Research:

What is state-of-the-art in a paper?

In scientific writing, state of the art describes the current knowledge about the studied matter through the analysis of similar or related published work.

“Systematic literature review on the state of the art and future research

work in anonymous communications systems”

(M.Nia and A. Martnez, Computers & Electrical Engineering, Vol. 69, July 2018, Elsevier)

• Literature review:

• everything that is relevant

(Inspired by D. Ridley. The Literature Review. Sage Study Skills, 2008)

• State of the art:

• the highest degree of development of an art or technique at a

particular time

• “The ‘literature review is part of the thesis where there is

extensive reference to related research and theory in your field; it is

where connections are made between the source texts that you draw

on and you position your research among these sources...”

• “The ‘literature review’ is where you identify the theories and

previous research which has includes in your choice of research

topic ... you can use the literature to support your

identification of a problem to research and to illustrate that there is

a gap in previous research which needs to be filled ...”

Describes the knowledge about the studied matter through the

analysis of similar or related published work

• Provides a comprehensive overview of what was done, what has

been done in the field, and what should be further investigated

⇒ Helps formulate the problems and hypothesis the thesis

intends to address!

⇒ Producing a (good) state-of-the-art might be considered the main

initial step of a Ph.D. thesis!

• “The literature review also refers to the process involved in creating

the review that appears in your dissertation or thesis ...”

D. Ridley. The Literature Review. Sage Study Skills, 2nd edition (2008)

• It is a process and a product!

[Link](https://hal.science/hal-02161403v1#:~:text=In%20scientific%20writing%2C%20the%20state,similar%20or%20related%20published%20work.)

[Link](https://www.youtube.com/watch?v=K5PC4hSIp-M)

<https://www.sdu.dk/en/bibliotek/studerende/opgaveskrivning/state-of-the-art>

Introduction

“Motion capture technology is becoming ever more important in sports. It helps an athlete to become better, stay healthier, and recover quickly from injury.

First, Motion capture can improve the individual performance of an athlete as By analyzing the movements of the athlete, areas for improvement can be determined. Motion capture can determine the strengths and weaknesses of an athlete and is able to assist in adjusting their training accordingly.

Second, the Tactics, strategy, and composition of a team can be improved by motion capture. If a coach has access to motion capture technology, he or she has an important tool in hands. With real-time motion capture, he would be able to track player fatigue or the level of intensity of a player. This way he can adjust his strategy or replace the player.

Third, Motion capture is ideally suited for talent recognition. Motion capture can help to identify the potential of a certain athlete. His biometrics will not only identify his potential but also what he or she has to work on. In fact, there are labs that can identify what sports are ideal for a certain kid given his biomechanics.

Fourth, Motion capture is very useful for determining the risk of injuries and player fatigue. One of the most important applications of motion capture in sports can be found in the prevention of injuries. For the player, athlete, or team, it is very important to stay active and healthy and avoid injuries.

Fifth, the Rehabilitation and recovery of an athlete can be aided by motion capture technology. Motion capture can also be extremely effective when an athlete is rehabilitating from an injury. Analyzing body motion data not only results in improved accuracy, but it also will lead to better assessing the risks of re-injury and how to avoid this (how to properly use your muscles, etc).

Sixth, Motion capture plays important role in gamification as It makes the game much more realistic and more and more resembles the real thing.”[[Link](https://sporttomorrow.com/6-ways-how-sports-benefits-from-motion-capture/)]

Study of existing

Tools Study

* MediaPipe
* Open CV
* Pandas
* Scikit Learn
* TensorFlow

Project Pipeline

* Data collection

I looked for videos online demonstrating the movements, I included the links to the videos in the Video section below.

I downloaded them if they are on youtube using the tool 'video to mp4' on the right or by making a screen recording if it's not on youtube.

I extracted parts of the videos where the movement is being demonstrated in a somewhat fixed frame, the camera is in a fixed position.

I have also formatted all the videos to be of the same size using canva.

I uploaded some of the videos on Google Drive in the data folder.

* Feature Extraction and Engineering

After preparing the videos, the first code developed was one that shows how to read a video frame by frame and show it, using Python code. Here we used the Open CV library and this code was simple to develop.

The next step here was to

* Motion detection
* Motion Analysis