Houding en AI

van der Have Tuur

VerV

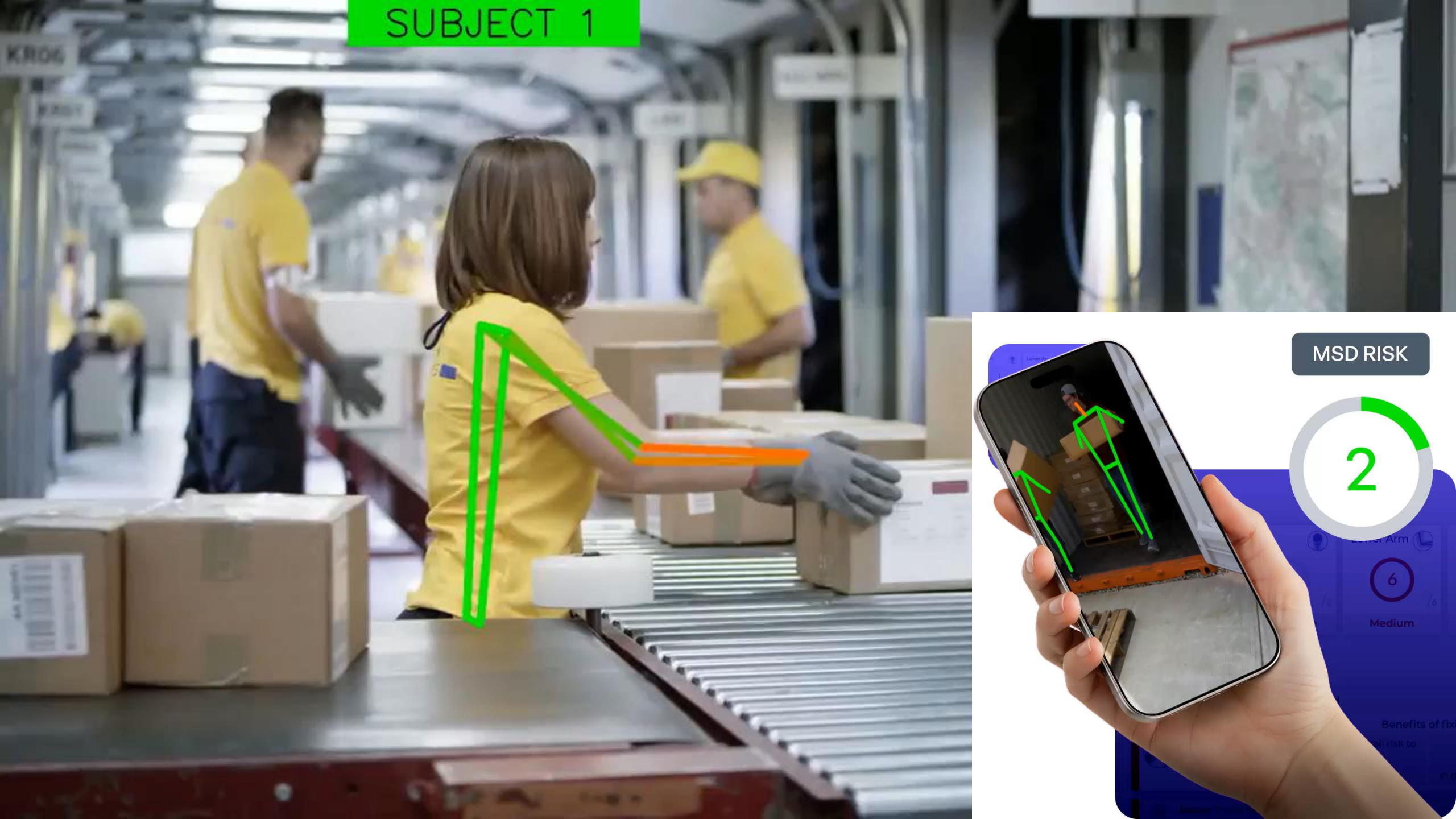
www.verv.be
info@verv.be

Gebruiken we al AI?

- Welke vorm van AI?
- Wat zijn de positieve ervaringen?
- Wat zijn de negatieve ervaringen?

VerV

www.verv.be
info@verv.be


SUBJECT 1
MSD RISK
2
Medium

Bedenkingen? Bevindingen?

VerV

www.verv.be
info@verv.be

Bedenkingen? Bevindingen?

- Snel, gemakkelijk en goedkoop
- Risicoanalyse?
- Zichtbaarheid van segmenten?
- Accuraatheid beter dan zelf analyse?
- Geen krachten
- GDPR zeer gevoelig
- Kalibratie nodig?

VerV

www.verv.be
info@verv.be

LEA

VerV

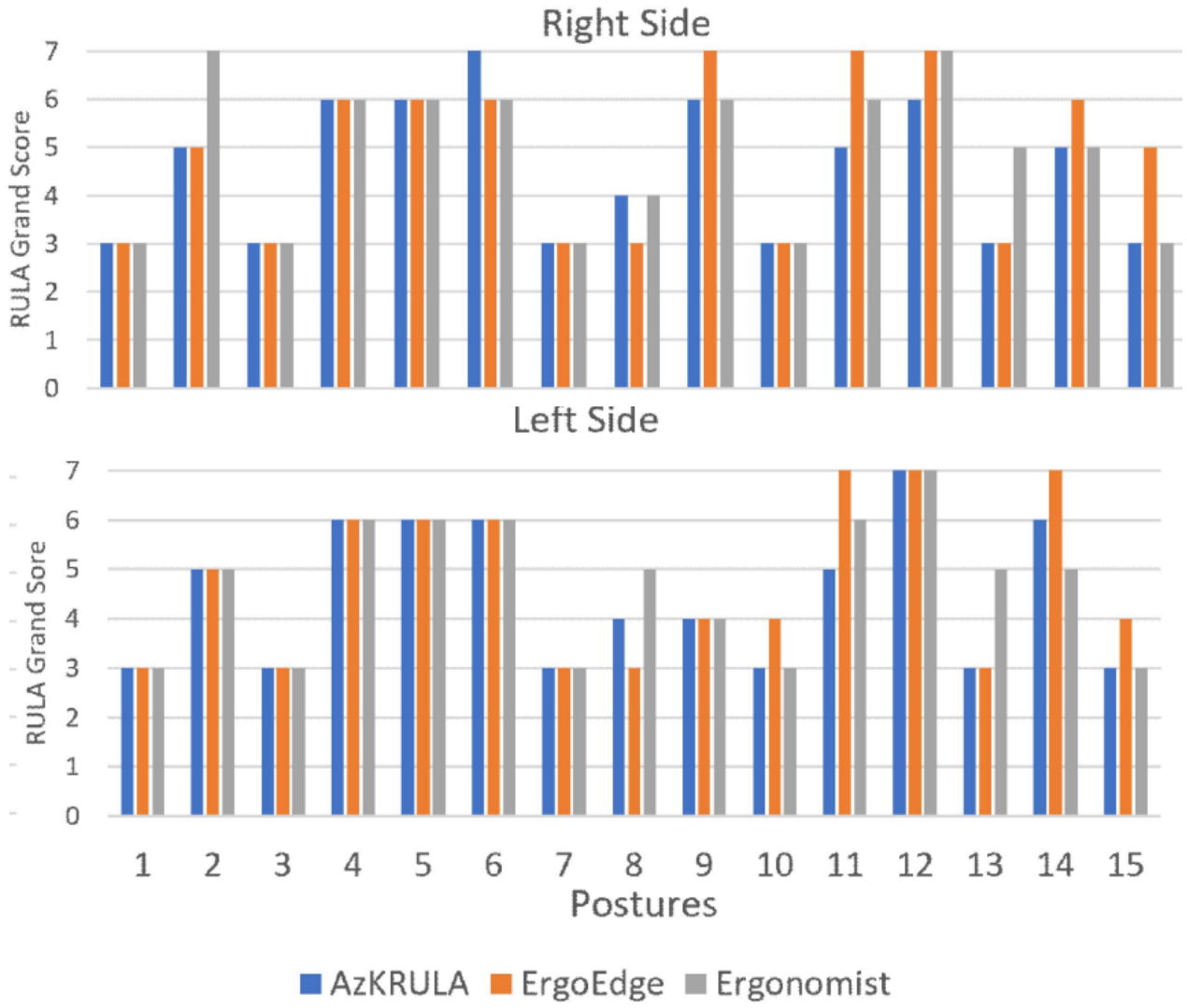
www.verv.be
info@verv.be

Example research - RULA

Comparing Semiautomatic Rapid Upper Limb Assessments (RULA): Azure Kinect Versus RGB-Based Machine Vision Algorithm

Antonio Maria Coruzzolo[1], Francesco Loll[1,2], Nazareno Amicosante[1], Hrishikesh Kuma[3], Pramod Thupaki[3], and Saurav Agarwal[3]

[1]Department of Sciences and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, RE 42122, Italy
[2]En&Tech Interdipartimental Center of the University of Modena and Reggio Emilia, Reggio Emilia, RE 42122, Italy
[3]CerebrumEdge Technologies, Bangalore, India



VerV

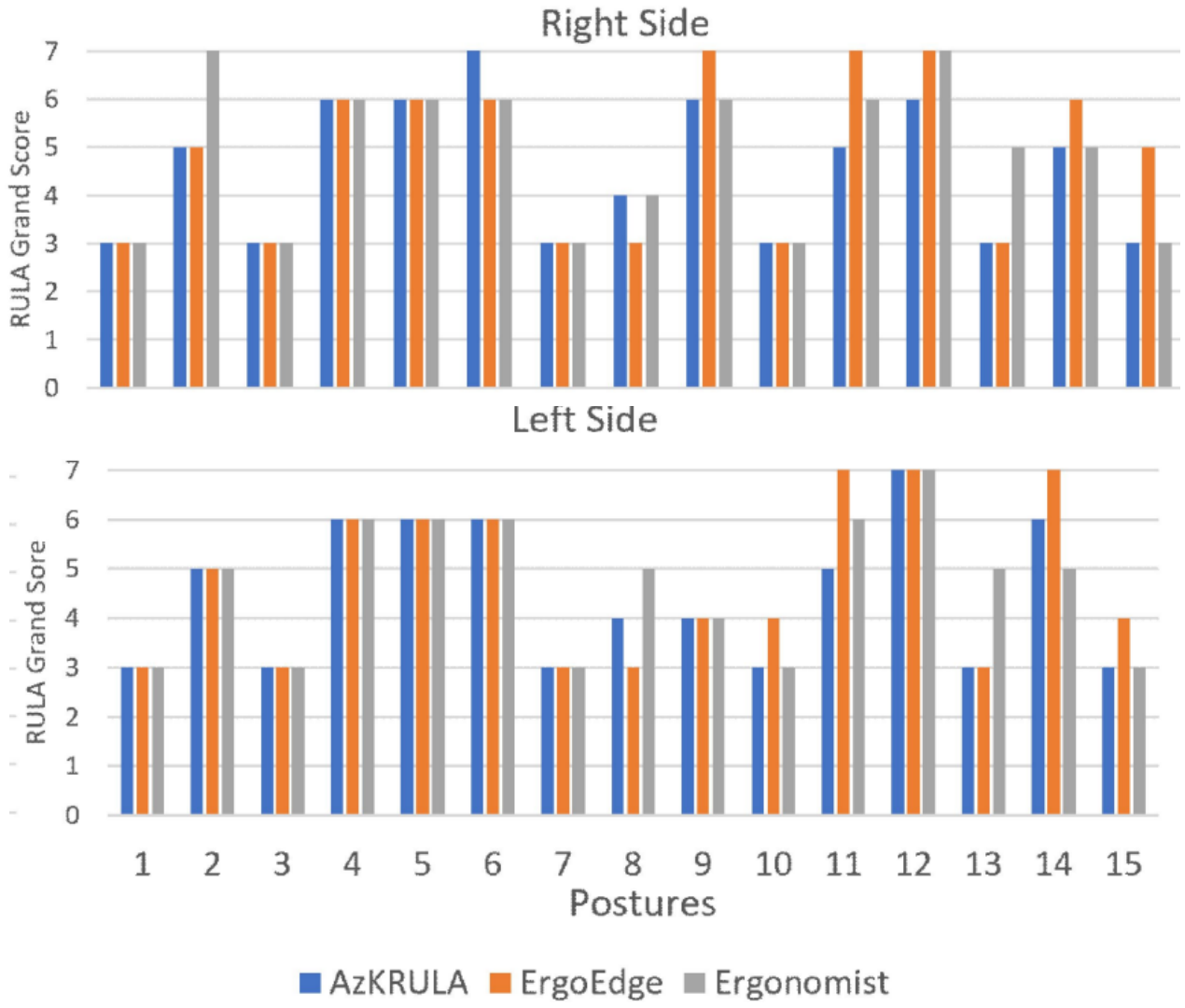
Example research - RULA

Comparing Semiautomatic Rapid Upper Limb Assessments (RULA): Azure Kinect Versus RGB-Based Machine Vision Algorithm

Antonio Maria Coruzzolo[1], Francesco Loll[1,2], Nazareno Amicosante[1], Hrishikesh Kuma[3], Pramod Thupaki[3], and Saurav Agarwal[3]

[1]Department of Sciences and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, RE 42122, Italy
[2]En&Tech Interdipartimental Center of the University of Modena and Reggio Emilia, Reggio Emilia, RE 42122, Italy
[3]CerebrumEdge Technologies, Bangalore, India

1. Manuele input nog steeds nodig
2. Even accuraat als ergonoom (meerwaarde?)
3. Wat is de correcte RULA?
4. Foute marge tijdens berekening RULA



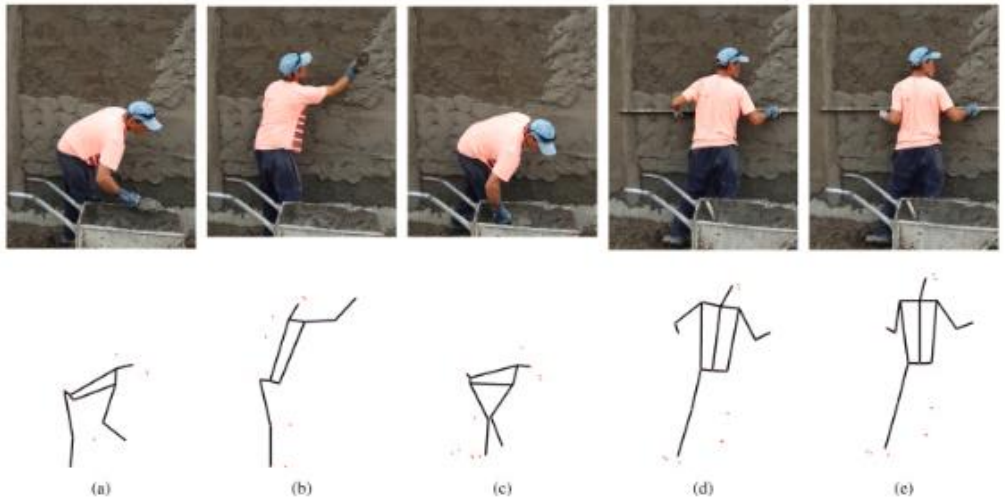
VerV

Example research - RULA

Ergonomic risk assessment based on computer vision and machine learning

Manlio MassirisFernández [a b], J. Álvaro Fernández [c], Juan M. Bajo [a], Claudio A. Delrieux [a b]

[a] Department of Electrical and Computer Engineering, Universidad Nacional del Sur, Av. San Andrés, 800, 8000, Bahía Blanca, Argentina
[b] National Council of Scientific and Technical Research of Argentina - CONICET, Av. La Carrindanga, km 7, 8000, Bahía Blanca, Argentina
[c] Department of Electrical, Electronic and Automation Engineering, School of Industrial Engineering, Universidad de Extremadura, Av. Elvas, n/n, 06006, Badajoz, Spain



Video name	Trunk	Neck	Score A	Upper arm	Lower arm	Score B	Grand score	Cohen's κ
Drilling	5	3	5	3	3	7	7	0.61
Tree cutting	4	4	5	3	2	7	7	1.0
Wall plastering 1	3	4	5	3	2	7	7	0.66
Wall plastering 2	3	4	5	3	2	7	7	0.66
Marshall signs	2	1	5	4	3	4	5	0.65
Hammering 1	5	4	5	3	3	7	7	0.81
Hammering 2	5	4	5	3	3	7	7	0.81
Cohen's κ	0.44	0.68	0.66	1.0	0.61	0.58	1.0	

Bedenkingen? Bevindingen?

- Snel, gemakkelijk en goedkoop
- ~~Risicoanalyse?~~
  - Handmatig nog extra parameters meegeven
- Zichtbaarheid van segmenten?
- Accuraatheid beter dan zelf analyse?
  - Moeilijk te zeggen
- Geen krachten
- GDPR zeer gevoelig
- Kalibratie nodig?

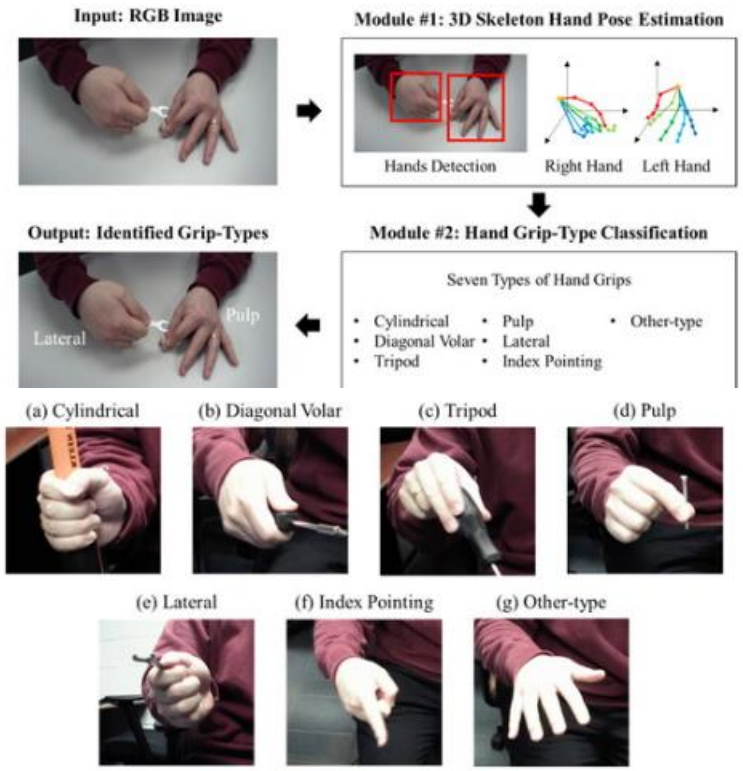
VerV

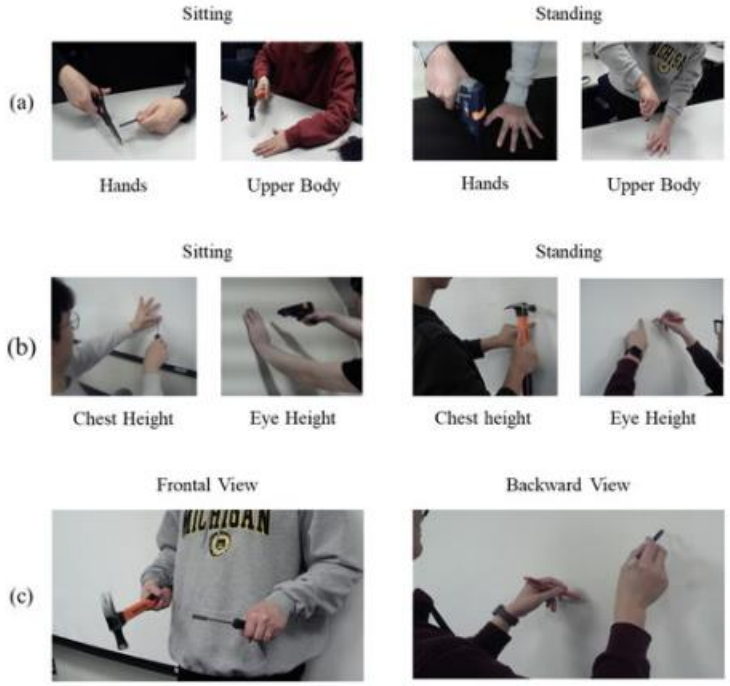
www.verv.be
info@verv.be

Vision-Based Computing Pipeline for Recognizing Hand Grip-Types During Tool Handling

Francis Baek , Daeho Kim , Julia Penfield , Rick Barker & SangHyun Lee

Pages 200-215 | Received 02 Dec 2024, Accepted 16 Jul 2025, Published online: 31 Jul 2025





Hand grip types	Sequential-image analysis		
	Precision	Recall	F1-Score
Cylindrical	0.8221	0.7852	0.8032
Diagonal Volar	0.8652	0.8293	0.8469
Tripod	0.8673	0.9102	0.8883
Pulp	0.9241	0.9600	0.9417
Lateral	0.9545	0.8814	0.9165
Index	0.9670	0.9153	0.9404
Other-type	0.8640	0.9744	0.9159
Macro Average	0.8949	0.8937	0.8943

VerV

Bedenkingen? Bevindingen?

- Snel, gemakkelijk en goedkoop
- ~~Risicoanalyse?~~
  - ~~Handmatig nog extra parameters meegeven~~
- Zichtbaarheid van segmenten?
  - Fel ingezoomd op de hand
- Accuraatheid beter dan zelf analyse?
  - Moeilijk te zeggen
- Geen krachten
- GDPR zeer gevoelig
- Kalibratie nodig?

VerV

www.verv.be
info@verv.be

Velocity EHS

VerV

www.verv.be
info@verv.be

Bedenkingen? Bevindingen?

- Snel, gemakkelijk en goedkoop
- ~~Risicoanalyse?~~
- ~~Zichtbaarheid van segmenten?~~
- Accuraatheid beter dan zelf analyse?
- Geen krachten
- GDPR zeer gevoelig
- Kalibratie nodig?

VerV

www.verv.be
info@verv.be

Bedenkingen? Bevindingen?

- Snel, gemakkelijk en goedkoop
- ~~Risicoanalyse?~~
- ~~Zichtbaarheid van segmenten?~~
- Accuraatheid beter dan zelf analyse?
- Geen krachten
- GDPR zeer gevoelig
- Kalibratie nodig?

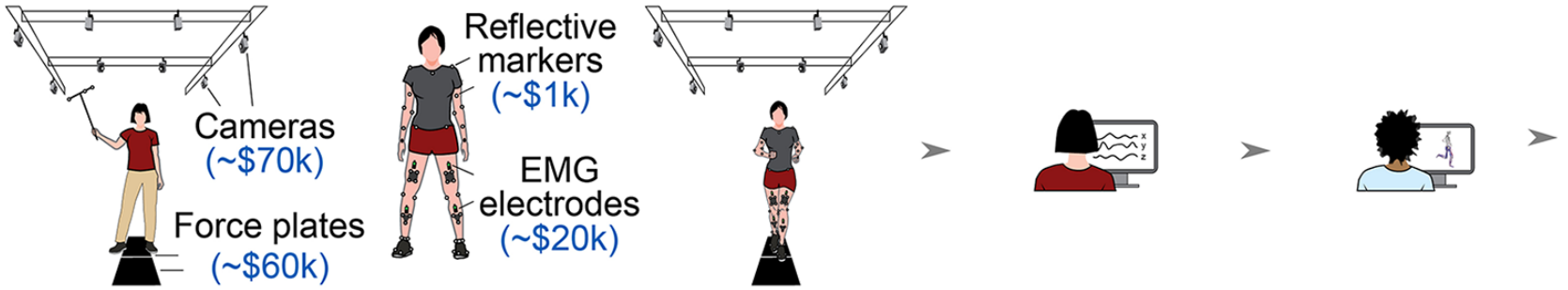
Welke redenen weerhouden jullie om dit te gebruiken?

VerV

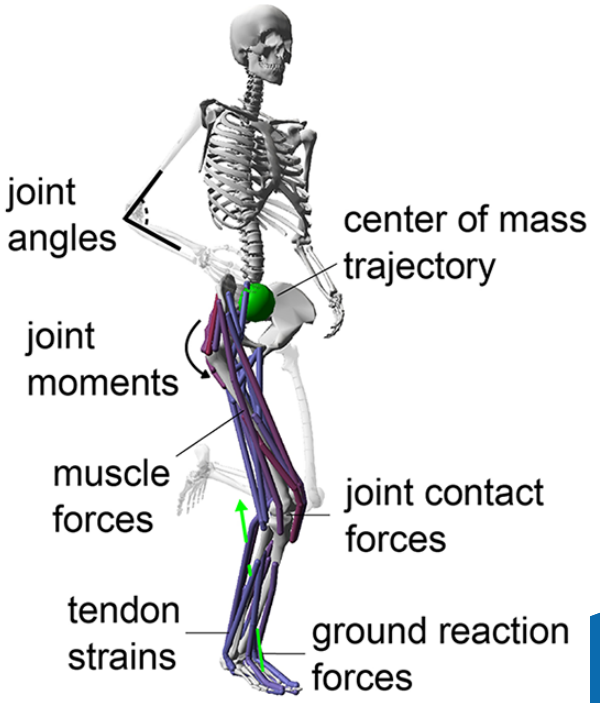
www.verv.be
info@verv.be

Biomechanically speaking

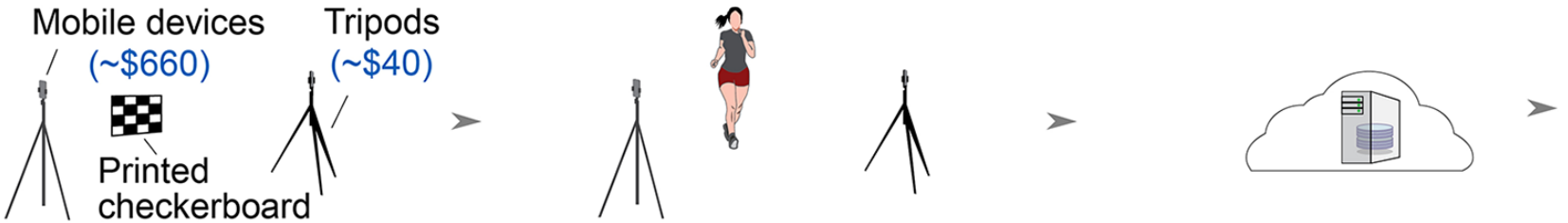
Mocap: marker-based motion analysis



Calibration (10 minutes) → Instrumentation (1.5 hours) → Data collection (2+ minutes) → Marker labeling (1-4 hours) → Modeling (>1 day) → **Dynamic musculoskeletal simulation**



OpenCap: video-based motion analysis



Setup + calibration (5 minutes) → Data collection (2+ minutes) → Data processing (automated)

.be
info@verv.be

Biomechanically speaking

Kinematics (MAE)	Walking	Squat	Sit-to-stand	Drop jump	Mean
Rotations (n = 18) [°]	4.1 (2.3–6.6)	4.1 (1.8–7.2)	4.7 (1.7–10.3)	5.1 (2.3–8.6)	4.5
Translations (n = 3) [mm]	12.3 (6.8–19.6)	12.3 (5.8–18.4)	13.2 (5–20.3)	11.5 (6.3–16.5)	12.3
Ground reaction forces (MAE)					
Vertical [%BW]	8.2 (7.5%)	6.4 (20.0%)	5.7 (13.4%)	25.2 (13.8%)	11.4 (13.7%)
Anterior-posterior [%BW]	2.1 (6.7%)	1.3 (37.5%)	1.9 (31.0%)	8.9 (17.3%)	3.5 (23.1%)
Medio-lateral [%BW]	1.1 (17.1%)	5.7 (85.4%)	3.2 (110.5%)	5.3 (29%)	3.8 (60.5%)
Joint moments (MAE)					
All degrees of freedom (n = 15) [%BW*ht]	0.75 (0.20–1.32, 19%)	0.97 (0.11–1.93, 45%)	0.68 (0.13–1.09, 60%)	2.50 (1.15–5.90, 25%)	1.22 (37%)

Errors for each activity were averaged over trials and participants (n = 10), and the reported mean is an average over activities and degrees of freedom (six for pelvis position and orientation [kinematics only], three for the lumbar, three per hip, one per knee, and two per ankle). Forces are expressed in percent bodyweight (BW) and moments in percent BW times height (ht). Kinematic and joint moment errors are presented as the mean and range over the degrees of freedom, and kinetic errors are additionally presented as the MAE as a percentage of the range. Root mean squared error in kinematics and kinetics are available in S2–S4 Tables. Average kinematic, ground reaction force, and joint moment waveforms estimated using OpenCap and Mocap are presented in Figs A–L in S1 Appendix.

https://doi.org/10.1371/journal.pcbi.1011462.t001

VerV

Biomechanically speaking

- Snel, gemakkelijk en goedkoop
- Risicoanalyse?
- ~~Zichtbaarheid van segmenten?~~
- ~~Accuraatheid beter dan zelf analyse?~~
- Geen krachten
- GDPR zeer gevoelig
- ~~Kalibratie nodig?~~

VerV

Waarom zo accuraat?

- Dat is voor mijn volgende presentatie in de volgende sessie

- Wat is er nodig voor jullie voordat jullie AI zouden gebruiken?

VerV

Toekomst

- Accurate kinematica zelfs als men beweegt met de camera
- Automatische schatting van de externe krachten – gewichten, duwkrachten, trekkrachten
- Betere schatting van kwetsuren

Maar: veel data nodig en die is er momenteel niet
+ AI verstaat geen fysica. Het legt connecties.➔ Oorzaak begrijpen?

VerV