

## Assignment 1 – Plan-Driven and Agile Development

### Part 1: Plan-driven and Agile Development

1. A stakeholder is defined as any person, group or organisation who is affected by the system in some way. In terms of the mocap process, there are two main categorises of stakeholders
  - a. The users
    - i. Performance captured actors: Actors/individuals who must perform whilst wearing the motion capture bodysuits.
    - ii. Other actors: Actors/individuals who have to perform around those wearing the motion capture bodysuits.
    - iii. Directors: Individuals who must direct the performance captured actors and other actors within a scene.
    - iv. Camera crew: Individuals who must film the scenes being performed. Camera crew is also responsible the motion capture cameras and ensuring that they are capturing/recording the motion capture equipment on the actors.
  - b. The producers
    - i. Developers of the software: Anyone who is involved with developing MOCAP software.
    - ii. Post-production team: Anyone who is involved with developing the film post-production.
    - iii. Motion editors and animators: Anyone who is edits or animates the motion capture data.
2. A major factor that needs to be considered when developing technology for location shooting is how the sensors are going to be captured. Within a sound stage, dozens of fixed-position cameras are set up to record the actors and scan their movements into the computers. However, when shooting on location the cameras have to be set up and arranged before each shot, to ensure they are positioned correctly to capture the scene and the sensors (Goundry, 2017).

A second major factor to consider when location shooting, it that the motion capture optical systems are sensitive to lighting (Turner, 2004). Without the correct lighting, the system will not be able to capture the movements of the actors. On a sound stage, it is easy to ensure that the scenes are lighted correctly through the use of artificial lights. However, when shooting on location the lighting becomes dependent on the environment, i.e. canopy blocking sunlight. Artificial lights can be used to mitigate the effect of natural lighting, but this will require additional equipment and set up time.

3.
  - a. User story

John Brolin must be wearing the appropriate motion capture sensors and equipment on his face. The sensor cameras must be functioning and appropriately positioned to collect the movement data.

If trying to project Brolin's face onto Thanos, the sensor cameras must connect to the MOCAP software. While Brolin is acting the cameras will detect his movements and capture these in keyframes. The system will then compile all the keyframes

from the shot to create flowing movements, which can then be projected onto the digital puppet.

If trying to make Thanos appear realistic, the system needs to detect subtle facial movement, particularly around the mouth and eyes. When filming, multiple close up shots, from different angles, of Brolin's eyes and mouth should be recorded. These shots are scanned by the system and used to project the subtle facial movements onto the digital puppet. Keyframes from of the eye movements can be used to ensure the Thanos puppet matches the natural way that our eyes tend to scan around what we're looking at. By including these movements, the emotions portrayed by Brolin are clearer and subtle nuances are easier for the audience to comprehend.

If trying to make Thanos talk, a mix of MOCAP and full animation must be utilised. When creating jaw movements, the MOCAP system can be used to detect the jaw pivoting through multiple pivot points as it opens and closes. Currently, MOCAP cannot effectively detect movements of Adam's apple or tendons within the neck, and therefore animation must be strictly used to control these movements.

In all instances, a high-resolution model of the puppet should be used to ensure realism. High-resolution ensures that the models include minute details, such as skin pores and stubble.

b. Task Card

<b>Task: Talking</b>
Creating a detailed talking puppet is vital in ensuring that Thanos appears realistic to the audience. Using MOCAP to capture subtle movements of the lips and the jaw, in order to accurately portray natural human movement. Check that all of the subtleties of performance are projected onto the digital puppet by comparing to live performance. If movements are missing from puppet, reshoot performance from other angles to capture more keyframes. Compile all keyframes to create movement puppets, add any new keyframes to past movement models until the puppet's movement appear natural. If the puppet is a high-resolution and movement appears natural, scene is complete.

## **Part 2: Reflecting on Learning Experience:**

1. Through this assignment I learnt about the process of motion capture and superimposing faces in the film and animation industry. Through reading the articles and additional research I learnt about the difficulties MOCAP technology faces when being implemented in location shooting. Additionally, I learnt about the importance of getting multiple close shots when using MOCAP, in order to make the animation/CGI look realistic and natural. However, whilst some movements can be track with MOCAP technology other movements are hard to track; often animation/CGI requires a combination of MOCAP and animation in order to create realistic movements.
2. Throughout this assignment I used a variety of online resources to answer the questions. Firstly, I utilised all the information provided by the assignment sheet; this included the following articles:
  - 'A visual history of performance capture at Weta Digital' by Ian Failes
  - 'Facets' by Weta Digital
  - 'What is motion capture' by MOCAPPY
  - 'Defining Thanos: Weta Brings Motion Capture to New Heights for 'Avengers: Infinity War' by Trevor Hogg

When answering question 1, I consulted my answers to tutorial 1 and the lecture slides provided on my uni. In question two, I used the provided articles as well as, conducting my own research to find additional information. The articles I consulted in question 2 include:

- 'Weta Digital advanced mo-cap for location filming' by Nick Goundry
- 'The Future of Motion Capture' by Henry Turner

By conducting my own research, I was able to gain a better understand of the limits of MOCAP technology for location shooting.

Finally, when completing question 3 I used a range of resources and techniques to better understand how to properly write a user story and task cards. These resources included watching a YouTube tutorial entitled 'Agile User Stories' by Mark Shead, referring to lecture and assignment notes, and searching for examples of user stories and task cards on google.

3. The main challenge I faced when completing this assignment was writing the user story. Mainly, I was unsure on how to structure the user story and what to include in the task card. In order to overcome this challenge, I conducted some research into agile user stories and task card. Furthermore, finding extra examples helped me to understand how to structure user stories and task cards. Furthermore, I started writing my user story by answering the questions of who is the user?, what are they trying to achieve?, and why are they trying to achieve it? in natural language. From there, I was able to develop my user story by elaborating the requirements.

For the next assignment, I will aim to write some practice user stories and task cards before writing the one for my final assignment. This will help to ensure that I am comfortable with the structure and content.

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