# A Rebuttal of Maner's Argument for Unique Ethical Issues in Computing

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**CS378**

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Maner's argument that computers raise unique ethical issues is not convincing because he does not seem to understand that a computer is, in the end, just a machine subject to, and an extension of, the programmer. He treats a computer as if it has developed almost to the point of self-consciousness, rather than simply being the end product of years of technological development. His eight examples of the uniqueness of computers do not lead to the conclusion that unique ethical issues are encountered in the use of computers.

**First Example**: *Data are uniquely stored in computers.*

Maner gives three scenarios of computers failing because of overflow errors. This is an error that occurs when a binary representation of a number cannot fit within its assigned limits (as when two 16-bit binary numbers are added and a carry occurs out of the $16^{th}$ place). Maner seems to think that these errors occur because of intrinsic flaws with the computer's system of data storage, when, in fact, they are programming problems, or problems with the hardware design of that particular machine (for example, a lack of exception handling). A computer is a dumb machine obeying commands. Is it at fault if wrong instructions were given it by a person? If so, is an airplane at fault if it crashes because of actions by its pilot? The consequences of the error are not the computer's fault – they are the fault of the programmer, and the faults of those who assume a computer is infallible and depend solely on it for critical transactions.

**Second Example**: *Computers are uniquely malleable.*

Maner claims in a somewhat cloudy argument that computers raise new issues because they are uniquely malleable, meaning they are easily adapted to multitudinous

tasks. Therefore, we are obligated to explore every way in which we may adapt them for everyone's use. This argument fails because malleability is not unique to computers, and thus raises no unique ethical issues. In fact, it may be argued that computers are not easily adapted for many tasks. There exists a class of problems, labeled NP-hard, that appear to be unsolvable by computers, and therefore for some purposes computers are not malleable at all.

The argument fails on another level, as well. A computer is a machine. It may only perform at the level of a machine, not at any higher level of consciousness. Therefore, it is intrinsically no different than an elevator, a city bus, or a robot made of Tinker Toys - merely more complex. If an ethical obligation exists to adapt computers to the needs of the disabled, it is not clear from Maner's argument to the contrary that this obligation does not also extend to other machines.

**Third Example:** *Computers are uniquely complex*.

Complexity is a nebulous concept. A machine may seem complex (even magical) to someone (such as Maner) who does not understand it. A computer memory chip is made up of millions of transistors, but the vast majority of them are in the memory area, where there are fields of transistors all exactly alike. An element repeated millions of times does not necessarily create complexity. A computer program is, at its basic level, millions of basic arithmetic and logic operations. There are no mysteries or surprises in the way in which these are executed (in spite of Maner's apparent belief that, once written, the program takes on a life of its own). In fact, the MIPS RISC architecture, for example, uses only three types of commands: basic arithmetic and logic operations, branching commands, and load/store commands. It is also not true that a programmer

produces programs he does not understand. Understanding of a program is a prerequisite for creating it. The computer does not create data or commands on its own. It merely does many repetitive calculations given it, at a high rate of speed.

**Fourth Example:** *Computers are uniquely fast*.

Maner uses computerized stock market trades as an argument that unique issues are raised by the speed of computers. Once again, this is not a unique issue. A hundred and fifty years ago, it might have taken two weeks to receive a mailed letter. A telegram was somewhat faster, but expensive. Now, with the telephone, communication can be made in real-time. The ethical issues raised by the speed of communication are considerable – for example, whether telemarketers have the right to disturb people at home to sell their product over the phone, or whether the public should be told of events occurring on the battlefield as they happen.

Maner does not take into account that the pace of every aspect of modern life has increased considerably within the last century. The volume of trades in the stock market has increased enormously since before the introduction of computer-assisted trading. Trades occur faster, the market crashes faster, and the news travels faster.

**Fifth Example**: *Computers are uniquely cheap*.

It is true that computer perform so many calculations that the cost of an individual calculation approaches zero. Maner's example for it, though, is completely ridiculous. The computer is not breaking the law, nor would the shenanigans he mentions have been impossible without computer assistance. The speed at which thievery occurs makes no difference in the eyes of the law.

The field of communications once again provides another parallel. Local phone calls are essentially free. It is no less ethical to perpetuate multiple cases of fraud using the telephone than to use the computer. Therefore, the issues raised by the inexpensiveness of computers are not unique.

**Sixth Example**: *Computers can make unique clones*.

Thousands of copies of a book may be printed from a typeset. They may physically differ slightly from each other, but the words they contain, when they are read, produce the same pattern of recognition in the reader's brain, no matter which copy of the book is being read. A computer's ability to exactly clone data is not unique – merely much faster. As for the ethical issue of theft, there is a loss to someone whose work is copied and used without payment, even though the original remains completely intact. He has lost the profit from making his own authorized copy and selling it to the pirater.

**Seventh Example**: *Computers are uniquely discrete.*

This example is not entirely true. It is possible for one bit to crash the entire computer, but this level of sensitivity is not confined to computing. Purely from a hardware standpoint, a dust particle measuring no more than half a micron (a human hair is 50-60 microns) is enough to cause a semiconductor device to fail permanently. Remove a single tooth from a minor gear in a fine watch and the watch stops. Maner mentions the Mariner spacecraft crashing because of a missing logical NOT in the program. This is no small error, however – to illustrate, examine the meaning of the sentences "Do destroy the universe!" and "Do not destroy the universe!"

In general, the closer the tolerances for the operation of a machine, the less it takes to make that machine fail. Dijkstra is not quite correct – there are instances of

small changes creating small failures, especially in modern computers with much redundancy. The original Pentium divide bug is an example of this. One bit may be off in a 32-bit color pixel, but the user will probably not notice during a high-paced game that one pixel is blue instead of gray. The game, certainly, will not be affected.

**Eighth Example**: *Data is uniquely coded in computers*.

Maner acts as if the computer takes the data and performs arcane magic spells on it, whereupon it disappears into a digital vault. This is not the case. It is similar to the Mycenean Linear B tablets, where the writing exists but the language has been forgotten. The rapid advance of technology leads to new methods of data storage, and poor planning and lack of understanding leads to the loss of the old algorithms. Maner's note of the Hollerith punch cards on microfilm is a perfect example. Someone who obviously did not understand the method of data storage on punch cards performed this operation to save storage space, effectively placing the data out of the reach of both computers and humans.

Maner does not understand computers well, and his arguments for unique ethical issues are not sound. Computers are our tools. They present ethical issues no different than many that have been raised in the past by the invention of new, powerful mechanical aids to human labor; they are issues that existed previously but have been magnified by the increased power, speed, and decreased cost of computers. Computers are merely a part of a bubbling technological pot, which we have been stirring for the last millennium. We understand the problems, because we have seen them before, and their solutions will be familiar to us.

# Sources

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