Panel - Ethics and Emerging Technology:

Ethical Concerns From a Cognitive, Media & Technology Focused Psychology Perspective Concerning Augmented Reality, Privacy, and Sigularity.

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***Abstract*— Developing technologies such as augmented reality merges an individual's real life with a digital life that enhances both the visual and the physical experience. Augmented reality creates many ethical concerns in regards to impact on society and human behavior. Blurring the lines between what's real and what's artificial is a significant concern in the future development of augmented reality. This panel examines the ethical considerations from a cognitive and media-focused psychology perspective in developing and deploying mixed and augmented reality (MAR) applications to help improve your understanding of key psychological factors in technological development.**

Keywords—Media Psychology; Psychology; Cognitive; Augmented Reality; Immersive Technology; Privacy; Singularity, Ownership; Facial Recognition; Ethics.

I. INTRODUCTION

Technological enhancement and development is often pursued vigorously because it promises significant benefits for society. This often leaves little time to explore and consider the ethical implications of developing technology. The excitement of new technology brings new ways for humans to interact and experience the world digitally. However, excitement of emerging technologies often overshadows ethical judgment. This leads to technology continuously advancing without considering the possible implications and often results re-active ethics.

Developing technologies such as augmented reality merges an individual's real life with a digital life that enhances both the visual and the physical experience. Augmented reality creates many ethical concerns in regards to impact on society and human behavior. Blurring the lines between what's real and what's artificial is a significant concern in the future development of augmented reality.

Consideration of the impact and implications of augmented reality technology is far reaching. How humans interact with technology is much larger than the individual. Human interaction with technology is social, cultural, and within the context of the individual user within society. The scope of the impact that augmented reality can have on society and individuals suggests that the considerations of the implications that augmented reality may have should not just be the personal decisions of the user, but rather a social responsibility. Moving forward, a more positive relationship between ethics and technology needs to be fostered, with equal consideration for the significant benefits and risks associated with the emerging technology.

This panel examines the ethical considerations from a cognitive and media-focused psychology perspective in developing and deploying mixed and augmented reality (MAR) applications to help improve your understanding of key psychological factors in technological development. Successful MAR applications will be those that take advantage of the inherent way our brains process information in this new environment while taking into consideration ethical principals adhered to by psychologists and other scientists, as well as ACM and IEEE. This panel provides a one hour session where media-focused psychology is explored at a basic level with numerous illustrations, examples, and techniques to ensure that ethical concerns and considerations

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are being understood and addressed during the research, development and deployment of MAR applications.

The purpose of this tutorial is to help define the role psychological research and theories play in understanding the potential ethical concerns and dilemmas during the development and deployment of commercial MAR applications. It contains five major sections of study for session participants. These are: 1) the persuasive and immersive power of augmented reality applications, 2) privacy issues in augmented reality applications, 3) ownership in an augmented reality environment, 4) singularity and the ethics of living forever digitally, and 5) how business can follow ethical standards while remaining successful. There is considerable research in psychology to draw from to help understand the significant power of mixed and augmented reality applications on end users. Further, as psychologists adhere to a binding and well defined set of ethical and moral standards, this panel is in a unique position to provide expert insight, guidance and debate to other scientists, technologists and futurists. Each panelist's presentation builds off of the prior, ultimately ending in the defining of how to potentially deal with the ethical concerns presented and remain successful in their commercial efforts.

Throughout this panel, attendees will view various examples of each of the topics, as well as be exposed to a variety of similarities and differences in the ethical concerns, dilemmas and considerations of MAR applications. By the end of this panel, attendees will have a better understanding of how to improve the design and deployment of MAR applications while avoiding ethical pitfalls and protecting the end users from the potential negative effects of their products.

II. MOTIVATION

The Ethical Concerns From a Cognitive and Media & Technology focused Psychology Perspective panel is of special interest to IEEE Ethics attendees because it provides valuable, yet often neglected, psychological considerations for MAR applications. This topic is often overlooked in initial technology advances, because the exciting new ideas, technologies, and details leading up to in implementation are most often the primary focus. However, ignoring basic psychological components that provide better understanding, use, and acceptance of MAR technologies could jeopardize new development or research projects by leading to serious ethical concerns and dilemmas.

Increased knowledge of this subject will advance MAR initiatives by appealing to the various psychological needs and desires of end-users while protecting their psychological well being. The core techniques are not difficult to understand or implement, but need to be examined within the context of the end-user's experience.

III. ETHICAL CONCERNS OF IMMERSIVE MAR APPLICATIONS

Augmented reality (AR) is a powerful technology that has a direct effect on the end user experience. AR is a persuasive technology that is already having direct impact on the end user, all the while collecting information about them and their actions. AR is currently being used to advise, inform, track, manipulate, entertain and persuade the end user while collecting and utilizing their data. This technology raises significant ethical concerns. Some of the ethical concerns include how end users will be affected, manipulated, persuaded, or informed by the technology. Due to the immersive and persuasive nature of AR applications, the actual physical and psychological safety of end users and those around them becomes an ethical concern.

IV. WHO OWNS WHAT? THE PSYCHOLOGY AND ETHICS BEHIND AUGMENTED REALITY AND OWNERSHIP.

Cameras were added to cell phones just a little over a decade ago. New hardware can now transform a cell phone to a 3-D vision devices opening up a new world for imaging application and how we use our mobile devices. This holds implications for gaming, commerce, and photography. The visual is no longer in the minds eye. Graphics are easily replicated and objects can be scanned and 3-D printed. The technology is shifting how we think about, measure, design, and construct. Along with that shift of thinking arises the question of ownership. This session will use the lens of psychology to explore new technologies with a special focus on augmented reality and ethical ramifications as the lines of ownership become blurred.

V. ETHICAL CONCERNS OF LIFE EXTENSION THROUGH THE DIGITAL TRANSFER OF CONSCIOUSNESS

The breakthroughs in bio-medical engineering over the last fifty years have been accelerating in parallel to other engineering feets in robotics and advances in neuroscience. This rapid movement forward has led to a convergence of these fields in the interest of extending life indefinitely. Google, Apple and other mainstream multi-billion dollar corporations are betting on the technology and leading the charge. This is not science fiction. It is real tech being applied today. They are breaking the law. Every application of exponentially advancing technologies pushes the boundaries of natural selection and challenges our limited capacity to keep pace. As we approach a period in human history where engineering wonders make possible the extension of life and consciousness to the point of immortality, the cognitive evolution, mental development and social disruption through the stages of life are put to the test. Peter Diamandis has suggested that to achieve such a status successfully, we only need to sacrifice our privacy and individuality in order to upload our consciousness for transfer to a new body when the old one fails, calling it a small price to pay. But is it? We can only guess at the impact such a long-lived status can have on the first generation upon which it is bestowed. Still, if this is the goal, we owe it to that generation to do our best to make it an educated guess.

VI. PRIVACY CONCERNS IN MAR APPLICATIONS

The leading and most controversial ethical concern regarding augmented reality is the issue of privacy. With no clear laws on privacy, combined with issues such user

disclosure, ownership, and intended use; users of augmented reality technology should be concerned about their privacy and security. Additionally augmented reality brings concerns regarding the increase of the power from the developers with use of persuasion and influence. The developers of AR devices have increased ability to mold users perceptions. The opportunities of marketing and advertisement are endless and the power and influence is powerful.

VII. Ethics and the Competitive Advantage of Doing the Right Thing

It has become common knowledge that young people are more than willing to exchange their privacy for the convenience of driving directions. This misperception makes it easy to conclude that technology and social media companies simply don't need to worry about a business model predicated on mining personal data and reselling it to advertising interests. Recent studies from the PEW Research Center conclude that not only does privacy still matter for young Americans; in some instances it matters even more than it does among their older counterparts.

The majority of 18 – 29 year olds disapproves of government telephone and Internet data collection and don't believe it has much, if anything, to do with preventing terrorism. A smaller 47% of young people conclude that Internet companies collecting information for targeted ads are an unjustified use of private information. Many government and commercial interests skirt this issue by concluding that if a data mining practice isn't overtly illegal, it is an acceptable business practice.

For over a century the guiding principle of our court decisions has been that the individual has the right to be left alone. While some more recent decisions have eroded this absolute right, the likes of Oliver Wendell Holmes and Louis Brandeis put the issue in contest, "The makers of our Constitution…..sought to protect Americans in their beliefs, their thought, their emotions and their sensations. They conferred the right to be left alone, and ….every unjustifiable intrusion by the government upon the privacy of the individual, regardless of the means employed, must be deemed a violation of the Fourth Amendment".

Even in the face of adverse court decisions, the desire for privacy is unlikely to go away. While often misquoted, Abraham Maslow, in describing the qualities of self-actualization was clear on the human need for, "the quality of detachment, the need for privacy". In this matter for personal privacy, legal precedents and psychological need come to the same conclusion.

Large organizations dedicated to data mining and the systematic collection and reselling of information have opened the door to technical innovation and disruption of markets, services and products. We are already seeing smaller ISPs, mobile providers and even social media sites positioning themselves as on the side of the individual. They are not gathering private data, they are not tracking physical location, they are not keeping individual correspondence on servers beyond a short time frame and they are not forwarding data to third parties without a court order.

This doesn't mean the death of targeted advertising. Some consumers of all ages are willing to trade their information for a fair exchange of free services. But the successful provider will need to guarantee transparency. The consumer is beginning to demand the right to be left alone.

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