Human-centric solutions and human-machine-interaction

FORGING

INTRO

Human-machine interaction and human centric solutions are not tied to a distinct line of technologies, but rather, should be present as a research area in all technology development. Humans' interaction with machines has dramatically increased over the past decades, and there is no end in sight to that development. Therefore, it is crucial to pay attention to building these interactions and interactive environments responsibly.

Potentials:

- New technologies hold significant potential in healthcare, from digital solutions improving efficiency to nanotechnology applied in human bodies.
- Technology and AI can help humans express their creativity with less effort and in a more accessible way.
- Multidisciplinary teams in technology development can lead to human-centric solutions.
- Technology and human enhancements can lead to completely new definitions of learning or education: there is no more need to know so many things by heart, and instead, understanding and interpretation become central in expertise.

Risks:

- Data should not be confused with knowledge, understanding or wisdom, even though it can lead to these outcomes.
- Unequal access to technology can deepen inequalities.
- Inserting technology to human bodies can leave people vulnerable to cyber attacks on themselves.
- Bodily enhancements can potentially become necessary for certain jobs or positions.

1: Research

- The research phase of technologies that humans will use a wide field with numerous different practices. As technology-focused research is done, the human and environmental aspects of technology should already be present, guiding the choice of new technologies to research and new capabilities to create.

Ecological considerations

- Re-use, repair, re-cycling: in the research phase the possibilities for environmentally wise behaviours, such as re-using old technology, repairing broken gadgets or re-cycling them part by part, can be created.

Societal considerations

- Multidisciplinary teams: As technologies for humans are developed, social scientists and experts familiar with human behavior should be included in the processes. This does not include only ease of use considerations, but also things like creating a healthy cognitive environment and avoiding harm to human minds.

2: Development of concepts and products

- When practical products and application of technology are developed, the human dimension becomes even more central. Technological capacities can be used in various manners to build products for the immediate use of humans.

Ecological considerations

- Environmental behavior: Technology can alienate humans from the nature, or it can bring more wisdom into the way we act with natural resources and protect the natural systems on our planet. When developing new technologies, their effects for human behavior towards nature or natural resources should be considered.

Societal considerations

- Complementing human intelligence: Technologies most often work alongside humans, complementing and not replacing human intelligence. When developing new digital solutions, ways of smoothly interacting with human cognition can be sought.
- Inclusion: As new products are produced, inclusion of different user groups should be considered. Often digital solutions can produce significant life-enhancing solutions for people with disabilities and the elderly, for example, if adequate efforts are made to adapt the solutions for their needs.

3: Introduction and early implementation

- As technologies are released and first used by real humans, data about their effects can be gathered. At the same time, the rights of people using the new technologies become more imminent.

Ecological considerations

- Considering resource use: New technologies are entering the market at a rapid pace. When adopting new technologies, ecological consequences should always be considered. If technology is clearly a more resource-intensive or environmentally harmful, the necessity of it should be carefully considered, aiming to find a more environmentally friendly alternative.

Societal considerations

- Intellectual property rights and authorship: Humans produce more and more content, including text, music and visual arts, in collaboration with computers and machines. As these solutions scale, there should be clear rules on IP rights and claiming authorship.
- User rights: As new solutions come to existence and humans come into contact with them, the users right to refuse the use of certain technologies or giving up their personal data should be always respected.

4: Scaling-up and fine-tuning established technologies

- As technologies become normalized, often also a dependency of them is created. Wide user groups bring a multitude of different users, and the diversity should be recognized.

Ecological considerations

- Nudging towards ecological behaviour: Technologies that reach large audiences also shape the behavior of masses. When humans' interaction with material reality is affected, ecological considerations should be concerned. This can mean encouraging people to fix their old technologies instead of buying new, or discouraging excessive online shopping of environmentally harmful products.

Societal considerations

- Cyber safety: individuals are increasingly dependent on technologies that hold their personal information, biometric identifiers and sometimes are even attached to their own body. This can leave individuals vulnerable to cyber attacks that are very personal, and the risks should always be minimized for individual users.
- Roles of data and understanding: Data intensity of modern societies has grown rapidly during the last decades. However, when scaling computer systems, data should not be confused with understanding, even though having enough good data can lead to new insights. Human considerations and wisdom can still not be outsourced.
- Possibility of opting out: Many technologies have already become practically a necessity in participating to the society. When technologies become more common, it should be carefully reflected whether we want them to become necessities, and for which technologies do we want to maintain the possibility of opting out.

The FORGING Consortium

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Funded by the European Union