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Characteristics of Humane Technology

(9-ENG version March 2014)

Drawn up by the Humane Technology Work Group

Humane Technology (v9-ENG)

Preamble

In a world in which the interweaving of technology, mankind and the world can assume unprecedented forms, an increasing number of dilemmas of an ethical and moral nature arise related to the necessity, desirability and use of techniques and products created by man.
These Characteristics of Humane Technology (HT) and the separate Code of Ethics that accompanies them want to draw up principles for designers, producers and users who are confronted with this interweaving of man and technology as responsible people in order to create products that serve the interests of mankind and the world.

The ideas of mankind with respect to these characteristics of the authors also determines the formulated principles. In this idea, people are considered authentic and autonomous beings in the making, endowed with an independent mind and a free will that enable him to act as a creative being. People can judge what is morally right or wrong in their actions. Human dignity and integrity must not be violated when interweaving technology and techniques.

Technical products are created by the realisation of ideas of the creative spirit by means of production resources that have also been conceived by mental processes. Ideally, products should be developed in this domain that contribute to the needs and well-being of mankind and the planet. But this domain may also address human weaknesses or dominate people.

The realisation of technical products and their use take place in the economic sector. Ideally, this domain should create products that meet the need of fellow people and support them in their development where possible. But the economic domain can also exploit people or focus excessively on their desires.

In society, the legal domain is responsible for protecting people against anti-social motives of the economic and mental domains and preventing damage caused by these domains as much as possible.
These Characteristics and the accompanying Code of Ethics do not aim to be imposed rules, but want to give developers and producers a tool to become aware through self-reflection about products that stand the test of these Characteristics and Code of Ethics, in other words, that have a “humane character”.

The structure of this document matches the three domains identified above to which the ideals once proclaimed by the French Revolution can be attributed:

- To the economic domain: Fraternité, or the criterion of *solidarity.*
- To the legal domain: Égalité, or the criterion of *equality* between people.
- To the mental domain: Liberté, or the criterion of *freedom*. These criteria have been broken down into the following values:

Solidarity: Economic and ecological values
Equality: Social and political values
Freedom: Cultural and personal values.

Even though the HT Characteristics and Code of Ethics have been drafted with great care, the first version does not yet provide a complete picture of all possible dilemmas that may arise in their first version. Nevertheless, the authors hope that this serves as a foundation for individual awareness of humane technology.
A philosophical introduction that formulates the principles for this humane technology has been included in Addendum I of this document.

I Characteristics of humane technology

1 Objectives.

Humane technology is characterised by the harmony between a meaningful development of mankind and the world in its intent and in its execution and application with respect to the required products.

2 Criteria and values.

Humane technology meets the following criteria:

- It is INCLUSIVE, which means that it is in harmony with the desire that each person can fulfil his basic material needs and that the planet can develop in a healthy manner.
- It is EQUAL, which means that it is in harmony with the desire of all people being equal in society.
- It is FREE, which means that it is in harmony with the free mental development of a person.

These criteria can be broken down into a number of values as set out below, which determine the extent to which technical products can be considered humane.

2.1. Inclusive

2.1.1 Economic values:

Focussed on technical solutions that everyone can afford or that benefit everyone equally. This particularly means that:

2.1.1.1 The goal is to create an affordable technical product, for example, by including it in a “**circular economy**”, in which energy, raw materials and resources can be saved and recovered in a more efficient production process.
2.1.1.2. The goal is **sober innovation**. This is based on development aimed at the implementation of basic functions and controls that are accessible to everyone. Superfluous facilities are omitted.
2.1.1.3. The technical product is useful for a large number of users, not for an exclusive group. This can be deviated from if the exclusive group requires a product based on a human right.
2.1.1.4. The technical product will not be developed to promote economic dependence.

2.1.2 Ecological values:

Focussed on a design and realisation of the technical product conducive to the environment of living beings. This specifically means that:

- 2.1.2.1 Sustainable technical solutions are being sought for the development and manufacturing of the technical product, such as saving and reusing resources, tools and energy.
- 2.1.2.2. A risk analysis must be carried out to determine whether there are harmful consequences for living beings in all parts of the environment.
- 2.1.2.3. The release of unobservable, harmful phenomena, such as radio frequency radiation, radioactive radiation, and energetic electric and magnetic fields is taken into account.
- 2.1.2.4. The company does not only strive to meet current safety standards that solely observe the effect on the physical constitution of living beings but also standards that consider psychosomatic effects.
- 2.1.2.5. The product contributes to reducing the environmental impact; it is, as such, fully reusable (applying the “cradle to cradle” principle).
- 2.1.2.6. An attempt has been made to make use of completely degradable materials.
- 2.1.2.7. There is a deliberate attempt to achieve a maximum lifespan of the product. In addition to extending the lifespan of the product, another goal is to maintain its appearance for longer (to avoid “throw-away behaviour” of the user of a still properly functioning product).
- 2.1.2.8. Measures have been or will be taken to make users/consumers aware of their impact on the environment and the finite nature of the resources of the planet.
- 2.1.2.9. Harmful effects on air, water and soil are prevented or mitigated during the development and manufacturing of the product.
- 2.1.2.10 The nature of precaution is used, which mean that measures have been or will be taken to avoid damage to health, society or the environment once there is a reasonable suspicion that such damage may occur, without waiting for final scientific evidence of the damage.
- 2.1.2.11 Sustainable technical innovations and solutions will, where possible, be based on principles observed in nature, for example, by imitating natural cycles and functional and material efficiency of ecosystems and natural habitats.

2.2. Equality

2.2.1. Social values:

Based on the equality of people and the desire to use the technology in such a way that people do not become isolated or alienated from society, but encouraged to fulfil their role in society. This particularly means that:

- 2.2.1.1. The design of the technical product enables the user to be of service to others and the use has, where possible, an education impact.
- 2.2.1.2 The technical product will not be developed to harm a peaceful relationship with other people or to incite violence.
- 2.2.1.3. Experiences of the users of the product may lead to product improvements.
- 2.2.1.4. The staff involved in the creation of the technical product work under good working conditions and for suitable remuneration.

2.2.2. Political values:

Political values take into account a balanced use and application of the technology, the willingness to take responsibility for unforeseen consequences during the production or use of technical artefacts, and exercise restraints even if things are technically possible. This particularly means that:

2.2.2.1. The design of the technical product is aimed at creating a socially useful product. Any risks associated with the production and use of new techniques, technologies and materials will be estimated in advance.

2.2.2.2. The manufacturer is prepared to offer a sound guarantee scheme for the product or compensate any incurred damage.

2.2.2.3. The technical product is not only sold to acquire an economic monopoly, for reputational gains, or solely for enrichment.

2.3. Freedom

2.3.1. Cultural values:

Cultural values will ensure that the technology does not stand in the way of human civilisation, but promotes it. This means, among other things, that:

2.3.1.1. The desirability or necessity of realising the product is checked both internally at the company and externally at users.

2.3.1.2. The use and/or application of the product takes into account common cultural values.

2.3.1.3. The complexity of the controls and the maintenance of the product matches the nature of the culture of the market.

2.3.1.4 The products corresponds to the scale and culture of the market.

2.3.1.5. The goal is to create an aesthetically designed technical product with professional enthusiasm.

2.3.2. Personal values:

Personal values are aimed at technical solutions that guarantee the integrity of the individual and his/her personal freedom and promote his/her personal development where possible. This means, among other things, that:

2.3.2.1. The manufacturer must consider whether the product has an impact on the physical, psychological and mental condition of the user or his descendants.

2.3.2.2. Manufacturers must consider whether the use of the product has an impact on the freedom and privacy of individual users.

2.3.2.3. The technical product will be developed in such a way that personal data, if necessary for the proper operation, are adequately protected against misuse and stored in a manner which is transparent for the user. These data will not be processed or disclosed to third parties without permission of the user.

2.3.2.4. The manufacturer must determine whether the product has an educational impact on the user and whether he can benefit from it.

2.3.2.5. The personal usage experience can lead to product improvements.

2.3.2.6. Technical products that are or have been specifically developed to be integrated into living beings will not interfere with the integrity and essential characteristics of these beings. The use of these products in people will always be subject to the consent of the individual after he has received adequate information.

3 Conditions for action.

In order to create humane technical artefacts in the sense set out above, actions must be carried out based on a moral approach, which means that before proceeding to act, people must be informed of all factors that may affect it, as well as all possible consequences of their actions.

These aspects include but are not limited to:

- Knowledge about the artefact you want to produce;
- The necessary materials and resources;
- The methods to be used;
- The circumstances under which actions will take place;
- The knowledge and skills of the acting person(s);
- The knowledge of the world for which the artefact is intended.
- An estimate of the consequences of the introduction of the intended technical product.

II Examples of current technologies and products

1. Introduction

This chapter gives examples of technologies and technical products that are designed or created using the current technological knowledge and skills that may or not meet one or more of the Characteristics of Humane Technology set out above.
These examples include the following up to this point:

o An environmentally-friendly use of energy generation.
o A controversial application of biotechnology and nano-technology.
o An example of sober innovation.
o Genetically manipulated phytophthora-resistant potato.
o A clean “smartphone”.
o Google Glass

These have been described in Addendum II to this document.

Addendum I

Philosophical introduction of Humane Technology

General accountability

Considerations in which the *general humane aspects* are at the heart of the ideas serve as the basis of an assessment whether a technical product, existing or planned for the future, meets the expectations. Such assessment is necessary because group interests and personal interests can conflict with the general humane aspects. Each *morally* healthy person is accountable for his humanity and will want to act in accordance with *his* moral concepts and ideas about what to do in a given situation. This does not mean that the taken actions will be good in absolute terms. In a moral sense, life is also an *educational process* and each human being can only hope to *improve* his actions if the opportunity arises.

A technical product has an extra layer compared to the personal actions of a human being. After all, it will *implicitly* affect the actions of other people because it is often used by *other people*. The technical *tool* will be part of the actions it influences as a *given form* when it is used.
This is why the assessment of the moral dimension of a technical product must concern *three* aspects:
1) The morality of the manufacturing process;
2) The morality of the use in the moral reality as a given form;
3) What is left as a trace after the use?

This study can be used to determine ways to *improve* a technical product.

The above consideration means that the assessment of the *humane aspects* of a technical product must have a *method*. An assessment which would result in a *classification* of good versus bad products would be of little use. Just like a human learns from his mistakes during life and only acquires the necessary *alertness* not to make the same mistake again in the future based on *well-considered* experiences, the assessment must alert the users about the three moral aspects mentioned above. The result of the assessment cannot be a classification based on a *check* using templates. A true assessment shows that *the entire human life* is expressed in the (serial) *development* of technical products.
This requires open and honest *observation* of *existing* products, such as:

- Honest information about the manufacturing process;
- A versatile view on the use;
- And the thorough application of *scientific knowledge* to be able to track and *predict* the impact on nature and society, even after the use.

Any piece of technology has many relationships with nature and mankind which are interwoven with great complexity. This document discusses these in various categories that speak for themselves.

The authors of the document hope that designers, in particular, will be able to make fruitful use of it.

Addendum II

Examples of current technologies and products

1. An environmentally-friendly use of energy generation

Subject:

Thermal solar power plant Ain Beni Matar, Morocco Ref.:
Tijdschrift Ode of 17/3 2011

Goal:
Generating electrical energy using collection of direct collected and bundled sunlight, the so-called Concentrating Solar Power (CSP) technology through conversion into thermal energy.
The first of five planned thermal solar energy plants built in 2010 as commissioned by the Moroccan national electricity company with financial support by the World Bank and the African Development Fund.
Note: A much larger project is in development at Quarzazate in Morocco which instead uses the photovoltaic method based on solar panels and windmills. The plan is to eventually cover 42% of the energy demand by sunlight. As well as to export energy to Europe.

Implementation:

- Rows of hollow mirrors (the so-called parabolic troughs) have been placed at a site of approximately 18 ha. that bundle the directly collected sunlight and heat pipe systems filled with oil. The thus heated oil (up to 4000 C) transfers the heat to heat exchangers as part of which water is converted into steam that is fed into steam turbines. These, in turn, drive generators to generate power. The initial capacity is 20 Megawatt which meets the energy needs of several hundred thousand Moroccan households.
- The obtained heat is also stored in heat buffers (insulated vessels with liquid salts) which are used to continue to generate electrical energy after sunset.
- The CSP technology is perfect for use in Morocco because of the almost always present direct solar radiation. This technology is hardly suitable in the Netherlands because 60% of the sunlight here is diffuse and not used in such a plant.

Check based on the HT Characteristics:

- It is fair to say that this technical product benefits a large number of users (2.1.1.3.).
- The CSP method is environmentally-friendly as there is no emission of CO2 gases (2.1.2.2.) and the use of scarce materials (in solar cells) is avoided (2.1.2.1.). Whether further use has been made of sustainable materials for the structure is not clear.
- The product corresponds to the scale and culture of the market (2.3.1.4.).
- An additional objective of the project is the transfer of technical “know-how” to the local industry (2.2.1.1.).

2. A controversial application of biotechnology and nanotechnology

Subject:

The “cyber-insect", a combination of an insect with bio and nanotechnology. Ref.: NRC Science Annex of 18/2 2012. Previously in the Natuurwetenschap en Techniek magazine no. 5/2008.

Goal:
Creating an “insect-machine” for spying purposes in smaller spaces. In terms of flight performance, living insects are incomparably better than robot planes that can carry more sensors but are larger in size and therefore much more noticeable.

Developed in the U.S.A., based on fundamental research in sub-areas by various universities. Sponsored by DARPA (Defence Advanced Research Projects Agency, an institute of the U.S. Department of Defence). Started with the Hybrid Insect Micro Electromechanical Systems (HIMEMS) programme in 2007.

Implementation:

- Selection of relatively large insects (moth, Japanese leaf beetle) that can carry a relatively large weight of sensors (the “payload”).
- Influencing the flight direction of the insect by electronic stimulation of certain neuron groups (moth) or flight muscles (beetle). The insects themselves are good at avoiding obstacles and adapting the flight speed/course to the environmental conditions.
- Brain implants for “remote control”, sometimes already integrated into the pupal phase of the insect (moth), due to which the implant has fused with the tissue and an effective electrical and mechanical coupling has been achieved.
- The power source is preferably a biofuel cell that has been implanted in the stomach of the insect and converts sugars through enzymes into an electrical voltage (approx. 0.2 V) between two electrodes which generate continuous power.
- Payload: Micro-miniature sensors in the desired frequency range and transponders, depending on the mission and carrying capacity of the insect.

Ethical aspects:
The researchers believe that all existing ethical aspects should be observed. They also claim that insects do not have any pain receptors and therefore feel no pain. If the animal acts as a normal organism/shows normal animal behaviour, there is no problem.
Note: According to the Dutch Animal Experiments Act, anything can be done with insects because they belong to the invertebrate species.

Check based on the HT Characteristics:

- It cannot be stated that this “hybrid technical product” benefits a large number of users (2.1.1.3.).
- The harmful impact on living beings has not been directly investigated in this case (2.1.2.2.)
- It is highly doubtful whether this development will bring about a peaceful relationship with other people (2.2.1.2.)
- There is no reluctance to use new technologies (2.2.2.1.)
- Because it is “just” an insect, it is not important whether the freedom of this living being is being adversely affected (2.3.2.2.).

3. Example of sober of innovation

Subject:

Colour reader for the visually impaired, São Paulo, Brazil

Ref.:
Tijdschrift Ode of 17/3 2011

Goal:
Designing and producing a simple, cheap colour reader for the visually impaired, which can display not only the colour but also the value of paper money. The designer and producer is Fernando Oliveira Gil, a computer technician in São Paulo, Brazil. In production since 2010.

Implementation:

- The reader consists of a box with the dimensions of a cigarette pack, similar to an MP3 player. It contains two buttons and an output for an earphone that comes with it.
- When the box is held against the object to be read and the “colour” button is pressed, the optically perceived colour will be converted into an audio signal for the earphone and a visually impaired user will hear the colour. If another button is pressed, the value of the object, if it is a banknote, will also be converted into an audio signal.
- Thanks to the simple design, the product is much cheaper (< € 70) than existing colour readers that are also unable to read the value of the banknote. This makes it affordable and user-friendly for many people with visual disabilities.

Check based on the HT Characteristics:

- The product is an example of a sober innovation that contains no more than the required basic features and has controls accessible to everyone (2.1.1.2.).
- The technical product benefits a large number of users (2.1.1.3.).
- No large profit margin was pursued to keep the product affordable, especially for poorer users (2.2.2.3.).

4. A clean “smartphone”

Subject:

Clean “smartphone”, or “calling with a clear conscience”

Ref.:
NRC of 19/10 2012.

Goal:
Designing and producing an affordable and sustainable “smartphone” with little impact on people and the environment called the Fairphone as a response to the “smartphones” of Apple, Samsung and others that are sold for billions of profit.
The goal is to integrate as many sustainability ideas as possible into this device.
Dutchman Bas van Abel and the Waag Society, a Dutch institute that deals with art, science and society, took the initiative for this device.
The design comes from the also Dutch company, which is being established in the Netherlands, with a provisional location in London. The production is being developed in cooperation with Geeksphone.

Status:
In development. Scheduled introduction of an entry-level model in one-and-a-half years from now. First scheduled availability of 10,000 units. Target sales price € 200 to € 250. KPN is willing to include the device in its range. The parties are still talking with Vodafone and T-Mobile.

Principles:

- Attractive design.
- Economical use of “conflict-free” raw materials and minerals (i.e. extracted from “fair” mines in conflict-free areas).
- Use of common “open source” software (including Firefox Operating System).
- Easily accessible for both user and repairer.
- As many replaceable and recyclable parts as possible.
- Internal power source is rechargeable and replaceable.
- Produced in companies with good working conditions and good remuneration of staff.
- The often used sales incentive of giving away a free device when concluding a subscription will not be supported. This does not stimulate value awareness and sustainable use.
- The hope is that this approach will inspire other producers and stimulate sustainable consumer behaviour.

Check based on the HT Characteristics:

We must wait how everything will be realised but the principles are promising. The following conclusions can be drawn:

- The Fairphone complies with characteristic 2.1.1.1. : The goal is an affordable, sustainable design with conscious and economical use of raw materials.
- The device complies with characteristic 2.1.2.5.: Reusable parts
- The Fairphone partly complies with characteristic 2.1.2.7. An attractive design contributes to longer use.
- The product is made under good working conditions by staff that is being remunerated properly (2.2.1.4.)
- They encourage sustainable consumer behaviour (characteristic 2.1.2.8.)
- The device is deliberately being marketed as an alternative to the large producers, not as a competitor. (characteristic 2.2.2.3.).

- The disadvantage of a mobile phone that is part of an R.F.-emitting network remains (2.1.2.3.). It is not yet clear whether the device meets the current standards for exposure to R.F.-energy.

Note:
The use of “open source” software is not included in the HT Characteristics but is included in the General Design Rules. This use promotes the independence of the design.

5. Google Glass

Subject:

The Google Glass, a far-reaching design for smart glasses from Google, Silicon Valley, California, U.S.A.

Ref.:

1. Article about “smart glasses” in newspaper NRC of 13/11 2013
2. Article “Geen asshole maar glasshole” in TC/Tubantia of 23/11 2013
3. Article “Nooit meer anoniem” in TC/Tubantia of 24/11 2013
4. Article about the search engine of Google, the “Knowledge Graph”, newspaper NRC 11/12 2013

Goal:

Selling smart glasses which provide the wearer with prompted and unprompted information (“augmented reality”) about everything he/she sees.
Multiple companies are working on a similar development (e.g. at Samsung, South Korea, and at Philips for medical applications).

Implementation:

- The glasses are in fact an upgraded “iPhone” housed in a frame. A mini-camera will be incorporated into the glasses.
- Information will be projected onto a small prism in the corner of the glasses on request and sent to the eye of the wearer from there. Use is made of an advanced search engine (“Knowledge graph”) which makes connections between objects (persons, buildings, countries, etc.) depending on the location, behaviour and history. This provides the wearer with “ready-made” information.
- The glasses must be controlled using voice commands given by the wearer. You can take the glasses off but they cannot be turned off. Only Google can do this. You will remain “online” during this time.
- They will include an integrated navigation option.
- An integrated option for facial recognition is still under development. The wearer of the glasses will take a photograph of persons he passes and the glasses check whether the person in the photograph is known. This can be done without the knowledge of the person in question. Google already introduced a first facial recognition option in Google+.
- The glasses are currently still being developed but are also being tested by a range of selected users. The introduction of this product has been postponed until the second half of 2014 in the U.S.A.

Ethical aspects:

Google is not known for looking at the consequences of introducing its products on society, let alone any associated ethical questions. In fact, Google offers the wearer of these glasses a prompted or unprompted unreal (virtual) world.

Check based on the HT Characteristics:

- Depending on the pricing, there will undoubtedly be a large number of enthusiasts for this product who will also find it a useful tool (2.1.1.3. and 2.2.2.1.)
- One could say that the glasses are geared to the current Internet culture (2.3.1.3.)
- There is no reluctance to use new technologies (2.2.2.).

- The desirability of the product is determined by the producer based on expected interest and profitability in the market rather than by market demand (2.3.1.1.).
- Especially where the privacy of individuals is concerned, nobody will be able to go out anonymously once a facial recognition option has been implemented (2.3.2.2.). Note: In essence, this is also a violation of the fundamental right to inviolability of people.
- Personal data cannot be collected and stored with the permission (2.3.2.3.). The unsolicited storage of profile data of users as is currently the case with the Google search engine raises serious fears if the glasses also stores biometric data.