watchdog, to make sure that it does not itself contravene the freedom of information.

Another problem would be the conflict between the right to information and the right to privacy. Deciding exactly where the boundary between privacy and secrecy lies would best be done by the courts, as the problem is a pragmatic one, and not

²During the introduction of compulsory seat-belt wearing, there was a small but vigorous campaign against it, which to its credit received little media attention. The campaigners were not against the wearing of seat-belts, but said that seatbelt legislation was merely shifting the focus away from the main causes of deaths in car accidents, such as drink-driving, and was an impingement on civil liberties.

one of principle.

Freedom of information would expose military secrets, and this might seem to pose a problem for world security if adopted by any of the major powers. However, if agreed by all the major powers, a large part of the problem would be solved, and the only danger would come from smaller countries eager to acquire nuclear weapons, and other advanced military technologies. For this reason, it would probably be necessary to keep such information secret. To retain the spirit of the freedom of information, the powers involved could give up their secrets to the UN, to be held in trust until the time came when it would be safe to release them. In the meantime, the major powers should retain enough of an advantage to deal with threats from smaller unstable nations.

The last major problem to be tackled will arise eventually however the supply of information is governed. The amount of information available is growing exponentially, and needs urgently to be regulated. How this will be done is a matter for a new generation of visionary librarians, who will need to develop new methods of indexing, cross-referencing and other techniques if society is not to be swamped by the sheer quantity of information it generates and uses. This in itself is a matter for research, and it is vital that it be accomplished, as otherwise all our hard won information will be rendered worthless. The computer will be an ally in the struggle to control information, but it is up to human beings to devise methods to make information management on a large scale a reality.

Information has always been a fundamental feature of life, but in the twentieth century it has come to assume a position of importance as an entity in its own right, rather than just the medium in which our senses and minds deal. The right to information should be recognized as fundamental, at the root of all other freedoms. Information should be treated not as a luxury, but as a necessity, the bearer of trust and cooperation. There is much truth in the saying, *Veritas omnia vincit*.

Acknowledgements

Once again, I am indebted to Jeremy Douglas, who listened to me when I sorted out in my mind the ideas in this essay, provided some useful examples of the ‘nanny state’, and commented on the finished essay. I also thank Mark Cheng, for some useful criticism.