

What Augmented Reality Would Face Today? The Legal Challenges to the Protection of Intellectual Property in Virtual Space

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Abstract

Augmented Reality (AR) refers to a display of a real-world environment whose elements are augmented by one or more layers of text, data, symbols, images, or other graphical display elements. AR technology is always associated with online games. Beyond online gaming, AR has become part of daily life and affects every aspect of how society interacts with technology. In retail and marketing, AR and other virtual technologies play a very important role in saving costs. AR is also used in the education and medical sector, also in preventing crime. AR is even further used for humanitarian activities to reach remote areas affected by natural disasters and save human lives. Considered a new technology, the commercialization of AR may bring incredible business opportunities as well as potential legal risks. In the context of Intellectual Property (IP), AR systems and services can embody a variety of forms of IP. Meanwhile, the operation of AR systems in virtual spaces is creating issues about how to deal with data breaches and privacy. By using doctrinal methods, this paper will explore the legal challenge of AR in the context of IP protection in the virtual space and investigate the potential liability caused by the failure of AR systems from the Indonesian legal perspective.

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Introduction

In the last few years, new technology has brought new experiences to society. The role of smartphones has tremendously affected people's daily life. A few years ago, we experienced the phenomenon of online games such as Pokémon Go. Pokémon Go became an instant viral smash. Using a smartphone camera, Pokémon Go creates interaction between a virtual world and the surrounding physical world through a virtual map. Since the game was introduced in 2016, Pokémon Go made \$176 million in August, more than three years after its initial release.¹ Following

¹ Paul Tassi, 'People Still Play That? 'Pokémon GO' Just Made \$176 Million In August, #1 In The World' (Forbes, 21 September 2019) <<https://www.forbes.com/sites/paultassi/2019/09/21/people-still-play-that-pokmon-go-just-made-176-million-in-august-1-in-the-world/?sh=7006cf5d3948>> accessed 27 May 2022.

this phenomenon, some issues arose concerning safety, traffic violation, privacy, even national security. Amazon, one of the biggest retail companies, working with L'Oréal, introduced Modiface, an application allowing customers to digitally overlay make-up looks onto live images and videos or to test cosmetics in a virtual environment. Based on reports, this business model was believed to boost digital sales, however, according to medical research; this app also caused an increase in body-image disorders and unnecessary plastic surgery among children.²

Similar applications are launched by retail and marketing industries to gain more potential customers such as the Gucci 'try on' Shoe application. This app allows potential customers to choose and to see a digital overlay of different sneakers on their own feet by pointing their smartphone camera downwards.³ This app also allows users to take photos that can be shared on social media or in messaging apps. Similarly, the Toyota - vehicle demo app allows customers to see how different parts of the car system are interacting. In the other words, the app allows customers to gain insight into the product without touching it directly. AR Beauty Try-On is a YouTube app that works with split-screen that allow users to watch a tutorial and try on the look at the same time. In the sneaker industry, Adidas and Foot Locker introduced apps which allows customers to experience trying on brand new products. Subsequently, Adidas launched its own 'a Shoppable AR' feature on Snapchat.⁴

AR technology brought us to these apps. Historically, AR is a technology that was developed long before Pokémon Go appeared.⁵ This technology has been developing since 1968 but only in the 21st century has AR achieved such

² Conor Grant, 'The Ugly Side of L'Oréal's Mission to Bring Augmented Reality to Makeup - The Hustle' (theHustle, 4 June 2019) <<https://thehustle.co/amazon-loreal-fashion-augmented-reality/>> accessed 27 May 2022.

³ Kyle Wiggers, 'Gucci's IOS App Lets You Try Shoes on Remotely in AR | VentureBeat' (VentureBeat, 29 June 2019) <<https://venturebeat.com/2019/06/26/guccis-ios-app-lets-you-try-shoes-on-remotely-in-ar/>> accessed 27 May 2022.

⁴ Robert Williams, 'Adidas Pairs with Snapchat for AR Sneaker Try-on | Marketing Dive' (MarketingDive, 13 December 2018) <<https://www.marketingdive.com/news/adidas-pairs-with-snapchat-for-ar-sneaker-try-on/544270/>> accessed 27 May 2022.

⁵ Bagus Aji Santoso, 'Mengenai Teknologi Augmented Reality Dibalik Pokémon Go-Codepolitan' (CODEPOLITAN, 31 July 2016) <<https://www.codepolitan.com/mengenai-teknologi-augmented-reality-dibalik-pokemon-go/>> accessed 27 May 2022.

rapid progress because of the development of its supporting technology.⁶ In the context of retail and marketing, AR has played a significant in enhancing customer experience and driving long-term brand benefits.⁷ AR technology allows brands to offer unique and immersive digital experiences and memorably.⁸ AR technology has also allowed some industries to take more business advantages. The global market for AR is forecast to a reach value of USD 70 billion by 2023.⁹

Becoming a valuable sector, the commercialization of the AR concept has existed for decades. This is in line with some business predictions. In May 2008, AR was identified by Gartner Group as one of the top disruptive technologies for 2008-2012 and predicted to be embedded in mobile technology by 2014.¹⁰ In April 2010, Business Weeks suggested that AR would rise and affect how people interact with technology. Time Magazine listed AR in its list of top 10 technology trends for 2020. Whilst, Google Trends showed that since 2009, the search terms for AR have risen substantially.¹¹ Therefore, with such prediction, today, AR technology has been applied broadly in the public sector in areas including education, military purposes, humanitarian activities, and even crime prevention.

In the context of Indonesian customers, unfortunately, the country's commercial AR applications and products have been experienced insignificantly.¹² Indonesian customers were also generally unable to differentiate between AR

⁶ Ana Javornik, 'The Mainstreaming of Augmented Reality: A Brief History' (Harvard Business Review Home, 4 October 2016) <<https://hbr.org/2016/10/the-mainstreaming-of-augmented-reality-a-brief-history>> accessed 27 May 2022.

⁷ Marius Bulearca and Daniel Tamarjan, 'Augmented Reality: A Sustainable Marketing Tool?' (2010) 2 Global Business and Management Research: An International Journal.

⁸ Nikki Gilliland, '10 of the Latest Examples of Augmented Reality Brand Experiences - Econsultancy | Good To SEO' (Goodtoseo, 2 July 2019) <<https://www.goodtoseo.com/10-of-the-latest-examples-of-augmented-reality-brand-experiences-econsultancy/>> accessed 27 May 2022.

⁹ *ibid.*

¹⁰ Marty Resnick, 'Virtual Reality and Augmented Reality: Using Immersive Technologies for Digital Transformation, Customer Experience and Innovation' (Gartner Research, 3 July 2018) <<https://www.gartner.com/en/documents/3881066>> accessed 27 May 2022.

¹¹ Bernard Marr, 'The 7 Biggest Technology Trends In 2020 Everyone Must Get Ready For Now' (Forbes, September 2019) <<https://www.forbes.com/sites/bernardmarr/2019/09/30/the-7-biggest-technology-trends-in-2020-everyone-must-get-ready-for-now/?sh=345d530f2261>> accessed 27 May 2022.

¹² Daily Social, 'Virtual Reality and Augmented Reality in Indonesia Consumer Survey 2017' (2017).

and Virtual Reality (VR). In contrast, revenue from this industry is expected to continue to increase until 2020.¹³ Yet, the Indonesian AR business has a long road to development, and positively speaking, consumers are aware of its confident development.¹⁴

Following the commercialization of AR, business opportunities are wide open to development, but with such technology, there is also the emergence of potential legal risks. Moreover, understanding AR's legal aspects will lead to an increase in consumer confidence and dealing with future legal risks. This paper explores some legal challenges of AR technology in the context of IP protection in the virtual space and potential liability issues caused by the failure of AR technology from the Indonesian legal perspective.

Research Method

By using doctrinal methods,¹⁵ this paper explores the legal challenges of AR by sorting some AR-related regulations, particularly under the IP regime. In addition, the virtual space-related regulations are also used to examine further because part of the AR system occurs in virtual space. In exploring such related regulations, a conceptual approach is used to find the potential liability caused by the AR system. In some instances, a case approach is also used to illustrate the potential liability caused by this 'new' technology. Some technical terms appear in this paper to illustrate how AR technology works and to therefore show its potential legal challenges.

Understanding Augmented Reality

Understanding AR cannot be separated from Virtual Reality (VR) and cyberspace. Both share the common concept of a virtual environment. In a

¹³ Shinta Donnie Pratama, 'VR: Game VR, Pasar Yang Menjanjikan Di Indonesia' (Technologue, 2019) <<https://technologue.id/shinta-vr-game-vr-pasar-yang-menjanjikan-di-indonesia/amp/>> accessed 4 November 2019.

¹⁴ Daily Social (n 12).

¹⁵ Peter Mahmud Marzuki, *Penelitian Hukum: Edisi Revisi* (Prenada Media 2017).

virtual environment, human senses such as vision, haptics, hearing, smell, etc. are controlled by a computer.¹⁶ Meanwhile, AR adds visible digital content to a person's perception of the real world.¹⁷ VR replaces the real world altogether.¹⁸ By using speakers and goggles, VR places people inside a virtual environment, allowing people to move around in it and interact with it as if it were the real world.¹⁹ Put more simply, AR still uses the real environment but mates it with virtual objects.

Unlike VR, AR attempts to embed synthetic supplements into the real environment.²⁰ AR integrates synthetic information into real environments. Synthetic information in this regard can be in 2D and/or 3D graphical elements. In line with how Azuma defines AR as the combination of the real world and virtual world and both interact in real-time with 3D animations.²¹ Furthermore, AR is a concept that is imaged as a real three-dimensional image. To image the three-dimensional image, the AR system must first do a vision or vision of the environment in which the virtual object will be imaged, then the specific objects are tracked and the location of the virtual object is determined in the image. Then, the object will be recognized or analyzed. After being recognized and analyzed for position and orientation, the computer will conduct imaging processes of the object and will appear on display fixtures.²²

AR can be displayed on various devices such as glasses, screens, cellphones, and so on. For the device to function properly, certain amounts of data in the form of videos, images, animations, and 3D models need to be used. People can see the results in artificial and natural light. AR uses SLAM (Simultaneous Localization

¹⁶ Oliver Bimber Raskar and Ramesh, *Spatial Augmented Reality: Merging Real and Virtual Worlds* (AK Peters 2005).

¹⁷ Mark A. Lemley and others, 'Law, Virtual Reality, and Augmented Reality' (2018) 166 *University of Pennsylvania Law Review*.

¹⁸ *ibid.*

¹⁹ *ibid.*

²⁰ Oliver Bimber Raskar and Ramesh (n 16).

²¹ Ronald T Azuma, 'A Survey of Augmented Reality' (1997) 6 *Presence: Teleoperators and Virtual Environments*.

²² Heru Vitono, Helfi Nasution and Hengky Anra, 'Implementasi Markerless Augmented Reality Sebagai Media Informasi Koleksi Museum Berbasis Android (Studi Kasus : Museum Kalimantan Barat) | Vitono | JUSTIN (Jurnal Sistem Dan Teknologi Informasi)' (2016) 2 *Jurnal Sistem Dan Teknologi Informasi*. [239].

and Mapping) technology, sensors, and depth devices. One example is using sensor data to calculate the distance from the sensor location to an object. The main components of AR are the camera (including sensor), projection, and reflection. The camera and sensor are used to collect information from the user to be processed further. For some gadgets, the camera can check surroundings and with the data collected, will be able to find and create a 3D model. The projection component will take information from the sensor and project some computerized contents on the surface to be able to be seen. The reflection component is used to set a precision object. See below for a further illustration of how AR works:

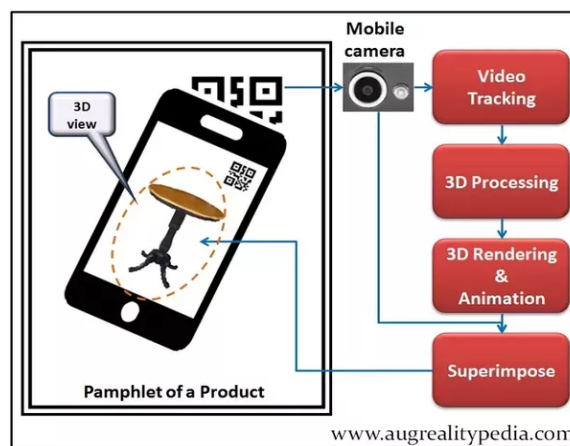


Figure 1 How AR Works (Source: AugRealityPedia)

There are several categories of AR technology; each category has different uses in different applications inter alia Marker-Based AR, Marker-less AR, Projection Based AR, and Superimposition Based AR. Marker-Based AR uses a camera and visual markers to differentiate or read QR or 2D codes. QR Codes or 2D codes are used as markers since they are easily recognized visually. Position and orientation are also counted respectively. Marker-less AR uses Global Positioning System (GPS), digital compass, speed meter, or accelerometer that is embedded in the device to provide data based on the user's location. The power behind marker-less AR technology is the availability of the location detection feature on smartphones. This is the most commonly used to map directions, find the closest business, and other location-based mobile applications. Projection-based AR works by projecting artificial light onto the real surface. The application

of this technology enables human interaction by sending light to the real surface and then feeling human interaction (touch) from the projected light. Detecting user interactions is done by distinguishing between expected projections and altered projections. Another interesting application of this technology is the use of plasma laser technology to project interactive three-dimensional (3D) holograms in the air. While Superimposition-based AR can replace part or all of the original appearance of an object with a new view and add from the same object. Object detection plays an important role because the application cannot replace the original appearance with an augmented one if it cannot determine what the object is. An example of Superimposition-based AR can be found in the IKEA AR furniture catalog application. By downloading the application and scanning selected pages in their printed or digital catalog, customers can place virtual IKEA furniture in their own homes with the help of AR.

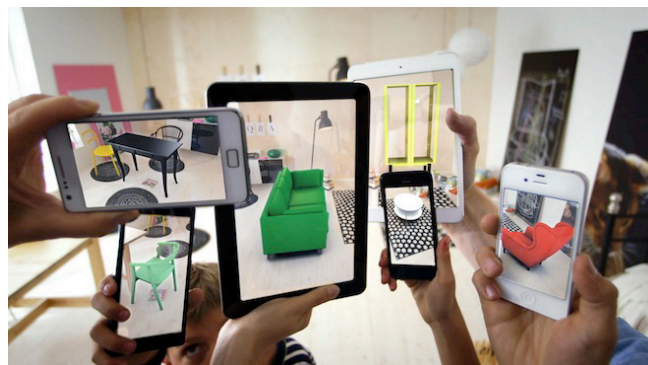


Figure 2 IKEA Virtual Furniture (Source: VRScout)

In the medical field, AR technology has the potential to revolutionize medicine. During surgery, AR systems provide medical imaging data and other patient information superimposed on the operation area in the most intuitive way. Furthermore, AR-aided navigation systems can reduce the risk of complications and improve the safety and quality of surgeries, AR education systems train the surgeons of tomorrow to acquire the critical skills and AR rehabilitation concepts help patients to recover faster after interventions. However, while research is rapidly evolving in the field of Medical Augmented Reality, strong relationships between doctors, engineers, and industry are the key to the development and

implementation of new AR systems in medicine.²³

As argued by Tabusca, AR is the game-changer in education. AR technology will equip and support of teaching process. This combination is very important as a modern support tool in education.²⁴ It is also shown that AR contributes to achieving learning outcomes.²⁵ However, it has also been stated that AR in education is subject to further research.²⁶ Likewise in manufacturing, AR technology also enhances productivity in areas such as the assembly process.²⁷ AR also reduces costs in many different ways. AR can be used for data management in equipment maintenance, quality assurance, and even for local deliveries.²⁸ In the entertainment industry, according to Forbes, the AR entertainment market is growing, driven by the continued proliferation of smartphone AR applications.²⁹

In 2017, the International Red Cross Committee (ICRC) releases 'Enter the Room', an AR technology-based program to provide an experience of an intimate sense of civilians in the middle of armed conflict. Enter the Room was inspired by Pokémon Go and Snapchat. The application works through the iOS operating system. According to Maurer, the story told by this application gives people new insights into the realities of war.³⁰ The application also brings a reminder for the

²³ Medical Augmented Reality, 'International Lecture Series & Summer School Computer Aided Medical Procedures' (Medical Augmented Reality, 2019) <<https://www.medicalaugmented-reality.org>> accessed 16 November 2019.

²⁴ Alexandru TĂBUCĂ, 'Augmented Reality - a Possible Game-Changer in Education' (2015) 1 National Strategies Observer.[245].

²⁵ Hsin Kai Wu and others, 'Current Status, Opportunities and Challenges of Augmented Reality in Education' (2013) 62 Computers & Education.[41-49].

²⁶ *ibid*

²⁷ George Michalos and others, 'Augmented Reality (AR) Applications for Supporting Human-Robot Interactive Cooperation' (2016) 41 Procedia CIRP.

²⁸ Kayla Matthews, '5 Ways AR Is Changing the Manufacturing Industry | ManufacturingNet' (Manufacturing.net, 22 June 2018) <<https://www.manufacturing.net/operations/article/13123361/5-ways-ar-is-changing-the-manufacturing-industry>> accessed 27 May 2022.

²⁹ John Koestler, 'AR's Not Dead: Augmented Reality Entertainment Growing 244% Annually' (Forbes, 26 June 2019) <<https://www.forbes.com/sites/johnkoetsier/2019/06/26/ars-not-dead-augmented-reality-entertainment-growing-24-4-annually/?sh=2114f470c55c>> accessed 27 May 2022.

³⁰ International Committee of The Red Cross, 'When War Hits Home: ICRC's Devastating New Augmented Reality App | International Committee of the Red Cross' (ICRC News Release, 7 March 2018) <<https://www.icrc.org/en/document/when-war-hits-home-icrcs-devastating-new-augmented-reality-app>> accessed 27 May 2022.

international community that war destroys lives.³¹ Based on an ICRC report, some 65 million people are escaping conflict and 75% of them live in the city. The purpose of these apps is to create immersive experiences in the humanitarian situation. Enter the Room is claimed as the first known AR application in the humanitarian sector. Since the app was introduced, it has been downloaded more than 50,000 times.³²

According to an FBI report, AR has significant implications for policing. The development of AR technology could become a tool that provides a tactical edge over rapidly evolving sophisticated criminal threats, particularly terror-related. Unlike AI technology, which potentially eliminates human involvement in any decision-making process, AR technology will directly improve human performance, allowing people to work smarter and faster, while also still in full control of technology instead of being controlled by technology itself.³³ In its development, Microsoft HoloLens introduces tuServ, an AR application, to assist police officers in the field by mapping out the environment of a crime scene in real-time to further build a digital recreation using virtual markers, 3D objects as well as other multimedia evidence while at the same time eliminating any risk of contaminating the physical evidence.³⁴ Furthermore, tuSurve was also considered a unique tool since it can virtually transport and immerse the investigators back to the scene; also the mapped-out AR crime scene could be used as evidence during a trial.³⁵

Some fields that have used AR technology are medical, military, entertainment (games, broadcast, TV etc.), education, manufacture, humanitarian aid, crime prevention, and many more. With such characteristics, AR is surely gaining attention in terms of its development as the technology offers new insights

³¹ *ibid.*

³² Nita Bhalla, 'Forget Pokémon GO, Red Cross Augmented Reality App Brings War to You | Reuters' (Reuters, 14 May 2018) <<https://www.reuters.com/article/us-global-war-technology/forget-pokmon-go-red-cross-augmented-reality-app-brings-war-to-you-idUSKCN1IF22C>> accessed 27 May 2022.

³³ Thomas J Cowper and Michael E Buerger, 'Improving Our View of the World: Police and Augmented Reality Technology' [2003] US Federal Bureau of Investigation.

³⁴ Bobby Carlton, 'How AR Is Making Its Way into Crime Scene Investigations - VRScout' (VRScout, 31 October 2017) <<https://vrscout.com/news/ar-crime-scene-investigations/>> accessed 27 May 2022.

³⁵ *ibid.*

in some fields. However, with such technology and services offered by AR, there is a fundamental problem that a real environment is much more difficult to control than a completely synthetic one. Thus, it is argued that AR may also face social and legal problems.

Augmented Reality as an Intellectual Property Product

IP law regime protects ideas and creative expression and other intangible concepts. These concepts become intangible valuable assets in a digital-driven economy. AR combines virtual objects (2D and 3D) and real objects into a real 3 dimensions (3D) environment. With such characteristics, AR technology and application entail a variety of forms of IP including Patents, Copyrights, Trademarks, and other publicity rights.

a. AR and Patent

A patent protects the property right of the inventors of their invention. Patentable subject matters on AR include its system, features, processes, and functions. The overall AR system architecture and functionality can be exercised from the real-time of the AR application's data sensor, how the data is captured, managed, analyzed, displayed, or manipulated in certain manners, or the combination of how the data are processed, or even how the algorithm works in AR system and many more as long as it can be exercised under the patent's test elements.

The first case of the AR-related patent lawsuit was filed in June 2011 between Tomita Technologies USA, LLC v. Nintendo Co. The infringement, in this case, involved AR game's sliding control button on the 3DS Nintendo handheld console. The decision of the U.S District Court for the Southern District was essentially the first decision on an AR-related patent infringement case. Most discussions in this case centered on the parties' argument and the court's opinion which focused on how the 3DS camera works to capture the 3D images.³⁶ The jury awarded Tomita

³⁶ Brian D Wassom, *Augmented Reality Law, Privacy, and Ethics: Law, Society, and Emerging AR Technologies* (2014).

USD 30.2 million in damages based on the estimated value of reasonable royalty payment by Nintendo for using such technology.³⁷ Even though, at the end of this case, Tomita was given two choices either accept 50% of the jury's award or conduct a whole new trial on damages since it found that the 3DS technology was an add-on technology rather than a core feature of the console.³⁸



Figure 3 Nintendo 3DS Console (source: Nintendolife.com)

Based on *Tomita v. Nintendo* case, Wassom argued that the case demonstrates patent infringement in the AR industry. Moreover, the jury and the judges' elaboration represented their knowledge on the implementation of AR technology, also the amount of money is even the most significant over the AR patents.³⁹ Following this, other AR-patent related cases have also arisen such as *1-800-Contacts v. Ditto Technologies* in 2012 and the *Lennon Image Technologies Case* in 2013.

In the context of Indonesian Patent Law, an invention must meet substantive requirements to be patentable. There are three criteria for patentable matters *inter alia*:⁴⁰ 1) Novelty, an invention must not have been disclosed or published in any media both nationally or internationally before the patent application is filed (Filing Date); 2) Containing Inventive Steps, in this context patents will only be granted for unpredictable inventions, or not obvious, to people who have expertise in the related field (a person skilled in the art); 3) Applicable on the industry, an invention must be able to be carried out repeatedly while still producing a consistent and unchanging function.

³⁷ *ibid.*

³⁸ *ibid.*

³⁹ *ibid.*

⁴⁰ Article 6, Article 7 Article 8 Patent Law.

Whereas, the invention cannot be patented if it meets certain conditions *inter alia*:⁴¹ a) the announcement, the use, and the implementation are contrary to the applicable laws and regulations, religious morality, public order, or morality, e.g. inventions specifically designed for drug use; b) in the form of examination, treatment, sceand/or surgery methods applied to humans and/or animals; c) theories and methods in the fields of science and mathematics; d) all living things, except micro-organisms; and biological processes that are essential for producing plants or animals, except non-biological or microbiological processes. Because there is a patent exemption for these living creatures, the protection of new plant varieties resulting from breeding is held separately through Plant Variety rights. It should also be noted that the invention does not include aesthetic creations (which can be protected by Copyright or Industrial Design), schemes, rules, and methods for conducting mental activities, games, or business, or rules and methods regarding computer programs (in this matter is software which is protected by copyright), and presentation of information.

In Indonesia, AR technology is very popular within the online-gaming community. For example, the 5DX game made by 5DX Mobile Entertainment licensed by Marvel was released in 2017. In addition, football lovers can also experience AR competition with other players through Astartk, the creation of local game developer startups, ASTARK, and AR & Co.⁴² Based on AppAnnie and NewZoo, AR, VR, and MR (Mix Reality) represent a bright future for 2020. There are substantial amounts of AR and VR game lovers and game developers with 150 members spread all over Indonesia. Revenue from the industry is also expected to continue to increase until 2020.⁴³ This inspired local AR developer, Shinta VR, to launch the Codename: Mindvoke game. Codename: Mindvoke is the first multiplayer VR game in Indonesia. This game offers players the sensation

⁴¹ Article 9 Patent Law.

⁴² Asri Amanta, '10 Fakta Tentang Penerapan Teknologi Augmented Reality Di Asia!' (smarteye.id, 4 March 2020) <<https://www.smarteye.id/blog/penerapan-augmented-reality-di-asia/>> accessed 27 May 2022.

⁴³ Shinta Donnie Pratama (n 13).

of entering into a surreal world which is a unique place in the game. Following the game launch, in 2018, Shinta VR held a Codename: Mindvoke Competition to gather AR game enthusiasts.⁴⁴

Besides online gaming purposes, some AR technology has been applied for teaching media and helping museums for preserving certain objects. In the teaching process, AR is believed able to stimulate critical thinking by visualizing an abstract concept making them more understandable to learners.⁴⁵ AR is also used for helping a museum in preserving some objects. AR technology in this context is used as a medium to share information and content on a museum's collections.⁴⁶

The development of AR technology in Indonesia is still growing. With such criteria as patent protection, there are many areas of AR technology that can be developed and can be the subject of a patent. The challenges may appear regarding this new technology and these require legal experts and legal practitioners to know about new technology.

b. AR and Copyrights

Copyrights protect original works of authorship including literary, dramatic, musical, and artistic works, such as poetry, novels, movies, songs, computer software, and architecture. WIPO describes works covered by Copyrights ranging from books, music, paintings, sculpture, and films, to computer programs, databases, advertisements, maps, and technical drawings. In general, for obtaining Copyrights, the works must meet the requirements of criteria of fixed in a tangible medium. To understand how AR can be the subject of Copyright protection, one point to consider is that AR, by its nature, is built on computer programming technology. Furthermore, most AR technologies are expressed by augmented means. In other words, the tangible fixation is visualized in 3D media. Therefore, to exercise the Copyrights' infringement, we must see the use of the works protected by Copyrights, or in other words, using someone else's works without their permission. However, it

⁴⁴ *ibid.*

⁴⁵ Ilmawan Mustaqim, 'Pemanfaatan Augemnetd Reality Sebagai Media Pembelajaran' (2016) 13 *Jurnal Pendidikan Teknologi dan Kejuruan*. [174].

⁴⁶ Heru Vitono, Helfi Nasution and Hengky Anra (n 22).

remains difficult and inefficient to find potential copyright infringements based on the sheer volume of works that can be created with AR technology.⁴⁷ The difficulty is caused by the fact that some AR content may never make it to the public since it is stored within the AR equipment software.⁴⁸

To illustrate further how AR is subject to Copyright protection is a case in the US involving Firesabre Consulting LLC v. Sheehy. Cindy Sheehy, a middle school teacher, purchased a set of islands within the online multiplayer game Second Life (SL)⁴⁹ to use as part of her teaching media. Sheehy utilized the islands she bought and changed their topography and landscape (known as terraforming). Firesabre is specialized in the educational use of virtual world which provides terraforming services used by Sheehy within SL. Since the relationship between the two broke down, Firesabre accused Sheehy of infringing their copyrighted work based on the services they provide within SL because Sheehy allegedly continued to display the education content. The court decision denied Sheehy motion since the judgment saw that there was no distinction between the terraforming designs and a drawing created on a sculpture created by moldable clay, and it did not mean that the art was too transitory to be copyrighted in the first place.

Another example to illustrate copyrights case in AR technology is computer-generated AR image. The ability of AR to enhance certain objects with additional graphics, visualization, sounds and further distorts the figures in those objects may arise a copyright dispute with the original creator, there should be an assessment whether there is an agreement or not between the parties.

Even though it is considered a not so clear-cut since the distortion-generated images produced by AR may constitute an enhancement of a work of art, it

⁴⁷ Mma Afoaku, Brian D Wassom and Joel Merkin, 'The Reality of Augmented Reality and Copyright Law' (2017) 15 *Northwestern Journal of Technology and Intellectual Property*.

⁴⁸ *ibid.*

⁴⁹ Second Life (SL) is an online environment or the 3D virtual world where users, called residents, can pretend to be whomever or whatever they want to be. SL influences the real world, including a virtual economy that's dependent upon actual money. In reality, or perhaps virtual reality, Second Life is a complex environment filled with potential risks and rewards. See details of SL at Jonathan Strickland and Dave Roos, 'How Second Life Works | HowStuffWorks' (howstuffworks, 21 August 2021) <<https://computer.howstuffworks.com/internet/social-networking/networks/second-life.htm>> accessed 27 May 2022.

should be assessed whether there is an agreement or not between the parties. To conclude, the cases occurred related to AR and Copyrights are very dynamic. It is shown that the dynamic AR content will trigger some controversies under copyrights law.

In terms of traditional copyrights works, it has been fairly easy to determine who should be granted authorship and thus be considered the rightful copyrights' owner as long as it meets the copyrights protection' criteria which are original works and the fixation in certain media. But in an AR environment, the issue of authorship is difficult to prove. Is it the programmer, the platform, or the user of the generated content? The infringement issue will be especially complicated due to the massive amounts of digital data which will be created through AR, coupled with the fact that AR can be used to reproduce preexisting works and create derivative works, which may result in copyright infringement. For those who create copyrightable works through AR, it will be equally difficult to find infringers. Is Indonesian Copyrights Law applicable to this issue?

In the context of Indonesian Copyrights Law, there are at least six articles that cite computer programs inter alia: 1) Article 1.9 on the definition of the a computer program, 2) Article 11 (2) on the exemption from the economic right to lease a work or copy to a computer program, 3) Article 40 (1s) on copyrighted of computer program, 4) Article 45 on the permission to duplicate or to adapt a computer program without the creator's consent or copyright's holder under certain terms of use, 5) Article 46 (2d) on the prohibition to duplicate computer program for personal use, 6) Article 59 (1e) on protection period for a computer program. However, we must consider other articles of Copyrights Law to understand it from a broader perspective.

c. AR and Trademarks

In general, anything that distinguishes the source of a good or service can be a trademark. Infringement of trademarks rights occurs when a person or entity adopts a mark that is similar to a pre-existing mark. In the context of AR, many companies are using both AR and VR applications as their part

of marketing tools. The concern is that these AR applications bring new possibilities of unauthorized trademark use, infringement of intellectual properties and counterfeiting.⁵⁰

Below will illustrate further how to understand how AR technologies function as objects of Trademark protection. Also, AR technology may potentially infringe on a person or an entity's trademark. By its nature, AR technology will demonstrate 3D images. These published digital contents may be considered as a depiction of sponsorship. To illustrate more, we may take a look at Keiichi Matsuda's YouTube account that shows how AR is used a depiction tool for certain trademarks in the shape of sponsorship.

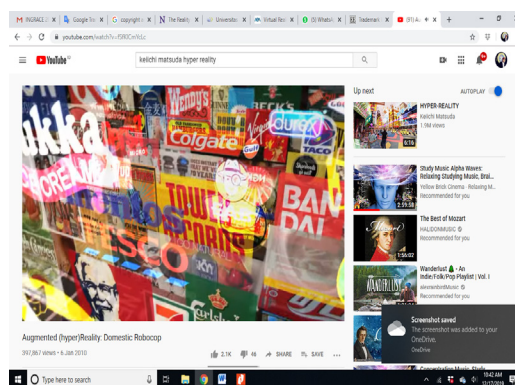


Figure 4 Keiichi Matsuda's YouTube Account on Augmented (hyper) Reality: Domestic Robocop

In this video, the AR users see a digital kitchen with branded advertisements. At one point, they even manually raise the advertising level by their eyewear, suggesting that they are receiving micropayment or subsidized services for each ad they see.⁵¹ This situation raises questions about how commercial goodwill is being used to attract consumer attention which represents the realm of trademark law.⁵² This emerging AR technology is inspired by conventional trademarks and in the future, the AR technology also will change the legal enforcement of trademark infringement. Note, that not every AR technology or its parts will automatically be eligible for trademark protection.

⁵⁰ Tony Onorato, Guido Asshoff and Jaime Castill, 'Virtual Reality and Augmented Reality: A New Reality for Brand Owners?' (2018) 11 *Landslide*.

⁵¹ Wassom (n 36).

⁵² *ibid.*

Under Indonesian Trademarks Law, a trademark that can be registered must have distinguishing features and be used in the trade of goods or services and can be in the form of pictures, words, names, phrases, sentences, letters, numbers, figures, color composition, 3D, sound, hologram or a combination of those elements. Concerning AR technology, Indonesian Trademark Law may apply in certain circumstances. Also, the challenge would be the same in the Copyrights and Patent protection, which require legal experts to follow the development of these technologies and exercise it with the basic principles of the IPRs-related protection.

Further Legal Questions of AR

Separate from IPRs protection regime, there are further complex legal issues concerning AR such as who owns or governs virtual space, the right over virtual spaces, security issues, including online trespassing and the right to privacy. The discussion in this part will be limited to the issue of the rights over virtual spaces, online trespassing and security, and the possibility of liability and negligence.

a. The Rights over Virtual Spaces

The concept of virtual space has a long history and in a nutshell may be defined as a computer-based simulated space, world, or environment which allows users to interact and participate in some activities by creating a personal avatar (a graphical representation of the user's character in such computer networks).⁵³ Virtual worlds or virtual spaces are freely accessible to anyone from anywhere with a device that allows one to freely move and act as if one were in a public space.⁵⁴ The interaction is supported by certain devices such as a headset, glasses, or otherwise yet unknown technology without ever leaving home. Certainly, the vast amount of data will enrich this kind of interaction.

With such characteristics, virtual spaces as the basic space of AR technology

⁵³ Richard Bartle, *Designing Virtual Worlds* (New Riders Publishing 2014).

⁵⁴ Daniel B Koburger, 'Legal Implications of Public Spaces in Virtual Reality' (2019) 12 *Landslide*.

leave some legal questions. Data is very crucial in AR systems. Therefore, the commercial value of data would be very promising to businesses. To illustrate, Niantic's Pokémon Go, recently entered into an agreement with Starbucks for thousands of its coffee shops in the US to be tagged as Pokémon Go Stops. Soon after this, another business agreement followed with mobile telephone companies Sprint and Radio Shack.⁵⁵ Misinterpreting this kind of data may potentially compromise the reputations of the businesses involved. Also, this kind of guerilla marketing has the potential to create legal issues regarding trespassing. The development of technology hints at a concern where virtual space will also have considerable commercial value. Without a doubt, the problem that might occur is similar to the types of problems in the real world. Digital data is an essential element of AR. With such systems, digital data created by AR is superimposed on the physical world. Digital data particularly associated with a location, raises a set of legal and policy issues. Therefore, the issue becomes more complex when it is integrated with physical world.

In the context of Indonesia, Information and Electronic Transaction (IET) Law is a space-based related regulation. Based on Article 2 IET Law, jurisdiction over virtual spaces is governed under this law. This law has the scope of jurisdiction not only for legal actions that apply in Indonesia, committed by Indonesian citizens, but also applies to legal actions carried out outside the jurisdiction of Indonesia both by Indonesian citizens and foreign citizens or Indonesian legal entities as well as foreign legal entities that have legal consequences in Indonesia, bearing in mind the use of Information Technology for electronic transactions can be cross-territorial or universal. Furthermore, what is meant by "detrimental to the interests of Indonesia" includes but is not limited to the detriment of national economic interests, protection of strategic data, national dignity, national defense and security, state sovereignty, citizens, and Indonesian legal entities. By citing

⁵⁵ Andreas Guadamuz, 'Pokémon Go: Augmented Reality Tests IP' (*WIPO Magazine*, February 2017) <https://www.wipo.int/wipo_magazine/en/2017/01/article_0005.html> accessed 27 May 2022.

EIT Law, interaction in virtual spaces may be examined under this law.

b. Online trespassing, Security and Privacy Issue

Additional to the aforementioned tagging case, when equipped with geolocation capabilities, AR produces user-generated content that tracks users' real-time location. Like traditional privacy issues, AR technology will face a personal location tracking information system and the use of such information. The issue of consent and a real-time notice is vis a vis with the AR data collection and information sharing. To illustrate, if a user agrees to subscribe to a geolocation sharing application, they could offer/add real-time privacy notice and selections. Moreover, related to the issue of security and privacy, experiments on some AR devices were likely to show the potential breach of privacy and security.⁵⁶ In addition, cultural differences in privacy may influence the perception of privacy itself. As AR technology is globally developed, the different perspectives regarding privacy should be considered further.

Considering such circumstances, Indonesia may face legal complexity because the legal framework for the protection of the right to privacy is considered insufficient.⁵⁷ Even though regulated under the 1945 Constitution, there are sectoral regulations containing the right to privacy. A previous study found that there are at least 32 regulations that contain the right to privacy. As argued by Kurbalija, comprehensive regulation on data protection would be suitable to guarantee the protection of the right to privacy.⁵⁸ Despite the Indonesian Government enacting a series of technical regulations on data protection, it is still considered to be insufficient from a constitutional perspective.

c. Liability and Negligence

As mentioned previously, applied AR in certain industries may face some legal challenges. Besides infringement under IPRs regime, the issues regarding

⁵⁶ Song Chen and others, 'A Case Study of Security and Privacy Threats from Augmented Reality (AR)' [2018] 2018 International Conference on Computing, Networking and Communications, ICNC 2018.

⁵⁷ Masitoh Indriani and Amira Paripurna, 'Do We Have Privacy in The Big Data Era?', *ICOC-SPA 2018 Proceeding* (2019).

⁵⁸ Jovan Kurbalija, *An Introduction to Internet Governance* (Diplo Foundation 2014).

liability and negligence may occur in the future. To illustrate further, some of the potential sources of liability caused by the applied AR technology such as injuries during use, flaws in product design and issues over data quality cause navigation failure. As argued by Lemley and Volokh, some actions may be exercised under Tort Law such as direct tort lawsuits against offenders and tort lawsuits for physical injuries to users and outsiders.⁵⁹

There are important questions to be answered such as can AR users be held legally liable for any damage or injury caused while us AR? Can the AR programmer be held legally liable for navigation failure? Or even further, can Internet Service Providers (ISP) be held liable for causing internal system failure? Indeed, these questions should be examined in the context of the surrounding injury or damage.

To illustrate, in construction work, AR is used to coordinate or assist in installing materials by providing visual aids that indicate additional elements that need to be installed later. However, the distraction of images supplanted onto existing space can confuse or distract the user from hazardous conditions nearby.⁶⁰ The risk-on cybersecurity is also significant. Cybersecurity breaches can result in project specifications being intentionally or unintentionally modified, causing delays, mistakes or worse. The likelihood of cybersecurity breaches of construction in AR applications is still speculative, but as the use of this new technology increases, it is important to consider in the future.

Conclusion

The boundaries between the digital and physical world are increasingly difficult to distinguish. AR technology is quickly entering a new phase of development that allows an even more sophisticated user experience. In the

⁵⁹ Mark A. Lemley and others (n 17).

⁶⁰ Megan K George and Kelly Ball, 'Legal Risks Of Virtual And Augmented Reality On The Construction Site - Construction & Planning - United States' (*Mondaq*, 2 July 2019) <<https://www.mondaq.com/unitedstates/construction-planning/820886/legal-risks-of-virtual-and-augmented-reality-on-the-construction-site>> accessed 27 May 2022.

broader context, AR technology can be utilized and applied for many purposes ranging from the entertainment industry, marketing, and retail, even for public and social matters such as humanitarian aid, education, and crime prevention. As a result, AR technology will bring significant transformation to many economies in terms of productivity, competitiveness, and the provision of new and innovative services for societies. However, the global trend towards a gap in regulation should be dealt with by the government with a variety of different approaches.

From the legal perspective, Indonesia has been struggling with this regulation gap when it comes to the use of AR technology in certain areas, moreover, there are challenges to legal knowledge and understanding of the technology when it comes to disputes. There are many potential legal areas challenged by the existence of AR technology such as IPR's infringement, negligence, online trespassing, data breach, and the issue of the right to privacy and even national (cyber) security. Therefore, AR technology and its development will surely be a promising subject for further research.

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