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Av Helge Ridderstrøm (førsteamanuensis ved OsloMet – storbyuniversitetet)

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Virtuell virkelighet

Engelsk: “virtual reality” (forkortet VR). “Virtuell” er latin for “potensiell”, “tilsynelatende” og i datateknologi-sammenheng noe som er simulert av en datamaskin. I “virtuell virkelighet” betyr ordet “virtuell” at noe (ofte virkelighetsnært) er simulert av en datamaskin. Det virtuelle har ingen fysisk masse, tyngde eller utbredelse. Det er et som-om-fenomen.

En virtuell virkelighet er vanligvis en fullstendig romlig visualisering, en simulering av et tredimensjonalt rom ved hjelp av datamaskin-teknologi. I dette rommet kan en person bevege seg og styre den simulerte handlingen i et forløp. Til slik inndukking (immersjon) i den virtuelle virkeligheten, og styring av den, brukes det f.eks. datahjelm og datahansker. Grensesnittet kan eventuelt oppleves med et helt kroppsdekkende hylster. Kroppsbevegelsene er meningsløse for dem som er utenfor VR-rommet.

En person kan “stige inn” i en datamaskinskapt verden, slik at man er på “innsiden” av en tredimensjonal illusjon, fullstendig omgitt av et data-skapt rom. Brukeren/spilleren kan f.eks. mer enn å kjøre på veien og kjøre i grøfta med en virtuell bil: Spilleren kan stige ut av og gå rundt bilen, klemme på dekkene og kanskje kjenne svidd lukt. Akselerasjonen fra bilen trykker føreren ned i setet, osv.

Virtual reality er forskjellig fra “augmented reality (AR), where, for example, you point your smartphone at a landmark or a striking building and interesting information about it pops up automatically. Augmented reality is all about connecting the real world we experience to the vast virtual world of information that we’ve collectively created on the Web. Neither of these worlds is virtual, but the idea of exploring and navigating the two simultaneously does, nevertheless, have things in common with virtual reality. [...] VR uses sensors that detect how your body is moving. And where a PC displays output on a screen (or a printer), VR uses two screens (one for each eye), stereo or surround-sound speakers, and maybe some forms of haptic (touch and body perception) feedback as well. [...] in VR, you see a 3D image that changes smoothly, in real-time, as you move your head.” (Woodford 2017)

“The term ‘virtual reality’ was coined by Jaron Lanier in 1987 during a period of intense research activity into this form of technology. But before then, he had set up VPL Research – a company which pioneered research into virtual reality and 3D graphics which also sold the first virtual reality gear such as virtual reality glasses, data gloves and later, the full data suit. [...] Virtual reality became very popular around this time – especially in the 1990’s, but this soon dropped off due to a yawning gap between public expectations and technological limitations.” (<https://www.vrs.org.uk/virtual-reality/who-coined-the-term.html>; lesedato 18.10.17)

“You’ll probably never go to Mars, swim with dolphins, run an Olympic 100 meters, or sing onstage with the Rolling Stones. But if virtual reality ever lives up to its promise, you might be able to do all these things – and many more – without even leaving your home. Unlike real reality (the actual world in which we live), virtual reality means simulating bits of our world (or completely imaginary worlds) using high-performance computers and sensory equipment, like headsets and gloves. Apart from games and entertainment, it’s long been used for training airline pilots and surgeons and for helping scientists to figure out complex problems such as the structure of protein molecules. [...] Virtual reality means blocking yourself off from the real world and substituting a computer-generated alternative. Often, it involves wearing a wraparound headset called a head-mounted display, clamping stereo headphones over your ears, and touching or feeling your way around your imaginary home using datagloves (gloves with built-in sensors).” (Woodford 2017)

“A believable, interactive 3D computer-created world that you can explore so you feel you really are there, both mentally and physically. Putting it another way, virtual reality is essentially:

1. Believable: You really need to feel like you’re in your virtual world (on Mars, or wherever) and to keep believing that, or the illusion of virtual reality will disappear.
2. Interactive: As you move around, the VR world needs to move with you. You can watch a 3D movie and be transported up to the Moon or down to the seabed – but it’s not interactive in any sense.
3. Computer-generated: Why is that important? Because only powerful machines, with realistic 3D computer graphics, are fast enough to make believable, interactive, alternative worlds that change in real-time as we move around them.
4. Explorable: A VR world needs to be big and detailed enough for you to explore. However realistic a painting is, it shows only one scene, from one perspective. A book can describe a vast and complex “virtual world,” but you can only really explore it in a linear way, exactly as the author describes it.
5. Immersive: To be both believable and interactive, VR needs to engage both your body and your mind. Paintings by war artists can give us glimpses of conflict, but

they can never fully convey the sight, sound, smell, taste, and feel of battle. You can play a flight simulator game on your home PC and be lost in a very realistic, interactive experience for hours (the landscape will constantly change as your plane flies through it), but it's not like using a real flight simulator (where you sit in a hydraulically operated mockup of a real cockpit and feel actual forces as it tips and tilts), and even less like flying a plane." (Woodford 2017)

"It makes you think you are actually living inside a completely believable virtual world (one in which, to use the technical jargon, you are partly or fully immersed). It is two-way interactive: as you respond to what you see, what you see responds to you: if you turn your head around, what you see or hear in VR changes to match your new perspective. [...] An architect might build a detailed 3D model of a new building to show to clients that can be explored on a desktop computer by moving a mouse. Most people would classify that as a kind of virtual reality, even if it doesn't fully immerse you. In the same way, computer archaeologists often create engaging 3D reconstructions of long-lost settlements that you can move around and explore. They don't take you back hundreds or thousands of years or create the sounds, smells, and tastes of prehistory, but they give a much richer experience than a few pastel drawings or even an animated movie. [...] What about "virtual world" games like Second Life and Minecraft? Do they count as virtual reality? Although they meet the first four of our criteria (believable, interactive, computer-created and explorable), they don't really meet the fifth: they don't fully immerse you. But one thing they do offer that cutting-edge VR typically doesn't is collaboration: the idea of sharing an experience in a virtual world with other people, often in real time or something very close to it. [...] Difficult and dangerous jobs are hard to train for. How can you safely practice taking a trip to space, landing a jumbo jet, making a parachute jump, or carrying out brain surgery? All these things are obvious candidates for virtual reality applications. [...] Just like pilots, surgeons are now routinely trained using VR. In a 2008 study of 735 surgical trainees from 28 different countries, 68 percent said the opportunity to train with VR was "good" or "excellent" for them and only 2 percent rated it useless or unsuitable." (Woodford 2017)

"Apart from its use in things like surgical training and drug design, virtual reality also makes possible telemedicine (monitoring, examining, or operating on patients remotely). A logical extension of this has a surgeon in one location hooked up to a virtual reality control panel and a robot in another location (maybe an entire continent away) wielding the knife. The best-known example of this is the daVinci surgical robot, released in 2009, of which several thousand have now been installed in hospitals worldwide. Introduce collaboration and there's the possibility of a whole group of the world's best surgeons working together on a particularly difficult operation [...] Architects used to build models out of card and paper; now they're much more likely to build virtual reality computer models you can walk through and explore. By the same token, it's generally much cheaper to design cars, airplanes, and other complex, expensive vehicles on a computer screen than to

model them in wood, plastic, or other real-world materials. This is an area where virtual reality overlaps with computer modeling: instead of simply making an immersive 3D visual model for people to inspect and explore, you're creating a mathematical model that can be tested for its aerodynamic, safety, or other qualities.” (Woodford 2017)

Under forhandlingene om den såkalte Dayton-avtalen om fred i Bosnia i 1995 kunne de som skulle inngå avtalen, “fly” over de aktuelle landområdene på et virtuelt kart (Colombain 1997 s. 23).

En “virtual café” er en spillehall med teknologi som simulerer et tredimensjonalt rom. Blant de første eksemplene på slike spillehaller, som dukket opp i USA ca. 1990, var Battletech Center i Chicago og Sega Virtualand Amusement Center i Las Vegas (Zey 1995 s. 259). Den japanske figuren kalt Kyoko Date var den første “virtuelle stjernen” som (fra 1996) sang og danset på TV og var skapt fullt og helt i en datamaskin (Colombain 1997 s. 22).

“- Tanken er at politietterforskerne skal ha på seg en brille, om vi forstår deg rett? - Ja, jeg har brukt en teknologi som heter “augmented reality”, det betyr en “kunstig utvidelse av fysisk virkelighet”. Her blander man virtuelle objekter sammen med virkeligheten. For å se disse virtuelle objektene bruker vi briller med skjerm på brilleglassene. - Er vi omsider ved “virtual reality” som vi ble førespeilt for tyve år siden? - I “virtual reality” er alt kunstig. I “augmented reality” bruker vi det vi kan fra virkeligheten og blander det med ting vi har gjenskapt. I kriminalettforskningen kan det være gjenstander som er blitt borte fra åstedet, det kan være blod, et våpen, et lik. Dermed kan etterforskeren gå omkring på det autentiske åstedet, så å si. - Åstedet er filmet først? - Nei, her går du på det egentlige åstedet, mens det du ser i brillen er de objektene som har vært fjernet, men som vi har gjenskapt virtuelt og lagt til.” (intervju med Ingerid Rødseth i *Morgenbladet* 24.–29. april 2009 s. 40)

“Den australiske doktorgrad-studenten Wayne Piekarski var ikke fornøyd med å skyte monstre på PC. Ved hjelp av en bærbar PC, en hodemontert skjerm, et GPS-system (Global Positioning System) og PC-spillet “Quake” tok han skytefesten med ut i den virkelige verden. - Du kan bruke dette overalt utendørs der det er et GPS-signal. Ettersom ryggsekkene er ganske uhåndterlig er det derimot best å spille i et åpent område eller et annet sted hvor du ikke kommer til å løpe inn i andre mennesker, for eksempel, sier Wayne Piekarski til VG Nett. Spillet foregår på en gjennomsiktig skjerm festet på hodet, hvor monstrene dukker opp i det virkelige miljøet spilleren ferdes i. Mus og tastatur er erstattet med en spillpistol, og det som skjer i spillet oppdateres hele tiden i forhold til virkeligheten via GPS. For å unngå at monstrene går gjennom veggene på universitetsbygningene, har Piekarski laget et spillbrett basert på bygningene i universitetet. Bygningene i spillet er gjennomsiktige så de ikke skjuler de virkelige bygningene, og i praxis betyr det at det bokstavelig talt kan være et monster som venter på deg bak hushjørnet. - Spillet

er for det meste lik originalen. Vi har bare modifisert koden så den håndterer posisjonene i spillet fra sporingssystemer i steden for tastatur og mus, sier Piekarski. Piekarski og veilederen Wayne Thomas har kalt systemet “ARQuake”, og arbeidet deres inngår i en omfattende global forsking i det som kalles AR (Augmented Reality – “forstørret virkelighet”). Og AR inngår i samlebegrepet VR – Virtual Reality. [...] AR-systemet til Piekarski kan også brukes til å se hvordan planlagte påbygg og nybygg vil se ut i det fysiske miljøet.” (<http://www.vg.no/spill/artikkel.php?artid=1715102>; lesedato 18.04.02)

“1999: *The Matrix*, a movie starring Keanu Reaves based on virtual reality, grosses over \$450 million at the box office. [...] 2017: Sony reveals that it sold almost a million PlayStation VR headsets in their first four months on the market.”
(Woodford 2017)

“I en hangar utenfor Cannes har filmskaperen Alejandro G. Iñárritu (*Birdman*) installert sitt nye verk *Carne y Arena* (Kjøtt og sand). Virtual Reality-prosjektet er på alle måter en overbevisende og annerledes opplevelse. [...] et glattcelleaktig rom venter. Sko og sokker skal av. En alarm går, og døren åpner seg inn til et mørkt rom dekket av sand. To assistenter står klare med Oculus Rift-briller og en ryggsekk. Så starter den drøyt seks minutter lange seansen. Er VR redningen for en kinobransje i endring? I fjor åpnet selskapet The Void attraksjonen *Ghostbusters Dimensions* på Times Square. For drøyt 50 dollar kan du i 15 minutter kjenne illusjonen av å bekjempe spøkelser på egenhånd. [...] “VR er alt det kinofilm ikke er, og vice versa”, skriver Iñárritu i presentasjonen av prosjektet sitt. “Utsnittet er borte, de todimensjonale grensene er oppløst.” Kinofilmens store forse er nettopp rammene. At den er fortalt, redigert og vist som et enhetlig produkt og presentert for et fellesskap. Vi kan la oss bli sugd inn, men vi vet hele tiden at vi sitter i en kinosal sammen med andre. [...] VR står slik i kontrast til det kollektive og gjensidige aspektet ved kinofilmen. Vi ønsker å bli overrumplet og overbevist, men fortellingen og følelsen av fellesskap er viktigst.” (Ulrik Eriksen i *Morgenbladet* 2. –8. juni 2017 s. 29)

“Ved å montere mobilen inne i et par briller, dele skjermen i to og vise et adskilt stereoskopisk bilde for hvert øye, kan en smartmobil skape en komplett virtuell virkelighet i tre dimensjoner. [...] Med lydtette klokker over ørene og lystette briller over øynene, har jeg øyeblinkelig blitt transportert langt vekk, til de underligste verdener: Jeg har stått på bunnen av havet mens 50 svære haier sirklet rundt meg, uansett hvor jeg snudde hodet. Jeg har dundret gjennom ørkenen på en fjern planet i Star Wars-universet, på vei rundt vraket av en gigantisk, intergalaktisk krysser. Jeg har stått midt i den høyst virkelige verden rett etter jordskjelvet i Nepal, og sett hvilken umenneskelig oppgave det er å rydde opp. Jeg har svevet inne i magen til en gravid kvinne, der jeg møtte en ufødt baby som strakte ut en hånd og smilte til meg. Og jeg har spilt helt nyskapende spill, der jeg har brukt nakken til å styre min ferd gjennom en underjordisk grotte. [...] De største problemene ser ut til å oppstå når du selv er i mye bevegelse inne i

verdenen. Akkurat som under dekk på en båt, oppstår det et misforhold mellom det øynene opplever og hva kroppen kjenner. Det er derfor alt blir lettere og sjøsykheten gir seg, hvis du går opp over dekk og ser på horisonten. Dessverre har den ugne følelsen en tendens til å sitte i, også en god stund etter at du har tatt av VR-brillene. [...] Om man helt klarer å utslette problemet, vet ingen, før hastighet og bildekvalitet er maksimal. [...] VR, slik du kan oppleve det i dag, er også ekstremt usosialt. Hvis det ikke er du som har på brillene, blir det som å forsøke å kommunisere med en som med vilje har satt propper i ørene og dratt et digert bind over øynene. Sterkere signal til andre om å ligge unna er det vanskelig å gi.” (Per Kristian Bjørkeng i <https://www.aftenposten.no/norge/i/5EJX/Derfor-bor-du-prove-virtual-reality-allerede-i-dag-og-n-uggen-grunn-til-at-du-bor-vente>; lesedato 06.10. 17)

“Den britiske avisen The Guardian står bak virtual reality-prosjektet *6x9: An Experience of Solitary Confinement*, der vi får prøve en isolasjonscelle i et amerikansk fengsel. Når klaustrofobien setter inn, er det som å presses mot taket, med de sparsomme møblene flere meter under oss. [...] en installasjon om en flyktningeleir på Gaza, laget for FN av amerikaneren Gabo Arora. Straks jeg får på meg masken, forsvinner omgivelsene, og jeg står ute på en støvete slette i Midtøsten. En guttegjeng tøyser og vinker, det kjennes som om de gjør narr av meg, og på motsatt side står andre personer så nært at jeg skvetter. [...] *Notes on Blindness* tar oss inn i bevisstheten til den britisk-australske teologiprofessoren John Hull. Han ble blind i voksen alder, og tok til å føre dagbok på lydbånd for å utforske sin nye tilstand. Det unike er måten blindheten visualiseres på, fra et stummende mørke til svakt lysende konturer, som gløder mørkeblått når personer eller gjenstander settes i bevegelse. I den blindes verden synes bare det som høres – en avis rasler, skritt går forbi, trær animeres av vind eller regn. Vi får selv lage vind ved å stryke på siden av masken, og må følge lysende fotspor med blikket for å lytte oss fremover. Den viktigste kraften er likevel ordene, i det poetiske lydsporet med Hulls egen stemme.” (Oda Bhar i *Morgenbladet* 14.–20. oktober 2016 s. 36–37)

“VR-apparatet kan ligne en dykkermaske, bortsett fra at neseborene selvsagt er fri. For å hindre at lys kommer inn, må den slutte tett mot ansiktet, men ellers er det ulike løsninger. Noen masker har integrert skjerm og høretelefoner, andre benytter en fastklemt mobiltelefon som skjerm. En svingstol er viktig, siden synsfeltet utforskes ved å snu på kroppen. [...] kroppens orienteringsevne settes midlertidig ut av spill. Det virtuelle kan skli over i en følelse av realitet, som gjør det mulig å besøke steder vi ellers ikke har tilgang til, eller prøve ut aktiviteter på grensen til det umulige.” (Oda Bhar i *Morgenbladet* 14.–20. oktober 2016 s. 36–37)

Mange ser farer ved virtuelle virkeligheter. Et eksempel: “I am concerned with how virtual technologies might foster a myopic withering of social identification with real places, lived bodies, and the nonhuman parts of material reality.” (Hillis 1999 s. 189) “If realized, this change in kind would imply an unthinking acceptance of

schizophrenia as a natural way to organize social relations. Schizophrenia is, in part, a profound disturbance of the self's relationship to space. Schizophrenics often view the world as an extension of themselves and at their whim, and they may be afflicted by a loss of identification with their own experiences. They report that their thoughts exert magical influence on material realities, and they may think they are identical with external objects." (Hillis 1999 s. 186)

Virtuell virkelighet-tekst

Jeffrey Shaw, Dirk Groenewald m.fl. utviklet i 1988-91 en interaktiv installasjon som består av en fastmontert sykkel med en stor skjerm foran, et verk kalt *Legible City*. Ved å trække på pedalene kan en bruker få bilder på skjermen til å bevege seg slik at det virker som man sykler inn i en "tekst-by". Alle bygninger består av store 3D-bokstaver, ikke av vegger. Brukeren sykler blant ord/tekster som samtidig fungerer som hus langs gatene. Brukeren kan velge om hun vil sykle i gatesystemet i New York, Amsterdam eller Karlsruhe. Arkitekturen og byplanen er altså lagd etter modell av tre byer. Den som sykler, kan sykle rett framover eller svinge til høyre og til venstre. I New York-versjonen (1989) kan syklisten følge åtte "fortellertråder" med hver sin farge, der ordene utgjør utsagn av byens borgermester Ed Koch, arkitekten Frank Lloyd Wright, forretningsmannen (og senere president i USA) Donald Trump, en reiseguide, en kjeltring, en ambassadør eller en taxisjåfør. Brukeren sykler rundt i en "virtuell informasjonsstruktur" (Schwarz 1997 s. 149).

"In *Legible City*, bicycle riding is truly an important element, in the sense that one experiences one's whole body as the causal power of the entire journey." (Hansen 2004 s. 58)

"Textscape as Virtual Reality [...] it provides for the reader both the pleasure of immersion in an imagined world (the achievement of realistic fiction) and the pleasure of instrumental action in that world (the goal of virtual-reality technology). [...] tactile feed-back playing an important role. [...] The reader must change her/his attitude, which means that not only does s/he read the text, but also navigates between words and considers them as words-images and words-bodies. [...] During the process of reading, the reader sinks into them, watches and touches them. The word-image and the word-body are emancipated words. We do not only read them, but use them in a complex relationship including tactility. The current trendsetting culture is not only visual, but also tactile. It 'hits' its users, makes an impact on them with its high-tech effects, but the readers are also in a position to touch interfaces, to click the mouse, operate the switches and hit the keyboard. In his text Techno-literature on Internet cyberpoet Komninos Zervos points out that writers no longer put words into lines on 2-dimensional surface, but into 3-

dimensional cyberspace in which the text moves around (Zervos 1997).” (Janez Strehovec i <https://www.drunkenboat.com/db3/strehovec/textscape.html>; lesedato 21.06.17)

Et annet eksempel er amerikaneren Noah Wardrip-Fruin: *Screen* (2002). Denne VR-teksten må leses i et rom der projektorer gjør tre av veggene til tekstflater. “Leseren” må bruke en brille som gjør den tredimensjonale opplevelsen av teksten svært ekte, og en digital hanske som gjør at hun kan beregne nøyaktig hvor hånden hennes befinner seg i det tredimensjonale rommet. De verbale tekstene dreier seg om hukommelsestap. Etter hvert flyter noen av ordene ut fra veggene og kommer mot leseren, og denne kan dytte ordene tilbake ved å bruke hansken. Stadig flere ord faller ned fra veggene i økt tempo, og til slutt klarer ikke leseren å dytte dem tilbake på plass. Hukommelsestap blir til tap av mestring av ordene.

CAVE står for Cave automatic virtual environment. “Many literary experiments have been produced in CAVE environments since the early 2000s, largely because of the fact that Brown University has made Cave writing (now Writing3D) courses a regular offering in its Literary Arts program since 2001 in courses led first by Robert Coover and subsequently by John Cayley (Cayley, 2014). *Screen* (2002) by Noah Wardrip-Fruin with Josh Carroll, Robert Coover, Shawn Greenlee, Andrew McClain, and Ben Shine was one of the first and is likely still the most often cited literary work produced for a CAVE environment. In *Screen*, words are projected on three walls and on the floor. The user’s position is tracked, so that the visualization responds to her movement and perspective, and a glove allows her to trigger interactive elements. As *Screen* begins, words appear and cover the three screens in the Cave and are read aloud. On each wall a different text describes a double moment in time, a woman or a man remembering and feeling the memory slip away, hidden by the present. The texts describe intimate memories, “She uncurls her arm,/ reaches back to lay her hand across/ his thigh, to welcome him home,/ but touches only a ridge of sheet,/ sun warmed, empty.” The reading of these texts concludes with the spoken line, “We hold ourselves in place by memories,” before the state of the work changes. The memories at this point refuse to stay still and begin to peel off the walls. The interactor can try to catch them, and might succeed in forcing them back where they belong, but before too long the words collide and fracture as the interactor loses control. This experience in virtual reality is very different from the Holodeck vision of total immersion in a mimetic representation of the world. *Screen* instead immerses the user in a reflexive literary representation, one in which words and narratives remain predominant. In part because of the nature of the custom software developed at Brown, which privileges writing in the sense of material texts made of letters, many of the most notable works produced in Brown’s CAVE, such as *Word Museum* (2004) by William Gillespie, *Lens* (2007) by John Cayley, and *Canticle* (2010) by Samantha Gorman feature text prominently and can be understood as expanding on the genre of kinetic poetry by carrying it into immersive 3D VR environments.” (Rettberg 2019 s. 196-197)

“*Hearts and Minds* is based on research by social scientist John Tsukayama for his dissertation *By Any Means Necessary: An Interpretive Phenomenological Analysis Study of Post 9/11 American Abusive Violence in Iraq* (2014). Tsukayama interviewed a number of soldiers who had either tortured prisoners themselves or witnessed such acts in the battlefield. *Hearts and Minds* is a VR performance artwork intended to communicate some of the very difficult stories these soldiers told Tsukayama and to promote reasoned consideration of the problems generated by using torture as an interrogation tactic. *Hearts and Minds* is intended for collective viewing. The CAVE2™ is a quite large facility in comparison to most CAVEs. About 20 people can fit comfortably into the space. A single performer navigates the work through his movement and by his selection of trigger objects with a handheld controller. The first part of the work takes place in a 3D modeled temple-like space, a reflective environment. As the performer moves through the modeled environment, the audience hears the voices of four soldier characters describing their motivations for joining the military. Four doors lead out of the temple into spaces of a different character, each based on an American domestic environment (a boy’s bedroom, a living room, a backyard with a shed, a kitchen). In these rooms, certain objects present themselves with targets and sound cues. When the performer triggers the given object, the walls of the space fall away and the audience members find themselves in a surreal desert landscape, as they listen to one of the soldiers telling a story of torture or its aftermath. The stories themselves were directly excerpted from Tsukayama’s interviews then interpreted by voice actors. *Hearts and Minds* in some sense models an experience of post-traumatic stress and is intended to put the audience in the challenging position of identifying with the difficult subject position of soldiers who never set out to become torturers, but who now have to confront what they have done in the name of their country.” (Rettberg 2019 s. 198)

“*Palavrador* is a work of collective authorship that offers us an image of ourselves as a mixture, or at least strange balance, of “eros” and “chaos.” Transferred into a 3D world as a kind of flying animal, the user starts a journey during which she navigates poems that are themselves made dynamic by AI [artificial intelligence,] algorithms. The reading process here is rendered as intuitive navigation, the user crashing against the “flocks” of words that themselves wander through the video game environment. [...] *Palavrador* is a poetic cyberworld built in 3D (*Palavrador* comes from the Portuguese word *palavra*, which itself means “word”). Directed by Francisco Carlos de Carvalho Marinho (Chico Marinho), it was nonetheless conceived and implemented as a result of synergetic collective assemblage of ideas and activities of a wider group of authors with backgrounds in the arts, literature, and computer science. Six flocks of meandering poems autonomously wander through the three-dimensional space. The readers may choose how many flocks of poems they want to see wandering through the environment, and the poems (botpoems) are able to turn around obstacles to keep their unveiling cohesion while moving through the space. The logic of movements was implemented using artificial intelligence procedures based on swarm behavior and steering behaviors

of autonomous locomotion agents. Among the virtual objects of the *Palavrador* there is a labyrinth whose architecture is generated by mathematical procedures (fractal). There are also video poems, the sounds from which are modulated in relation to the distance of the readers, thus creating an immersive journey with a musical dimension. Readers choose between two avatars to represent them inside the virtual environment, one of which flies, and the other which meanders through the space. Additionally, it is possible to make the avatars “throw up” flying poems by using the joystick. *Palavrador* implies action; the creative achievement of words in symbiosis with humans and the autonomous poems (bots) adding new perspectives to art and literature by incorporating ideas from others disciplines such as computer science and biology. [...] *Palavrador* was the winner of the “Ciutat de Vinaròs Digital Literature Award” in 2006.” (http://collection.eliterature.org/2/works/marinho_palavrador.html; lesedato 04.04.17)

“William Shakespeare’s famous play *Hamlet* has been adapted thousands of times: on the stage of the Globe Theatre, in high school productions, and even on the TV show *The Simpsons*. Now, in the 400th year since Shakespeare’s death, a team of artists, actors, engineers, and developers are transporting the canonical text into virtual reality in a new production titled *To Be with Hamlet*. Conceived by Javier Molina, a graduate and current adjunct assistant professor of Integrated Digital Media at NYU Tandon, the production is one of the first live performances of theater in social virtual reality (VR). Molina also works in the Virtual Reality Lab at MAGNET (Media and Game Network), the NYU program that promotes intersectional education and collaboration between technology and culture. Though VR is a new experience for many, Molina said that familiarity with the Bard’s play would allow audiences to easily relate to the production. The performance focuses on the fifth scene of Act I, which features the encounter between Hamlet and his father’s ghost. The team has been tirelessly creating the virtual skeletons and avatars of the actors playing Hamlet and the Ghost [...] In order to build Hamlet’s 3D model, the team scanned [Zachary] Koval’s body with a Sense 3D scanner and photographed him in various lighting conditions to create a dynamic virtual character. Motion-capture cameras, body suits, and markers track the actor’s movements, which are then transmitted onto the avatar and the virtual castle grounds. “What’s actually being transmitted is the movement data of the skeleton,” [regisseur David] Gochfeld said. “The rest of the image is in the video game engine [Unreal Engine], which is running the experience.” [...] Melding theater with VR technology is challenging not just for the engineers and developers, but also for the actors who are venturing into new, virtual territory. “It’s an interesting balance of technology, artistry, and performance,” Koval said, highlighting the difference between performing in a theater versus performing for a remote audience in VR. “It’s not only learning how to use my body in a way that expresses what the character’s going through,” Koval said, “But also to bring a life to this skin, basically, of myself in the virtual world that broadcasts what the actor is feeling.”” (<http://engineering.nyu.edu/news/2016/11/18/storytelling-virtual-reality-hamlet-takes-virtual-stage-new-production>; lesedato 04.04.17)

Noen romaner handler om virtual reality. To eksempler:

“Ready Player One by Ernest Kline

Published in 2011, this young adult novel has stormed best-seller lists and brought virtual reality science fiction into mainstream consciousness. The novel evokes a vision of a dystopian future in which Earth's resources have been depleted and the US economy is in shambles. Luckily, everyone has affordable virtual reality headsets that allow them to escape their grim lives and participate in an online universe with unlimited possibilities: the OASIS. With satisfying plot lines and a cinematic feel (Steven Spielberg's directing the movie version), the book is a love letter to gaming that will make even newbies understand its appeal.

Snow Crash by Neal Stephenson

Readers with more hardcore sci-fi appetites should pick up *Snow Crash*, a 1992 novel that has the rare distinction of influencing the trajectory of what's soon to be a multibillion-dollar industry. Oculus chief scientist Michael Abrash writes that the book “made me realize how close networked 3-D was to being a reality.” *Snow Crash* has also had a lasting influence on the terminology in the virtual reality field, coining the terms “avatar” and “Metaverse,” among other concepts. The book itself is nuts in the best possible way, with a plot that shifts between ancient Sumerian myths, battles, virtual reality, and dystopian mega-religions. It’s long, but well worth the madness.” (Jacob Trefethen i <https://qz.com/618845/these-five-books-will-help-you-understand-the-future-of-virtual-reality/>; lesedato 01.09.17)

Virtuelt samfunn

Et eksempel på et virtuelt samfunn fra 2003 er Second Life. Det hadde i 2007 over 6,8 millioner brukere og i 2008 15 millioner registrerte avatarer. Hver bruker lager sin avatar og kan med den bevege seg i landskap og gater. Brukerne kan selv lage hus, klær og møbler til sine avatarer, eller kjøpe dem med Linden-dollar, en virtuell valuta. Nyhetsbyrået Reuters hadde i 2007 en egen korrespondent i Second Life (*Morgenbladet* 1.–7. juni 2007 s. 17). Et annet virtuelt samfunn heter Lively (fra 2008). Disse samfunnene er ikke primært spillbasert, men har bl.a. en egen økonomi og valuta (som kan la seg veksle inn i ekte valuta).

“*Trope* is one of the more compelling experiments with literary production in the virtual environment of Second Life. Visitors to the conVerge island are able to explore the variety of landscape and architectural designs, read text presented in the form of books and a floating geometric maze, and enjoy a fireworks display. The significance and appeal of the project derives from the creative use of an increasingly commercial platform, thus blurring the lines between

aesthetics and instrumentality, work and play, education and entertainment. [...] *Trope* creatively intervenes in the ways that readers engage with literary texts by creating a virtual environment that is conducive to and assists the experience of reading the poetic text. The physicality of the text itself is key. Poems and short stories are repositioned rather than illustrated in spatialized, audio and visual format/s not possible in “real” life. In the *trope* landscape, Second Life users can negotiate their own paths through each creative environment and for example, fly into a snowdome, run through a maze in the sky, listen to a poem whispered by a phantom pair of dentures, or stumble upon a line of dominos snaking around the bay. *Trope* aims to expand writing networks and further develop the virtual literary community.” (http://collection.eliterature.org/2/works/waterson_trope.html; lesedato 27.04.17)

“Den danske forfatteren Gitte Broeng [...] poet i dataverdenen “Second Life” [...] Broeng opprettet nemlig en bruker, en såkalt avatar, og lagde en skulptur i det tredimensjonale nettsamfunnet. Skulpturen avspilte en dikttopplesning når andre brukere kom forbi. [...] - Kuratoren kjøpte en forholdsvis dyr tomt i “Second Life”. Diktet mitt fantes inne i en virtuell bok, formgitt som et høyhus, ikke ulikt nasjonalbiblioteket i Paris. Der installerte jeg i samarbeid med kuratoren et “gryterettsdikt” bestående av kun matoppskriftens kommandoer: “rør! / riv! / kok!”. For å oppleve verket, må en avatar simpelthen plassere seg nær den digitale konstruksjonen, og slik aktiveres Broengs innspilte dikttopplesning.” (*Klassenkampen* 1. juni 2013 s. 46)

“At least initially the advantage of browsing the web in VR would be the navigability. When a search pulls up results they can be arrayed in a three-dimensional space and clustered by similarities – perhaps subsets of key words and phrases, as well as video loops hovering near them like tag clouds. Glancing around at these you would be able to skim a lot of data quicker than scrolling a page. [...] Will net users be visible to each other, flitting around from site to site, commenting to each other’s avatars in real time, and leaving ghosts of themselves to represent older comments? [...] Perhaps we will create a way to scan through an experience more effectively than scanning through text. Although it’s hard to imagine, user experience will be an even more complex field” (Adam Ferns i <https://uxmag.com/articles/poetry-in-motion>; lesedato 22.09.17).

Litteraturliste (for hele leksikonet): <https://www.litteraturogmedielexikon.no/gallery/litteraturliste.pdf>

Alle artiklene i leksikonet er tilgjengelig på <https://www.litteraturogmedielexikon.no>