

Technology and the Future of Ethics

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Technology & Morality

- Technology is the whip that drives changes in: Morality, Law, and Political Theory.
- As the Technology changes, our concept of the morality of situations must change.
- Technological progress moves us to ever higher states of Morality.

A few examples are:

- The Telephone
- The Automobile
- The Television
- The Computer
- The Advances in Medicine
- The Internet.

The Internet

- Stone Tablets
- Papyrus
- Gothenburg
- Radio, TV - one \leftrightarrow many.
- Telephone - one \leftrightarrow one.
- Internet - many \leftrightarrow many.
- The Internet represents the teleology of all communications systems.

Technology \Rightarrow Morality

- The situation of Technology implying Morality is fuzzied by the fact that we have a history of Morality when the Technology changes.
- Technological advancements in reproductive Technology could change the landscape of the abortion debate.

Computing History

■ Mechanical Computing Devices

1900 Analytical Engine

1919 IBM Tabulator

■ Electromechanical (Relay Based) Computers

1939 Zuse 2

1940 Bell Calculator Model 1

1941 Zuse 3

■ Vacuum-Tube Computers

1943 Colossus

1946 ENIAC

1951 Univac I

1953 IBM 701

1955 IBM 704

■ Discrete Transistor Computers

1958 Datamatic 1000

1958 Univac II

1959 Mobidic

1959 IBM 7090

1960 IBM 1620

1960 DEC PDP-1

1961 DEC PDP-4

1962 Univac III

1964 CDC 6600

1965 IBM 1130

1965 DEC PDP-8

1966 IBM 360 Model 75

■ Integrated Circuit Computers

1968 DEC PDP-10

1973 Intellec-8

1973 Data General Nova

1975 Altair 8800

1976 DEC PDP-11 / 70

1977 Cray 1

1977 Apple II

1979 DEC VAX 11 / 780

1980 Sun-1

1982 IBM PC

1982 Compaq Portable

1983 IBM AT-80286

1984 Apple Macintosh

1986 Compaq Deskpro 386

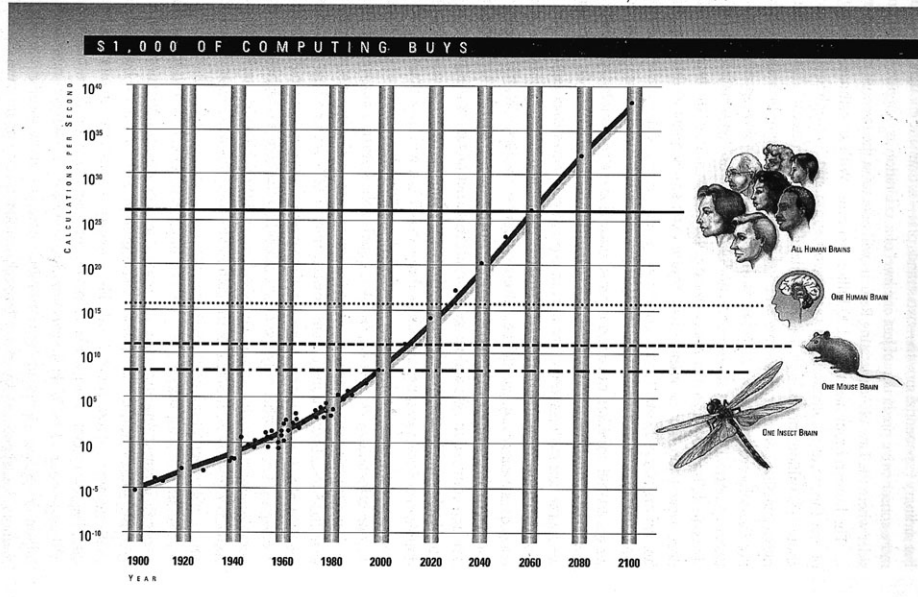
1987 Apple Mac II

1993 Pentium PC

1996 Pentium PC

1998 Pentium II PC

THE EXPONENTIAL GROWTH OF COMPUTING, 1900–2100



1953

- The chemical structure of the DNA molecule is discovered by James D. Watson and Francis H. C. Crick.

1959

- Xerox introduces the first commercial copier.

1971

- The first pocket calculator is introduced. It can add, subtract, multiply, and divide.

1977

- For the first time, a telephone company conducts large-scale experiments with fiber optics in a telephone system.

1979

- Dan Bricklin and Bob Frankston establish the personal computer as a serious business tool when they develop VisiCalc, the first electronic spreadsheet.

1989

- Intel introduces the 16-megahertz (MHz) 80386SX, 2.5 MIPS microprocessor.

1997

- Deep Blue defeats Gary Kasparov, the world chess champion, in a regulation tournament.

2009

- A \$1,000 personal computer can perform about a trillion calculations per second.
- The majority of text is created using continuous speech recognition. Also ubiquitous are language user interfaces (LUIs).
- Most routine business transactions (purchases, travel, reservations) take place between a human and a virtual personality. Often, the virtual personality includes an animated visual presence that looks like a human face.
- Although traditional classroom organization is still common, intelligent courseware has emerged as a common means of learning.
- Translating telephones (speech-to-speech language translation) are commonly used for many language pairs.
- Bioengineered treatments for cancer and heart disease have greatly reduced the mortality from these diseases.

2019

- A \$1,000 computing device (in 1999 dollars) is now approximately equal to the computational ability of the human brain.
- Computers are now largely invisible and are embedded everywhere -- in walls, tables, chairs, desks, clothing, jewelry, and bodies.
- High-resolution, three-dimensional visual and auditory virtual reality and realistic all-encompassing tactile environments enable people to do virtually anything with anybody, regardless of physical proximity.
- Automated driving systems are now installed in most roads.
- People are beginning to have relationships with automated personalities and use them as companions, teachers, caretakers, and lovers.

2029

- A \$1,000 (in 1999 dollars) unit of computation has the computing capacity of approximately 1,000 human brains.
- Permanent or removable implants (similar to contact lenses) for the eyes as well as cochlear implants are now used to provide input and output between the human user and the worldwide computing network.
- Direct neural pathways have been perfected for high-bandwidth connection to the human brain. A range of neural implants is becoming available to enhance visual and auditory perception and interpretation, memory, and reasoning.
- Automated agents are now learning on their own, and significant knowledge is being created by machines with little or no human intervention. Computers have read all available human- and machine-generated literature and multimedia material.
- There is almost no human employment in production, agriculture, or transportation.
- There is a growing discussion about the legal rights of computers and what constitutes being "human."
- Machines claim to be conscious. These claims are largely accepted.

By the year 2099

- There is a strong trend toward a merger of human thinking with the world of machine intelligence that the human species initially created.
- There is no longer any clear distinction between humans and computers.
- Most conscious entities do not have a permanent physical presence.
- Machine-based intelligences derived from extended models of human intelligence claim to be human, although their brains are not based on carbon-based cellular processes, but rather electronic and photonic equivalents. Most of these intelligences are not tied to a specific computational processing unit. The number of software-based humans vastly exceeds those still using native neuron-cell-based computation.
- Even among those human intelligences still using carbon-based neurons, there is ubiquitous use of neural-implant technology, which provides enormous augmentation of human perceptual and cognitive abilities. Humans who do not utilize such implants are unable to meaningfully participate in dialogues with those who do.
- Because most information is published using standard assimilated knowledge protocols, information can be instantly understood. The goal of education, and of intelligent beings, is discovering new knowledge to learn.
- Life expectancy is no longer a viable term in relation to intelligent beings.

Conclusions:

We must get smarter at how we cope with technology.

If we don't keep our eyes open and our senses tuned, we will be left in the dust by the railroad of technology. There is no stopping it. We must learn to deal with it.

Traditional ethical theories of Utilitarianism, Deontology, Rights, Justice, etc. will get dimmed and blurred by the light of technology. We must reserve a certain percentage of our R&D budgets for analyzing the effects of technology on society.

We must stay ahead of the game.

But if we teach computers how to know and how to feel, can we teach them to know how they feel? That's an entirely different lesson, one that human beings can barely process themselves.