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# Human Augmentation Through Applications Of Technology

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***Abstract: Augmented Intelligence works toward increasing the human capacities as well as scaling them by various ways of augmenting humans and through various technologies like cognitive computing. "Human augmentation" is an area of science that seeks to improve Human capacities by technology or medicine. Traditionally, this has been done by consuming organic compounds that strengthen a chosen capability or by inserting implants involving surgical actions. In cooperation of these augmentation techniques can be invasive. External instruments have also gained enhanced capabilities. Recently, virtual reality and multimodal sensing technologies of interaction have been rendered it possible for non-invasive ways to increase human development. In this paper, human augmentation based on applications of technological tools is presented. The working of augmentation is explained in detail. The sensory augmentation technologies are described with the future human abilities being highlighted. Also, a model for wearable augmentation is described in this paper.***

**Keywords: Artificial Intelligence; Intelligence Augmentation; *Human Computer Interaction;* Sensory Augmentation; Augmentation Technologies**

## 1. INTRODUCTION

Augmenting the human body has been a theme in cooperation with fiction and scientific accomplishment for much of human history. As a functional extension mediated by a biomimetic physical medium of the human body, the conventional view of augmentation [1].The definition of HA technology has also been made clear by contemporary technical developments such as the interface of the brain computer or brain machine, virtual worlds (VEs) of high resolution, and algorithms for optimization [2, 3, 4, 5, 6, 7].
The cognitive and biological processes underlying embodied cybernetic structures that are able to augment the human body, brain, and mind are less known. The general word "human enhancement" signify to a broad variety of current, evolving and vision based technology, comprising products for pharmaceuticals- Neuro based implants that include replacement vision or other non-natural senses, brain-enhancing medicines, human germline engineering and present reproductive technologies, dietary intakes, novel brain incentive strategies for alleviating pain and regulating mood, sports gene doping, plastic surgery, short-stage children's growth hormones, anti-aging drugs, and extremely sophisticated drugs.

*"Human augmentation is an interdisciplinary" area that discusses strategies, machineries & their applications to enhance a human's senses, behaviour and/or cognitive abilities. This is done by technologies of sensing and propulsion, information mixture and separation and methods of artificial intelligence (AI).*

## INTELLIGENCE AUGMENTATION

Another instance of HA includes different human relationships with AI that are symbiotic. The term intelligence augmentation (IA) was used by Engelbart in 1962 to describe these experiences. IA offers a way to supplement AI systems rather than merely being the opposite of AI, in ways that accompaniment the inherent shortcomings of both machine and human intelligence. There are possibilities for novel research to bring both AI and IA together, as AI and HCI (an allied field of IA) have been isolated from each other over the last 25 years [8]. Machine intelligence cannot be able to replicate or even reflect particular aspects of human intelligence, even in the case of so-called powerful AI [9].

### Working of Augmentation

To be successful, with regard to the underlying human perception systems and processes and biology, we must use augmentation in a strategic way. The explanation for this is clear: augmentation is basically not efficient unless it sets existing processes (rather than counters). This forces us to make other strategy choices and therefore go into the field of Human Factors Engineering beyond the human-machine relationship (HFE).When combined with an adaptive aspect such as Artificial Intelligence, complementary types of augmentation provide us with what is called a strategy for prevention. Two components should be included in a mitigation strategy: it must be robust and be quantitative in terms of both noise and dynamic range. A curve of performance or series of equations will suffice in terms of a quantitative explanation. Agent-based and other generative methods can be appropriate [10], but come with caveats of their own. Noise tolerance criteria and considerations of the dynamic spectrum means that the phenomenon in question must be well described.

Human augmentation can categorise into 3 categories

● ***Augmented senses*** are done by the perception of multisensory knowledge available and the presentation of human content by selected human senses. Augmented hearing feeling, vision, taste, smell and haptic feeling are sub-classes.

● ***Augmented action*** by sensing humanactivities and planning them to activities in regional, distant or atmospheresof cybernetic, augmented action is achieved. Motor augmentation, increased power, and motion, gaze-based commands, speech input, remote presence, teleoperation, and others are included in sub-classes.

● ***Augmented cognition*** is accomplished by identifying the human cognitive condition, using critical methods to interpret it correctly and modifying the response of the machine to suit the user's recent and predictive needs (e.g., during natural interaction, supplying stored or registered information).

## AUGMENTED SENSES

To offset sensory deficiencies (auditory & visual) or to surpass the capacities of current senses, enhanced sensations use methodology and machineries. The sensory impulses for the affected senses are greatly enhanced in the first case or augmented by other healthy senses.

Haptic actuators, for example, be able to be used to explain a blind person's world or voice signals to a deaf person [11, 12, 13]. In another example, by using external sensors, human senses are improved to examine signs beyond standard human being sensory capacities and turn them into an appropriate arrangement for social use [14, 15]. Beyond their natural limits, many technologies can improve human senses. Light sensors or small cameras might provide the user "eagle eyes or night vision", or the wavelengths of human vision also go far beyond that. A typical example is the use of "x-ray vision" to examine hidden objects [16].

Visionaries like Hainich (2009) have proposed that most of the existing computer hardware and user interfaces can be replaced by AR systems. "In AR systems such as Magic Leap One4, Nreal5, Focals by North6 and Vuzix Blade 7, this vision is becoming faster to reality step by step". While the technical creation of smart glasses for augmented human applications is still important, there are already studies showing the advantages of such techniques. We have found, for instance, that auditive and haptic data may benefit from AR interfaces to improve the human understanding of reality [17]. In this area, other related research includes the development of visual, auditory and haptic feedback calibration-free eye tracking techniques [18] and the provision of haptic guidance for guiding one's gaze [19]. Recent work integrating gaze contact and haptic feedback shows that these two approaches [20, 21] can be used seamlessly to help the key wearable interaction objectives of the consumer. We recently invented many extensions for them in order to drive forward the technical advancement of wearable VR/AR glasses [22, 23]. Without the need for wearable devices, Our Prototype Proof-of-Concept allows touching and feeling virtual 3D objects by users. Even the complete human "FOV can cover a super-wide field-of-view (FOV) optical design for VR glasses". We have also recently experimented with expanding a VR viewing device's FOV and supplying a smart glass consumer with visual input "directly to the retina, surpassing the eye and its lens" [24, 25].

Additional instances of sensational augmentation innovations incorporate, for example, "haptic eyes" that enable to feel what the camera sees [26], "the user or aided eyes that develop users' cognitive abilities by identifying and matching currently displayed objects automatically with previously saved data" [27]. It is possible to insert such sensors and cameras into AR glasses. The scope of human senses can be extended by near-ultraviolet (UV) and near-infrared (IR) light cameras. They are, however, extremely cheap. "Modern thermal (longwave) IR cameras" can also be low-cost and incredibly thin, opening up interesting opportunities for different products, such as the capability to see without any lighting in complete darkness. Possible mainstream applications for these sensors are often protection and care applications within and outside of cars, workplaces or residences [28].

Smart headphones, or 'hearables,' are examples of enhanced audition, which improve the hearing experience and natural ability. In noisy settings, "these wearables for the ear not only minimise improve hearing and hearing loss but can also catalyse super hearing". It can better filter off noise, discriminate against sounds [29]. Smart hearing machinery can increase the sense of space or help concentrate on sound emanating from a particular way [30]. In addition, virtual sound elements will complement real-world sounds, making a hybrid sound understanding and a customised sound atmosphere [31]. The earpiece may include supplementary sensors to track physiological signals due to the nearness of the body fluid in the ear. This further enhances its effectiveness in fitness and sports-related products [32].

By measuring or creating scents, an improved sense of smell can be obtained. State-of-the-art devices may quantify scents that are unnoticeable by the human smell approach, thus enhancing the capability to smell toxic chemical. Odour detection precision beyond human olfactory capability can be achieved by integrating odour analysis machineries and artificial intelligence (AI) algorithms [33]. By producing artificial odours, the human feel of smell may also be enhanced. For example, odour augmentation may add fun capabilities to VR. To increase the sense of taste, similar approaches have been established. It is relatively easy to create sensors that can recognise “any given taste as sweet, savoury, sour and bitter”. However, it has proved difficult to create taste sensations, as it is associated to the sense of smell and is therefore partly an individual experience. While electric actuators have been suggested to help taste buds in the tongue, they have not become popular [34]. Augmented taste experiences primarily focus on flavour, which means that olfactory signals are used to express a sense of taste.

Augmented senses may also allow sensory prosthesis or sensory substitution, in which data from one interpretation can be mediated by another meaning. In order to support motion and in low-vision settings, navigation, this could be achieved by comparing audio and haptic modalities. In addition to hearing and vision, in order to enhance power, a tactile helmet may be employed to mediate documents. More importantly, in extreme environments, “the ability of sensors to operate in severe conditions is crucial such as deep, space in the ocean or buildings on fire” [35, 36].

Sensors designed for particular uses, such as very dim light cameras or non-visible variety cameras, within mobile devices or even bulky-scale sensor arrays, auditory or vibration sensors, such as continuous broadcast of environmental knowledge by remote sensor networks and global positioning arrangements for controlling the movements of objects, are additional techniques for building augmented senses. Our knowledge of the surrounding environment can be improved by combining “these with delivered sensor systems, such as smart traffic systems and location-specific information sources” [37]. Augmented sensing has the ability to improve auditory reception, scent threshold, visual acuity, haptic sensation and gustatory perception beyond current natural human abilities, regardless of what sort of sensors are being used or what their configuration is. Yet the quantity of different sensory data will be improving exponentially with the inclusion of all these sensors, so how this data is interpreted and introduced to the individual consumer with quotation will be crucial.

**AUGMENTING HUMAN ACTION**

Motion augmentation was associated with the earliest examples of rising human behaviour. Any of the capabilities of an amputated leg have been restored by prosthetic limbs. New digital innovations have recently made it possible for behaviour to be increased in “ways that go beyond natural human motor and sensory limits” [38]. For instance, exoskeletons allow paralysed individuals to move on robotic feet. In a number of tasks that are typically performed by humans, “exoskeletons and dual-arm options” for power amplification are useful but cannot yet be completely robotic because they need human intelligence. Manual behaviour of products “where exoskeletons allow humans” to lift heavy objects and minimise pressure in the lower back region is one possible use case. The principle of an exoskeleton can be applied to computer-generated exoskeletons where a computer is worked in synchrony with the consumer's movements in a remote place [39]. This form of human-robot interaction-based remote presence is particularly useful if the working atmosphere is dangerous and it is therefore not possible to position a human operator on the ground.

Examples of applications include factories, nuclear power plants, space or sea assembly operations, rescue operations and search.

Other methods of feedback, such as touch, movements, look and expression can also be used to improve human activities in VR or in equipment control. Handheld controllers, gloves and related systems are frequently used in VR to allow virtual limbs to handle things of any size and weight. Gestures may be used from afar to improve action [40]. A simple movement of the hand or other action may appear to an observer as the use of telekinetic abilities to manipulate machinery over a distance. Gesture-based augmented motion, however, sometimes triggers a "Midas Touch Problem" phenomenon. This implies that selections and confirmations are made by a user inadvertently. The use of a fundamental interface to mediate gestures is one solution to the problem. In addition, improvement in automatic speech identification has made it possible to use voice controls for VR and robotic command more accurately. In an ideal situation, the interaction between "human-computer speech is adaptive, meaning that the software can interpret the speech correctly despite the skills or shortcomings of the user" [41].

A feedback loop is also necessary for several of the augmented act examples to relay sensory data to the operator. "Tactile feedback systems", for example, the use of virtual limbs can be more accurate, power sensors can facilitate the user's tactile data calculated by a computer, and synthetic skin can rebuild a sense of contact to a prothetic hand [42]. Sensory feedback can mimic the really-life operation of human sensory emotions and modalities to better serve augmented case. In certain cases, effective action enhancement involves the integration of multisensory material obtained from the natural environment and the adaptive regulation of action using the human sensory system. As additional things are linked to each other across the "Internet of Things", our daily physical living world is getting smarter. This helps us to interpret our world in new methods and also to engage with it by immediate and natural, such as spoken communication and gestural. Hypothetical ways of communicating with the atmosphere include using tactile input and feedback assisted by gaze regulation (or gaze paired with movements [43].

To allow the later step in augmented act, by measuring, for instance, the human brain, it is important to appreciate the cognitive state of the user. This conducts us to innovative technologies of augmented action like as neuroprosthetics, which will allow remote computers to monitor thinking and using a brain-machine interface to power prosthetic fingers. The integration of computers and humans with extremely evolved implant tools to build biotechnology-based amalgams is a potential outcome of this line of development.

**Augmented cognition**

It is a type of human-equipment collaboration where the "physiological and neuro-physiological sensing of the cognitive state" of the user achieves a near relation between a user and a machine. It incorporates user-detected knowledge to adjust computer data to meet the situational needs of the user [44]. A closed loop is thus formed between the consumer and the technical interface. It has been a multidisciplinary research area since the beginning, incorporating "cognitive psychology, neuroscience, computer science, engineering, and Human Computer Interaction **(**HCI) skills". The ultimate objective of the investigation is to expand the cognitive capabilities of the consumer and to seamlessly build a functional AC that can easily be used to solve and satisfy bottlenecks, weaknesses, and prejudices in the chain of human cognition and data processing.

Extended memory and nearly infinite awareness are found in augmented cognitive abilities. Using a centralised network to allow for expanded cognition will accomplish this instance. Increased cognition has also been employed to monitor one's wellbeing, support people with moderate brain injury, and enhance memory and learning [45]. Tools such as life-logging (i.e. storing memory-supporting memories and images) may be useful for improved cognition.

The seamless incorporation of established human being perceptual and cognitive skills and procedures to manage them, however, is currently lacking in the sector. In actual cases of use, this is needed to increase or expand human cognition. Earlier studies have focused on testing a system using one measurement tool to identify the cognitive or affective state of the user. In neuroscience, methods to track, promote and modulate the functioning of the human brain have been developed [46]. For example, to restore memory functions, electrodes may be implanted in the brain. Other explanations are more common for human-technology collaboration because of the invasiveness and ethical issues of such approaches. Wearable sensors can calculate electroencephalography, for instance. It is also possible to monitor human cognition without any “wearable sensors, infrared, ultrasound, and biofeedback loops have been used to monitor brain activity” to promote VRR learning. The level of cognitive workload is represented by “speech prosody recorded by a voice recorder, and eye movement activity assessed by a gaze tracker or camera may represent cognitive workload and emotional” workload [47].

But the unimodal approaches mentioned above are not adequate to achieve a genuinely mutually beneficial relationship between machine and human. Multi-dimensional measurements are required instead. It implies that many machineries are fused to monitor various aspects of emotional and cognitive functioning in humans. In addition, Skinner et al. (2014) propose that the methodology used to identify operator status should be understated in an ideal situation. They remember that the current state-of-the-art involves the creation of multimodal methods to diagnose a human condition in such a way that instruments and research methods are optimised to function in front of the laboratory [48]. Thus, various data sources need to be combined and interpreted in real user cases so that the device reaction functions in real time and is context-sensitive. Cybernetics modification and similar approaches can be reflected to make the loop between the consumer and the machine seamless. This also implies that mathematical models need to be developed to explain AC. Artificial intelligence may be employed to process large quantities of sensor records.

Finally, in human-technology interaction, one long-term objective is to usage the understanding of human cognition to create computers that can imagine like humans. Ren and Zheng et al., 2017 indicate that hybrid-increased intelligence might go ahead of human skills to cognition. Instead, it could be enhanced by using an intellectual documents structuring model that blends human cognition with device learning or by designing computer software & computer hardware systems that emulate the cognitive capacities of the human brain itself. Even though this form of computing is still in its infancy, “the protection, reliability and predictability of complex dynamic decision-making systems” will someday be enhanced by such systems [49, 50].

## SENSORY AUGMENTATION

It is characterised as the distribution of other sensory signals that convey relevant body orientation material for balance. During stroke recovery & for the treatment of phantom pain in amputees, passive types of SA, such as mirrors, have been used since the 1990s. In the

1960s, Bach-y-Rita created the first active type of SA to provide vibrotactile signals to warn visually impaired individuals about an object's location. Shortly thereafter, the “Tactile Situation Awareness System (TSAS), an array of torso-worn vibrotactile actuators”, was created and piloted by the Naval Aerospace Medical Research Laboratory to improve situational awareness of a pilot and provide orientation and targeting data [51]. The TSAS model for people with vestibular defects was adapted in the 1990's by Wall and Allum created a multimodal opinion display for people with equilibrium impairments [52]. Since the 2000s, SA for a lot of research has centred on harmony, possibly influenced by increased wearable technology availability, especially lightweight, wireless, and accurate inertial measurement parts. Research has involved numerous patient groups with predominantly sensory-driven coordination deficits: “individuals with vestibular loss, peripheral neuropathy, mild traumatic brain injury, and older adults, as well as individuals with stroke, Parkinson's disease, and ataxia”. Numerous theories, nevertheless, are possible and a rare have traditionally been suggested. It is possible to conceptualise these theories by considering how they affect different aspects of equilibrium, as epitomised by a basic balance control model. We note that more than one process may take place concurrently. "Sensory restoration refers to a system that fully restores sensory data” that is missing. In this case, different methodology for measuring the purpose of the balance will indicate balance control [53].

The sensory restoration will most likely be partial or minimal. For example, a vestibular implant system can at best semi-circular canal data restoration for the near future, but not information from the otolith organ [54].

'Sensory Replacement' describes to a system that acts to transmit motion information correlated to that of a compromised sensory resource over an alternate sensory modality (e.g., encoded using skin vibration patterns). Ideally, this replacement data should be paired with other information that is naturally accessible and the brain should perceive it as being identical to the impaired sensory source. If the “Alternative Sensory Modality” information varies significantly from the impaired sensory information it is intended to replace, it may not be capable of integrating the nervous system spontaneously with other sensory outlets. It might be more fitting in this case to consider that the system provides "Sensory Addition" [55]. “By making a sixth sense contribution to available sensory signals”, both sensory replacement and extension apparatuses can be imagined of as increasing balance power. “Historically, as vibrotactile, auditory, or tactile signals have been used to improve visual inputs”, sensory replacement and extension have been suggested as mechanisms. “Sensory Integration” refers to a process that integrates data from different sources on the orientation to serve as a source for producing corrective measures that promote stabilisation of the balance [56].

“Sensory restoration, substitution, and addition alter the available sensory information and are likely to have an impact on sensory integration via sensory reweighting”. Frequent exposure to an external 'channel' of body movement material has been postulated to provide the CNS with a connection to the stores from its whole sensory channels, encouraging improved weighting of these integral channels and the promotion of retentive retention and/or carryover impacts the additional channel until of in context-specific version by agreeing time for the nervous system to change optimal combi formation is removed [57]. Sensory integration and nation/weight sensory signals can be impaired by longer-time training with SA devices. SA used through balance improvement may also lead to valuable sensory integration improvements that are preserved even not including the continuous use of a SA unit. Other SA advantages may emerge from their effect on the methods of the engine. One might imagine that a system could motivate a change in "Control Strategy" that, as a function of available sensory knowledge, causes a person to create corrective torque.

This could be interpreted by a shift in the parameters of neural regulation where, for example, “an increase in corrective torque produced per unit of body sway would lead to a decrease in sway evoked by external disturbances, even though the mechanisms of sensory integration remained unchanged”. Changes in tactics for power. Changes in the control technique have been understood in Parkinson's disease subjects when sensory nodding is provided and are likely to be affected by individual inspiration as well [58].

To the degree that subjects use conscious thinking to produce voluntary behaviours to control equilibrium, 'Cognitive mechanisms' may have a role in understanding results. Cognitive procedures and sensory addition are possibly processed by the TSAS for pilot situational awareness. Finally, a practical electrical stimulation system provides “direct activation of muscles, bypassing or partially bypassing normal sensory integration and processes of muscle activation when they are not usable or damaged”.

## SENSORY AUGMENTATION TECHNOLOGIES

For balance applications, two of the most common forms of passive SA are visual and haptic feedback given by touch. Usually, innovative technology-driven active SA systems combine inertial measuring “units to estimate body kinematics and/or force plates or pressure-sensitive surfaces to estimate body kinetics with a wearable or off-body processor and a monitor”. In the literature, a number of displays were created and recorded to investigate standing and gait-based response products, including vibrating actuator arrays [59], televisions, electro-tactile arrays, and others.

Different kinds of displays, headphones or speakers and combinations of various modalities of input, wearable computers, laptops or desktops, gaming devices (such as Nintendo Wii, Kinect), and smartphones were included in the processors [60]. Similarly, for extended usage, such display modalities can present challenges during daily living activities. Several devices have currently been licenced for use in Europe and South America. To date, the FDA has approved a small number of active SA devices for use as a real-time balance or recovery tool in the US (e.g., Biodex Vibrotactile System).

An important component in facilitating human development is wearable interactive technology. It provides a seamless integration with the world around us, physical and digital. It will allow the user to connect with smart ideas and increase the hybrid physical-virtual creation of the future with non-invasive and easy-to-use extensions. “Augmented people can have a digital butler that is personal, but far beyond the visionary video Apple Information Navigator”. “This scenario is linked to the incorporation of human computers, which is most closely linked to augmented cognition, the use of computer resources and artificial intelligence to assist human beings and to operate in tandem with human beings” [61]. According to our behavioural patterns and preferences, “artificial intelligence assistants can act on our behalf and perform a range of simple and complex tasks effectively”.

### A model for wearable augmentation

As presented in the earlier section, there is a huge amount of relevant research. Human augmentation, however, lacks structural design and styles that incorporate individual roles as a comprehensive solution that could be used further as a framework for workable products.

Next, we introduce a model for wearable augmentation: through wearable technology, growing human senses, behaviour and cognition. The initial point is that the programme can directly boost human capacities, not by an external method that is controlled by a boundary. Collaboration should be as similar as possible to real human activity, which contributes to the need to monitor human actions employed as inputs for augmentation process. The proposed allowing wearable augmentation technologies are as follows:

● The climate, pieces, and events are identified by sensing technologies. These include "pattern recognition, auditory sensors, spatial, thermal and motion sensors, multispectral cameras, touch, olfactory and gustatory sensors", and other methods of computer vision.

● Via light-weight multimodal mixed actuality glasses, cross-modal appearance of details, and wearable accoutrements, multisensory performance technologies provide for focus, memory, and perception. Various human senses are applied: sight, sound, touch, smell, gustation as outlets for mediating augmented sensing and input on augmented behaviour.

● Technologies for human action capacity are based on numerous wearable sensors. Via, for example, "speech recognition, motor activity control, eye tracking, and force and touch input, human actions are recognised as inputs". Human operations are modelled at a higher level on the basis of this low-level data.

● Actuation technologies, as driven by humans, are used to influence the environment. These involve numerous forms of visual displays, audio devices, haptic actuators as well as generators of smell and taste. The sense of equilibrium can also be influenced by the generation of forces and human location in immersive environments.

● Connection to information systems that are networked, "the Internet of Things, and support for Artificial Intelligence would be provided by pervasive technologies for information services and artificial intelligence". This will allow customizable AI extensions to be created that can aid and autonomously support a variety of activities that users are unable to perform or not willing to do [62, 63, 64].

Augmented person is a modern model of user experience, combining and extending several of the old paradigms. Our wearable augmentation paradigm modifies the physical world beyond expanded engagement. Many sensors and cloud statistics provide knowledge, filtering it through artificial intelligence, and presenting it in easy-to-recognize ways to encourage human cognition in a timely style [65]. Physical devices or robots allow the environment to take action and alter.

**FUTURE HUMAN ABILITIES**

A fresh investigation on approaches to technology for human enhancement positioned various technologies along a 5-step continuum of use: "therapeutic use to restore capacity, prevention when there is a known risk or appropriate family history, prevention when there is no known risk or family or history, improvement beyond the capacity one would normally have, and improvement". The results showed that physical restorative was endorsed by 95% of respondent's applications. There is rapid ageing in the Western, Japanese and Chinese populations. There is a serious need for new ways to be found to deal with and combat age-related disabilities as disability rates rise with age 9. The proposed human increase will theoretically drive the retirement age higher and allow independent living to be better and longer [66, 67]. It would be remembered that not all challenges are solved by technical augmentation; individuals also have to “take care of their physical and psychological well-being by eating well, exercising and resting”.

User involvement and community acceptability should be thought carefully when developing augmentation technology for restoring capabilities: they influence the desire of people to use the technology. The increase should honestly sound like a part of the natural abilities of the user and not like technological instruments. The consumer does not need to wear technology or conduct things that are unpleasant or unusual to bystanders. Even if highly advantageous, older people who do not want to highlight their condition frequently refuse high-tech aids. When developing discreet augmentation technology, the stigma of assistive facilitates should be held in mind [68, 69, 70]. Recent developments in sensing technologies enable sensors to be inserted into clothing, standard eyeglass frames or jewellery so that they do not attract unnecessary attention.

Psychological variables still exist that can impede the implementation or observance to technical aids. The trust in operating the machinery, for example, offers greater incentive for constant use, emphasising the value of learning, ease of utilization, and sense of management. Even conventional assistive services like the wheelchair can feel "part of me" when effective. The programme clearly does not come with no expense. The advantages must outweigh the disadvantages, not just the monetary costs, but also the additional effort involved in learning, utilising and retaining the technology [71, 72]. If individuals are willing to try fresh innovations, long-term acceptance is not guaranteed.

The technology is used to allow skills one would not usually have as we step further in the 5-step process of enhancement technologies. Similarly, auditory or haptic feedback will compensate for vision loss, enabling the enjoyment of sports such as skiing. Interaction based on the gaze makes interaction can be done simply by turning the eyes, enhancing the capacity of individuals who can not move or speak to act. Someone can remotely browse a public screen using the same technology, just by looking at it [73]. For example, by regulating their posture, exoskeletons may compensate for disability or help staff or give industrial workers super strength. Increased sensation may reimburse for the loss of numbness sensation and support avoid pressure sores, or it can improve encounters of exceptional feelings. Augmented senses can also amplify compassion by repeating the perceptions of others. This is the post-print style of the speaker.

According to Werfel and others 2016, Cognitive augmentation provides people with dementia with the much-needed memory help, but it can also be useful for any busy person who escalates the opportunity to remember incidents and trials in their private life. As cooperative mediators for the enhanced senses & behaviour, the environment and surrounding objects may also function. “A walking cane may see the world and therefore help to route a person with vision impairment” [74]. Sensors in a vehicle can function like an outer skin that increases the sense of the world of the driver and, for example, through haptic feedback, increases driving.

When we pass to the other end of the 5-step continuum of Whitman (2018), individuals view machinery for change new and extra negatively. Of the respondents, less than 35 percent endorsed performance enhancement with programmes designed specifically to enhance physical or cognitive capacity. The most important explanation was that many ethical and social concerns were raised by such technologies. For instance, as Bavelier et al. (2019) indicate, for a war-fighter in the future, augmented vision or more cognitive ability may be beneficial. But does this mean that human enhancement should be done by those wanting to join the military? What happens if the fighters quit the army and the equipment for improvement is no extended required? In addition, improved recalling may be helpful, but harmful to the group, for a student studying for an exam [75].

## 2. CONCLUSION

In this research paper, the authors explained the working of augmentation in detail. The concept of human augmentation based on applications of technology is presented. The sensory augmentation technologies are described with the future human abilities being highlighted. A model for wearable augmentation is also presented. By developing international rules, standards and regulations to protect privacy, protection, uniformity & superior design for operator interfaces, all ethical problems posed in the area of human-expertise contact can generally be resolved. An integrated approach to HCI design may also provide any approaches to the issue. The obligation to control the privacy of personal data, for example, is previously recognised in the "General Data Security Legislation of the European Union (GDPR)". Similarly, it should be remembered that when smartphones were launched, social injustice problems were a problem, but nowadays the poor still use them and profit from the machinery.

It is likely to radically transform community for better or worse by extending human capacities beyond their normal boundaries. History indicates that both good and bad can and will be used with any technology. One can imagine how to use them to create a safer world and a more equal future for all of us through the analysis of ethical problems before introducing new technical strategies for human development. Therefore, technology plays an important role in enhancing human productivity with new emerging concepts of artificial intelligence.

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