Sector Innovation Through Game Technology
Digital Arts & Entertainment

Bachelor study program

• 1/23 programs at Howest
• In Kortrijk @The Level
• Since 2006 / 3 year bachelor
• 1100+ students (20% internationals)
• English + Dutch
• 4 majors
  • Game Development
  • Game Graphics Production
  • VFX & 3D Production
  • Independant Game Development
Evolution in games

1980

2017
Evolution in interaction / human controllers
VR/AR labo

- RESEARCH FOCUS = applied games / VR-AR-MR / AI / procedural 3D content / …
- SOTA & new tech
- Expertise lab
- With companies & organisations
- Prototypes
- Demo’s
- Testing
Introduction to the technology

What is VR, AR, MR,..?
Virtuele werkelijkheid, of Virtual Reality, simuleert een omgeving via computergegeneerde beelden om een gebruiker via diverse zintuigen ‘onder te dompelen’ in een digitale omgeving.

Toegelichte Realiteit, of Augmented Reality, is een live beeld van de werkelijkheid waaraan door de techniek staat inmiddels zo ver dat er ook zaken als ‘headtracking’ worden meegenomen in de ervaring. Dit wil zeggen: als de gebruiker zijn hoofd naar links draait, geven sensoren zoals gyrocoop, accelerometer en magnetometer in de VR-bril dit aan de computer en draait de projectie op je scherm mee.
Introduction to the technology

Immersion technologies

- REAL environment
- Matter Reality

- VIRTUAL environment
- Virtual Reality

- Augmented Reality
- Augmented Virtuality

- Mixed Reality
VR is not new

- We’ve come a long way
- Lot’s of iterations
- Thx to smartphone innovators massive breakthrough
  - Gyroscopes
  - Magnetometers
  - Accelerometers
  - …
Some of our recent DAE research projects

Showcase VR/AR projects
oVRheid

- VR pilot for the Flemish Government
- Infrastructural plans
- How to inform & inquire citizens in new ways
- Feedback of users in VR
- Oculus + Unreal
Interactive climbing game 2.0

- Technopolis + Sports Innovation Campus @ Howest Brugge
- Augmented climbing game
- Projection and camera’s
- Player detection (skeleton)
Heritage preservation

- Texture Museum
- Visualisation of machine « Zwingelturbine »
- CAD + FARO scan
- Interactive tour of the machine in VR
siVAR

- TETRA 2 years
- Machine builder use cases
Collaborative lego in VR

- Virtual lego builder
- Experiment with builder manuals
- Collaboration (2 VR booths)
VR Training framework V1

- siVAR use case
- First iteration
- New training forms
- CAD as a sourcefile
VR Training framework V2

- siVAR use case
- 2nd iteration
- Side track with Dana, Picanol, CNH industrial, Barco & Cronos aan de Leie
- More fine actions & complex assembly

-> in valorisation track with game companies
Related VR/AR student

Selection of student VR/AR work
DEWULF case

- STUDENT WORK
- VR simulator
- Unique joystick in cabin for driving/steering
- Used at fairs to showcase
Hand tracking in VR game

- STUDENT WORK
- VR + leap motion
- Hand tracking
- No controllers
AR furniture assembly demo

- **STUDENT WORK**
- AR
- Hololens
- Assembly assistant for IKEA chair: step by step instructions
- Unique markers needed on each part!
Internship “empathy in VR”

- By Sarah Markewich
  VUB student –
  Journalism
  & Howest colleague

- Did her internship at
  DAE

- Interviews &
  focusgroups on
  empathy & VR

- Whitepapers

Finished – results will be
published 2019
Be inspired...

VR/AR in sports? It’s already a thing!
NEXT VR

• Next VR is all about fan community & broadcasting
• Soccer (Man United, Man City, ...) American football & Baseball, Boxing, ...
• Broadcasting 360 movies for VR & youtube
• Be in the middle of a game, a training, behind the scenes ... as a fan
• Different point of views than TV

Bron: NEXT VR & zone360
Fan community

- Play in VR against or with your idols
- @US open – you versus Sharapova
- Made by REEL FX
StriVR & USA Olympic team

- Technical training in top sports
- Game + easy movement stimulation
VR work-out machines

• Fitness of the future
• VR and flying
• ICAROS

Bron: Mashable / ICAROS
Black Box VR

- Fitness of the future
- USA company
- Fully immerive VR gym

Bron: blackbox-vr.com
New AR e-sport

HADO

- AR multiplayer
- Squash / tennis -ish
- World cup 2018 – Dec 8th (3 million yen prices)
- Mainly in Asia
- Big community

Bron: hado-official.com
New AR e-sport HADO

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HADO Enters Belgium for the First Time!

2018/09/26

The AR sports games HADO developed by Meleap (located in Minato ku of Tokyo, CEO: Hiroshi Fukuda) appears in Belgium for the first time! Planned by DMM.com (headquarters in: Minato ku of Tokyo, CEO: Takanori Katagiri, hereinafter referred to as DMM), HADO appeared in public in the main stadium of the Belgian First Division STVV (St. Truiden) owned by the DMM Group. DMM held a HADO experiential session during the opening match on July 28; it was the first time that HADO appeared in a soccer stadium globally.

Bron: hado-official.com
Games that will make you sweat…

• Beat Saber = most popular & best selling VR game in store
• Very intensive, addictive & fun
• Slice cubes on music beat with lightsabers
• Fitbit recognizes it as cardio/aerobics
Homecourt.ai

- Basketball
- Technique training
- Feedback real-time AR
- Presented at Apple event for iOS12

Bron: vimeo / homecourt.ai
Soccerdream

- Spanish company + Chinese University
- VR experience
- Football intelligence
- Technical training
- Claim to have effectivity in just a few weeks

**OUR TECHNOLOGY: VIRTUAL REALITY**

For the first time ever, VR allows players to focus on their football intelligence guaranteeing the learning transfer to the real field. Benefit from proven exercises and start training now.

Bron: soccerdream.com
Baseball case

• Imagery-Assisted Virtual Reality for Athletic Training
• Lindsay Ross-Stewart, PhD at Southern University of Illinois
• Replay video of actual performance in VR
• Technique training

Bron: youtube channel HEC Science and technology
Academic research

- Academic papers published 2017-2018 on VR and sports = 407

**Virtual reality** replays of **sports** performance: Effects on memory, feeling of competence, and performance.

Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=9&sid=c707a7e4-55af-482b-aca0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>


Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=10&sid=c707a7e4-55af-482b-aca0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>

The Framework of Simulation Teaching System for **Sports** Dance Based on **Virtual Reality** Technology.

Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=15&sid=c707a7e4-55af-482b-aca0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>

Using **Virtual Reality** to Analyze **Sports** Performance

Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=19&sid=c707a7e4-55af-482b-ac0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>

**Avatar-Based Sport** Science Soccer Simulations

Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=21&sid=c707a7e4-55af-482b-ac0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>

**Brain-Behavior Mechanisms for the Transfer of Neuromuscular Training Adaptions to Simulated Sport:** Initial Findings From the Train the Brain Project.

Van <http://web.a.ebscohost.com/ehost/detail/detail?vid=8&sid=c707a7e4-55af-482b-aca0-e114141d993%40sessionmgr4009&bdata=JnNpdGU9c3BhZ2VzX2FjaGluZ3M9MjAxMQ==>
Academic research

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Studies on the Application of **Virtual Reality** Technology in **Sports** Training Under the Background of Internet.

[Van](http://web.a.ebscohost.com/ehost/detail/detail?vid=12&sid=c707a7e4-55af-482b-aca0-e114141d99340sessionmgr4009&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d)

Which technology to investigate visual perception in **sport**: Video vs. **virtual reality**.

[Van](http://web.a.ebscohost.com/ehost/detail/detail?vid=17&sid=c707a7e4-55af-482b-aca0-e114141d99340sessionmgr4009&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d)

Does the level of graphical detail of a **virtual handball thrower** influence a goalkeeper’s motor response?

[Van](http://web.a.ebscohost.com/ehost/detail/detail?vid=27&sid=c707a7e4-55af-482b-aca0-e114141d99340sessionmgr4009&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d)

Physiological **Avatar Technology** with Optimal Planning of the Training Process in **Cyclic Sports**.

[Van](http://web.a.ebscohost.com/ehost/detail/detail?vid=14&sid=c707a7e4-55af-482b-aca0-e114141d99340sessionmgr4009&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d)

Study on the Curriculum of **Sports** Teaching and Training Practice based on Computer Aided **Virtual Reality**.

[Van](http://web.a.ebscohost.com/ehost/detail/detail?vid=13&sid=c707a7e4-55af-482b-aca0-e114141d99340sessionmgr4009&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d)
Prevention & rehab related

• Physiologist (kine)
• Anatomic
• Show a sports patient where pain comes from and explain rehab plan
Mental training

• Stress
• Simulations
• Already used for anxieties
  • Vertigo
  • Fear of flying
  • Fear of public speaking
  • ...

© Microsoft Hololens
What brings the future?
More iterations on hardware

- New devices
- FOV in 5 years? 120°
- Higher resolution
- Faster & lighter
- Wireless
- Streaming data / 5G
- Prices will drop

- & for sports: SWEAT issues solved?

© OCULUS connect event
No more device?
Implants?
Bionic?
...
Hyperreality

- Mix real and virtual world
- Real-time info anytime anywhere?

Bron: Vimeo Keiichi Matsuda
• All senses will be used
• Total experience
  • Gloves
  • Haptic feedback
  • Sensitivity suits
  • Endless walkers
  • Smell & heat
  • Eyetracking
  • ...
SO ... WHAT’S YOUR EXTENDED REALITY FUTURE?

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