

Towards Stanislavski-based Principles for Motion Capture Acting in Animation and Computer Games

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Abstract. Current and future animations crave for realistic motions to create a perception of motions that are close to a realistic human-like performance. To create such human-like animations, motion capture actors enrich the movements of digital avatars with realistic and believable motions and emotions. Acting for motion capture, as it is performed today, implies certain challenges. In this paper we address these challenges and argue how to support motion capture actors especially when acting for computer games. We discuss the nature of motion capture acting in the view of Stanislavski's acting principles and point out the actors' skills and demands. We conclude that the developed principles should be: 'Imagination', 'Objectives', 'Information & Visual References', 'Magic if', 'Adaptation' and 'Relaxation' to support motion capture actors with their work.

Keywords: Motion Capture, Acting, Animation, Computer Games

1 Introduction

Today's video games are becoming more and more realistic, not only because of technological advancements but also because of a cultural change demanding highly realistic and aesthetic animations of humans, animals, objects and environments in these games. In many cases, cinematic elements adopted during game-play mean that games almost feel like watching a movie.

It is thanks to motion capture (MoCap) technology that we perceive motions in the gaming environment as more realistic. To create this sense of realism, human motions recorded from skilled performers are mapped to virtual avatars. An important role lies hereby with motion capture actors to create realistic motions and performances that gamers can enjoy.

Actors, especially when performing for games, perform in an 'empty' space and imagine the game environment they act for. For most motion capture shoots it is a common practice for actors to look at reference pictures or animations before they act. This helps actors to imagine the environment and helps directors to explain their expectations and ideas but this is still not effective enough.

Supporting actors so that their performance can be improved in terms of their imagination, emotions and feelings for the play could lead to more natural performances. This is why we need to create a better motion capture environment to support actors

with their task of performing realistic and believable performances. Yet to achieve this, we must first understand the nature of a motion capture actor. Here, in this paper we discuss the nature of a motion capture actor and point out skills, demands and developed principles to support motion capture actors with their work. Stanislavski's acting principles have been chosen as a theoretical basis for this research. This is especially because Stanislavski's acting principles have influenced many acting styles, even until today and are still basis to many acting schools. Therefore, many acting styles relate to those principles or even provide similar basic principles.

2 What is acting?

To understand the nature of a motion capture actor, we first need to get a basic understanding of what is acting. The complexity of an actor's nature covers a large area to discuss and addresses different approaches to answer this question. We could look at history and argue that if a storyteller was talking to his audience he could be considered as acting. As some say, storytelling is the oldest form of entertainment known to man [5]. Here the storyteller creates a story or knows a story to tell and uses his imagination to enrich the story. Storytellers then inspire their audience by telling their version of the story and make the story interesting by using voice and dialogs.

Likewise, we could also approach answering the question 'what is acting?' through modern times theories where building a character with a behavior, an objective and a life is of importance. For our purposes of understanding the principles of modern acting, we do not need to go into much detail or even into the history of acting. Nonetheless, answering the question of 'what is acting?' is not a simple task. There are many views on what acting is. Lee Strasberg answered the question 'what is acting?' by saying: it is the creation of a character [10]. Others describe it by saying that the actor's body is the fundamental sign, when it is there it is looked at and when it moves it attracts the audiences attention [4]. Another definition occurred by interviewing an academic acting teacher and director in an open interview with the goal to explain the essentials of acting. When interviewing him, he stated that "acting internalizes life and the relationship that an actor creates with the environment, his body, as well as feelings, emotions and thoughts that are simulated or even created". As an actor consciously works on building and using imagination as well as coming towards shaping a character, this definition was then concluded by saying that "acting is the awareness of behavior. We are aware of acting different then when being ourselves".

The above-mentioned definitions on what is acting can also be applied to motion capture, as the definitions are generally about acting. Creating a character and how this character behaves within its situation and environment is also quite important for motion capture as this might be the basics to prepare to act. The actors' ability to imagine the environment or the characters situation is of importance for motion capture as well. What we also need to keep in mind is, as cited before, that the actor's body is the fundamental part of an act, especially when the purpose is to capture motions.

Defining 'what is acting?' is one part but lets ask a bit more deeply, what makes an actor an actor? As others mentioned already, there is no law that an actor needs to have certain characteristics, experiences or training [5]. You could simply be gifted, get on stage and inspire your audience. In reality this is not the common way. Most actors do

get some acting training and then spent time preparing a role or a character before going on stage and fascinating their audience.

In modern acting training, two major acting schools have been established, the American and the Russian acting school. In other words, we talk about method acting and the Stanislavski system. Both schools built their theories on the basic elements originated from the Stanislavski approach [7]. The American school, which is based on method acting, was basically shaped and invented by Lee Strasberg who was a student of Stanislavski [9]. Method acting trains actors to use already experienced memories of their personal life to create realistic emotions on stage. Stanislavski's method approaches this by creating a sense of truth on stage that lets the audience believe that emotions are real.

To get a better understanding about acting in general and the differences of the American and Russian school, the previously mentioned academic acting teacher was furthermore interviewed. Throughout this interview it was mentioned that "the American school can be applied very well in mass production and needs no long rehearsals. So, for modern and realistic characters it functions very well. On the other hand, in sci-fi or fantasy, for example it might become a bit more complicated". This shows that there are differences in acting styles and training.

To summarize we can say that an actor, trained or naturally talented, needs to possess certain capabilities to control body, mind and emotions to perform realistic, truthful and believable on stage. In addition an actor needs to prepare and analyze the play to create the character before acting. Moreover, the imagination of an actor plays an important role to create the character and the play. So an actor needs to be able to master certain skills to prepare their act, the character and their body to perform believable and to inspire their audience. The principles of acting, originated from the Russian acting school show us how mastering these skills is approached in their system. As performing a believable and realistic play is very important for motion capture as well, motion capture actors need to be able to use and control their body well to deliver good performances. We can see that the major acting schools set a large focus on this. Therefore, actors performing for motion capture can certainly benefit from these techniques. Nonetheless, we need to be able to support these techniques and provide a better environment that allows the improvement of motion capture results.

3 Which principles should we support in motion capture?

In some research the main principles of Stanislavski's theories on physical acting were described and structured [8]. In this work the 12 principles of Stanislavski's physical acting method are presented in short. With the help of these principles we identified the principles that deliver the most benefits for motion capture and allow to be supported by e.g. directors and motion capture studios.

A major point to consider when using the Stanislavski method is the principle of **Objectives**. Objectives are used to identify the characters' beliefs and actions. Therefore, Objectives form in our understanding an important basis or root to understand the scene, the environment and the character of a play. Providing motion capture actors with as much information and material about the play and the character as possible would certainly be helpful for the actors. This would allow actors to spend more time preparing

the play, identifying the Objectives of a character as well as to create the character and rehearse before even entering a motion capture studio.

The principle Truth, Belief and the **Magic if** is used to distinguish the actors beliefs and the beliefs of the character, as well as to distinguish reality and reality on stage. Here the actors try to identify what the character would do in certain situations. This somehow relates to the objectives of the act and creating the character, as well as identifying the environment and its influence on the character. Therefore, it is in our opinion of importance to prepare for motion capture shoots but also as a means to describe the directors expectations of certain scenes. Especially when scenes need to be changed or movements need to be adjusted. So actors and directors can improve certain scenes collaboratively by using the question 'what would or should the character do in this situation?' to overcome issues faster.

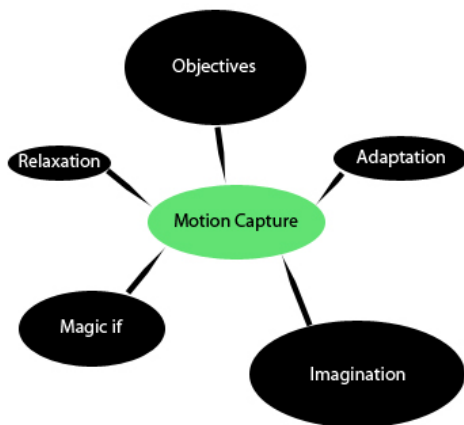
Imagination is another important aspect of actor training in the Russian school. It is about how quick an actor can adapt to a play or an imaginative environment, the conditions and the events happening to a character. Imagination is the part that creates the art and already comes into play when actors think about objectives and while shaping the character. Supporting the actor in using his full potential of imagination enriching the performance can only be in the interest of motion capture as well. Providing visual footage of the character, events happening or the environment in advance helps actors to use their imagination better to create the character and to perform more realistic and believable during a motion capture shoot.

Identifying the what, why, and how of a characters action, especially with other characters and the physical environment is considered in **Adaptation**. Working out the physical environment, the scene, other actors' actions as well as the imaginative virtual environment is mostly done for motion capture shoots on the shoot day. It is a necessary and important step to make actors understand the requirements of their act and the limitations of their acting space which is either limited through physical props, technical limitations or virtual content. It is also used to coordinate actions and interactions of actors and characters which can also be virtual. In Stanislavski's method this step is also meant to shape the character but when we consider that in most motion capture shoots, especially in games this Adaptation, if we can call it this, takes place right before a shoot. Providing actors with information, visual footage of the physical environment, the virtual environment, a rehearsal day as well as the dimensions of the acting space might support the actor in this matter. Detailed information about the play could also allow actors to identify the what, why and how of a characters action in advance so that the time for Adaption is reduced on the set.

Supporting the actors **Relaxation**, concentration and making the actor comfortable must be considered as important. In general actors know best what they need to relax, to relax their muscles and to get concentrated. Supporting Relaxation can be done by for example giving the actor some time and space before the shoot begins. Also a comfortable environment allowing the actor to relax can be thought of. Meaning the actor does not need to stand in a drafty cold hall to get concentrated and relaxed. As we have learned from Stanislavski's teaching principles and statement about Relaxation, taunt muscles can interfere with inner emotions [8]. This might result in less emotional acting and movements. For motion capture one should avoid this to allow capturing the best body performance an actor can provide. As it requires a motion capture studio only to provide time to a trained actor to prepare, relax and warm-up his body, it might be

important to be aware of the necessity of Relaxation and implement it in the motion capture process.

When setting the focus on Objectives, Magic if, Imagination, Adaptation and Relaxation, it is not meant to say that the missing principles of Stanislavski's system are not of importance. Some principles also add to the preparation as well as building the character, whereas other principles add to skills and tools that the actor uses to control his body and body language. We see these principles as professional skill sets of actors that need to be achieved and trained.



The principles pointed out here show the importance related to motion capture and show initial ideas on how we can support motion capture actors by using these principles. From the view of an actor all necessary principles and techniques should be used to prepare the role, the character and the play. In figure 1 the principles we think are of most importance in the attempt to support a motion capture actor and to create a better motion capture environment can be seen as a simplified visualization.

Fig. 1. Principles and their weighted and believed impact in better MoCap

4 What is the nature of Motion Capture Actors?

At this point we need to understand the nature of a motion capture actor to adapt the above-mentioned principles to help producing better motion capture results. For this, we need to discuss what is different for an actor in motion capture in comparison to other acting environments.

As experienced in some earlier research, MoCap actors do face some challenges while acting [6]. It has shown that the performances of MoCap actors are very dependent on their capability to imagine the scenery they are acting in and to put themselves in the desired role and mood demanded. Moreover, inexperienced motion capture actors were facing the issue to adapt to the MoCap environment quickly. Also imagining and remembering virtual content and their positions, which were needed to perform accurate motions, posed problems to some MoCap actors.

This led in some cases to less emotional and less natural looking performances. Also motions needed to be repeated multiple times to find the right movements suiting the virtual character. Overall, this shows that there are some difficulties in acting for motion capture. The question we raise at this point is, why is it like this and where is the difference to other acting environments?

To get a better understanding of these differences, we contacted three academic acting teachers, who are also experienced in motion capture, to describe their view on the differences between motion capture and other environments. One teacher mentioned that acting for motion capture is an even higher mental load due to the need for accuracy in repeating all of your body's motions, independent of the emotional requirements of a role. Furthermore, it was mentioned that in many motion capture (and compositing) shoots, it's even harder to act because you have nothing but space to act off of. So basically the lack of support through props, costumes and scenery was addressed, as well as the additional task to not only perform but also provide repeatable motions that look believable.

We got a slightly different view on this topic throughout the previous open interview, performed with the academic acting teacher. The question we asked here was what an actor needs to act. The academic acting teacher explained that a well-trained and experienced actor does not need any prop or specific environment to perform a believable and good performance. In our opinion, this view is actually supported through where it is mentioned that it makes no difference whether you are on a stage or in a studio or out in a field, Acting is acting [5].

Both views do not necessarily bypass each other; they could be true at the same time. This is because acting in MoCap does usually not provide much information of the shoot or even allow a lot of rehearsal time. So the work of an actor, trained or untrained, gets even more complicated. Not having sophisticated scenery or an acting environment might increase this issue.

To put in more details, MoCap acting actually needs to deal with a large variety of acting skills and different actors. MoCap sometimes only needs to record locomotion, so movements of professionals like athletes or other professionals that know how to operate certain devices or machines like for example soldiers. In such a case, acting skills are of less importance as the professional acts himself and performs motions and actions that he or she is used to do. It becomes even more interesting when professional locomotion and acting skills are needed at the same time.

Sometimes it might also be the case that the accuracy of motion is vitally important, as it would be when e.g. mimicking military motions is demanded. Then not only emotion is needed, but also correct military motions, the way a weapon is held or the way the soldier walks is vital.

So in short, motion capture actors have a variety of different acting skills and acting backgrounds. Supporting actors of all skill levels to perform better and faster within in motion capture must therefore be of importance.

5 Do we need to adapt major acting techniques in motion capture actor training?

For motion capture, it is quiet obvious that the captured motions are of large importance. The end product an actor delivers is a capture of body movements that, depending on the shoot, can be enriched by voice and video records. A question to raise at this point is if this necessarily implies that emotions are of less importance when only body movements are captured?

When looking at the American acting school, the Russian acting school and at mime acting, acting emotions seems to be an important point in training and acting. As it is believed in these acting styles that emotions are performed not only through facial and vocal performances but also through body expressions and gestures, we can assume that acted emotions, expressed through body gestures and postures do also enhance the acting outcomes in motion capture. So can we say that either of those acting styles fits better to MoCap, or can we even say none of those are needed because an actor only needs to perform motions?

In the field, there has been very little information about how actors work or behave in a motion capture environment so far to be able to answer those questions.

When looking at the skills and experiences of motion capture actors, we can say that the range lasts from trained and very experienced professional actors that work in movie or theatre to stuntmen and athletes without any acting experience or training.

As motion capture shoots demand different experiences, it is important to find the right actor to suit a role, as in any kind of acting. For motion capture, we need to distinguish what kinds of motion capture needs to be performed: cinematics, games, commercials or animation. In general we can say that for cinematics it is likely that a motion capture actor needs to perform not only locomotion but also perform traditional acting. For games, locomotion might be more of importance. This is just a very broad abstraction of motion capture shoots. For some movies or other cinematics, locomotion might be everything needed from a motion capture actor and on the other hand motion capture shoots for games can demand pure acting skills, especially when shooting cut-scenes (short dramatic scenes meant to further explain the story surrounding the game-play). Finding a suitable character for a role might become even more interesting when a mixture of athletic or acrobatic skills and acting skills are needed.

Imagining the scene and the environment, creating a character are practices that trained actors are using and we believe that these practices as well as acting out emotions and motions realistically and believable are of importance to create an even more realistic perception of gaming. Moreover, MoCap acting as a medium can be a quite quick and dynamic way of acting. By saying this it is meant that the preparation time and also other factors like a simplified environment, costumes and props might differ from other acting media. A motion capture actor needs to be able to handle these issues and adapt quickly to the environment. A good acting technique, training and experience definitely help actors doing so. Knowing how to put the actors body in place and use the body while acting for motion capture is important to capture scenes that look realistic and natural in a game or cinematics. A profound acting technique or style, training an actor to create a character and to use the body effectively is also beneficial for motion capture shoots.

When hiring a trained and experienced actor for a motion capture shoot we do not need to adapt major acting techniques because the actor brings those skills already to the set. Nonetheless, we should consider supporting the actor with the principles shown in figure 1. This support will also help untrained actors. When talking about supporting the actor, support might be for actors' preparations, through feedback or even technology helping the actor while acting. Motion capture directors and motion capture studios that provide actors support in the mentioned principles could explain untrained and inexperienced actors those techniques briefly and show how they are applied in their motion capture process to improve the acting and to improve timing within the process of a motion capture shoot.

6 What motion capture actors think and need?

To answer these questions, we created questionnaires that have been handed out to 18 motion capture actors and 10 directors working in motion capture.

When asking the actors about what they need to act, some common answers were mentioned. Many actors mentioned the use of visual references, props, costumes and the demand of being provided with as much information as possible about the character, the environment and the conditions in time. Most interestingly all these points mentioned can vary a lot in motion capture. For some shoots, information and props might be sufficient and provided in a decent amount of time in advance to the actor. Visual references that can be used for acting while shooting are usually not provided to an actor. An exception might be for cinematics where props as well as costumes and visual references were built to support the actors while acting. A prominent example for this was the movie avatar [2]. Commonly motion capture shoots and the scenes are very dynamic and extensive scenery or props are not provided to an actor. Even detailed information about the shoot might be handed out to the actors only a few days in advance.

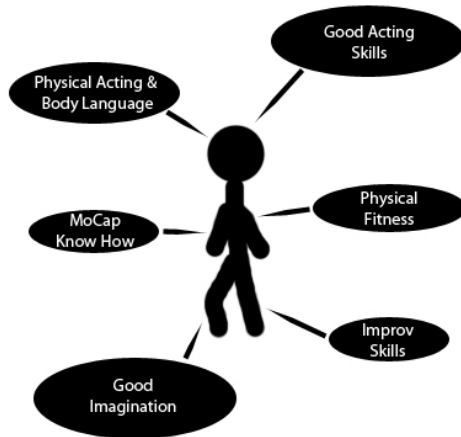
Actors were also asked about their acting styles in which they are trained and are using while acting for motion capture. The answers here have shown that there is a **large variety of acting styles**, different professional backgrounds and trainings. The actors that have done some form of acting training described their acting styles as Stanislavski-based, as an imagination-based technique from Meisner (behaving truthfully under imaginary circumstances) or other styles and techniques from Uta Hagen, improv, physical acting and personal styles that actors mentioned work for them.

Furthermore, actors were asked about the differences they see or experienced between normal acting and motion capture acting. A very common answer was that one needs to be able to have **good imagination** and **improv skills** when doing motion capture. Also the dress was mentioned quite often. In motion capture used for cinematics and games it is very common to use optical markers that are usually mounted on a tight fitting suit and even for MoCap performances helmets, caps or other technical equipment like belts for sound recordings need to be worn. It might be a bit more demanding to imagine that your fellow actor in front of you is supposed to be a zombie when he is not dressed like one. But as we have learned, this should not be an issue for a trained actor. Nonetheless, we can assume it might help actors when there is scenery, props and any other visual information so that less imagination needs to be used while acting.

Additionally to the questions handed to motion capture actors, directors have been asked what they expect from a good MoCap actor. In summary we can say that 4 attributes seemed to be of importance for the directors.

First, that the motion capture actor has **good acting skills** and is able to show emotions physically through his **body language**. Second, the actor should be physically fit. Being an athlete, stunt performer, dancer or similar might help in many cases. Third, being creative and having a **good imagination** was of importance. This includes knowing the subject area of the shoot and suggesting other moves as well as being able to imagine the scene. As a fourth attribute it was pointed out that it would be helpful as a motion capture actor to have a **know-how** about the language and procedures as well as technicalities of motion capture shoots.

7 How to improve current motion capture structures?



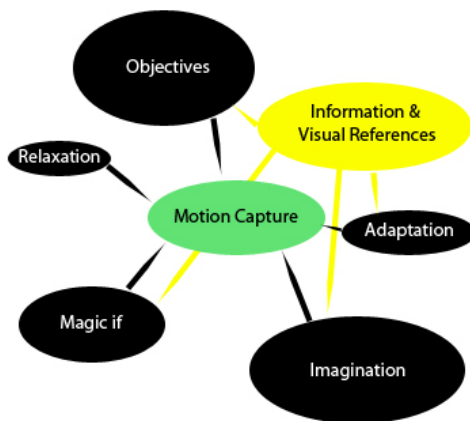
Before we discuss how we could improve current motion capture structures, we can have a look at figure 2 where our primary investigations show an indication of important skills and demands a good motion capture actor should have. The choices were made according to the frequency of the answers of actors and directors we questioned. Six skills, describing a good motion capture actor have been revealed. Out of these six skills, three major skills and demands can be summarized as good acting skills, good imagination and good body control.

Fig. 2. Skills and demands of a motion capture actor

When having a closer look at the three most important skills, they look very familiar, reflecting the principles focusing on actor training.

After identifying the nature of a motion capture actor, as well as the skills a motion capture actor should possess, let's reflect on the principles to support motion capture actors that we identified earlier and showed in figure 1.

A major point that we need to consider is the lack of information and visual references that actors need to deal with for many motion capture shoots. This is why we need to update figure 1 to visualize this lack. In figure 3 below, you can see which principles of acting training and preparation need information about the play to prepare the role and the character efficiently.



Let's now come to the point where we think about what needs to be changed to improve current motion capture environments and procedures.

As we identified, the **flow of information** for many motion capture shoots must be improved so that actors do have the information to understand the environment and conditions at the set but also are able to build the character with its details, motions and emotions that bring the character to life and can make the play more realistic and believable.

Fig. 3. Extended principles and their weighted and believed impact in better MoCap

Another important point to address that we see is to **support the actors' imagination**. One way how this can be done is to provide visual references, describing the environment and the conditions the character will be in for preparations and building the character as well as right before the shoot as a basis for discussions with other actors, the director and motion capture operators. Seeing visual references and using props while acting also support the actors' imagination.

Communication with other actors or even the director to work out the objectives and to shape the character can in addition help to increase the understanding of the play and the ideas of the director before the shoot day and could save production time as well as it could lead to better performances due to a better preparation. A rehearsal day might be a good way to allow these communications and shaping the roles and objectives.

Right before the shoot the actor should get **time to relax** and prepare for the shoot.

Being aware of the actors needs as well as supporting the actors work must be of importance as the performance and the quality of a motion capture shoot is very depended on the actor. Therefore, addressing the listed issues through ideas supporting actors within the principles mentioned in figure 3 is needed to improve motion capture outcomes. Especially solutions that support the actors' preparation of the play and the character as well as the actors' imagination in the preparation phase as well as on the shoot day must be developed.

8 Conclusion

When looking at literature dealing with the topic 'motion capture acting', less studies have been published. More studies can be found when it comes to the questions, what is acting and how is it taught. Within this paper we aimed to discuss the needs and wants of a motion capture actor, as well as in which way actors can be support. Under this scope, we explored the following points:

Within modern acting education, we have seen that the Stanislavski system is quiet often used as a basis for actor training. Therefore, we borrowed the principles of Stanislavski's physical acting system and pointed out which principles can be seen as important for motion capture and how actors could be supported by directors and motion capture studios to use these principles more effectively.

From the definitions of acting, the interviews and questionnaires with motion capture actors, directors and academic acting teachers we can see that acting for MoCap might not be considered as a special or separate style of acting but we need to say that there are some technicalities and environmental differences. A motion capture actor might need to face the issue of less preparation time and bodily demanding shoots.

Supporting actors to overcome the challenges that lie within motion capture acting is of importance to ensure even more realistic, believable and natural performances. Helping the actors to imagine and visualize the environment, the character acts in and pointing out the goals of the character to be played will also help the actor to create the character faster. Therefore, we need to create a better motion capture environment as well as guidelines that support the actors while preparing the role and while performing according to principles summarized above (figure 3). Addressing and considering the principles and solutions mentioned in this paper might help to develop ideas further and trigger new solutions that improve the motion capture environment.

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