Generating Expressive Facial Mesh Animation : A Survey

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Abstract

With technology allowing for increasing realism in games and movies, facial animation is still a very challenging task.

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1. Introduction

Human tend to be very sensitive to facial motion psychologically. Slightest uncanniest in facial animation directly leads to hurt overall experience [3]. Facial animation can be applied to multiple applications such as computer games, e-commerce, immersive VR telepresence, and movies. Yet achieving realistic facial animation is a challenging task. So, delivering natural expressive facial animation is a great interest in graphics field.

Animating high-quality expressive face is very labor-intensive job when done by animator. Another approach to animate face is to capture human face animation in 3D. Face capture is a well-understood field(cite here), yet such approach requires gigabytes of data from expensive capture system, and is hard to manipulate. Therefore, it is necessary to simplify such process.

To simplify such process, one can automatically generate facial animation or can simplify animating produce.

In this survey, I introduce and compare three research that animate expressive facial animation :

- JALI [1] and VisimeNet [6], a linguistic approach to lip-sync.
- MeshTalk [5], a deep learning method.
- D3DExpression [4], LSTM method which replicate facial expression.

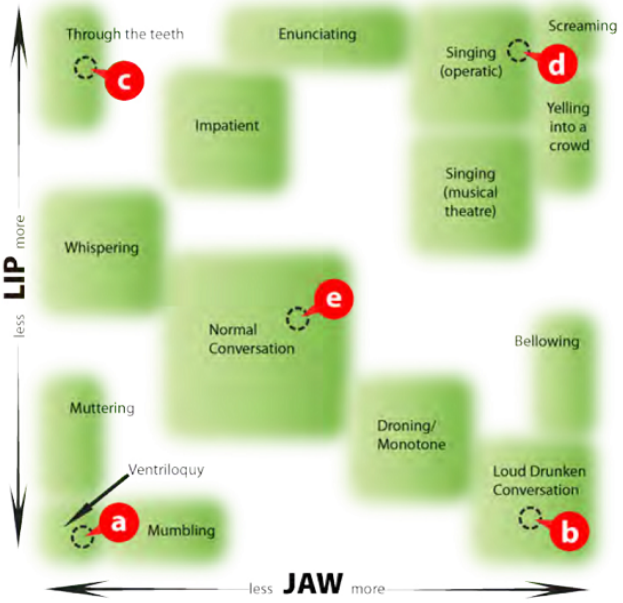

Figure 1. Speaking styles of JALI viseme field

2. Methods

2.1. JALI and VisemeNet

2.1.1 JALI

Lip-sync can be done by linguistic approach which is mapping text to phonemes, then phonemes to visemes [2]. Viseme is a specific facial shape when making certain sound. A traditional facial rig can have many-to-one mapping from phonemes to visemes, or many-to-many using dynamic visemes. This approach can achieve realistic acoustic motion, yet lacks some emotional

JALI [1] is a state-of-the-art viseme model. JALI takes jaw and lip activation multipliers into consideration, since jaw and lip is the most significant acoustic motion in face.

As shown on Fig. 1, different speaking styles shows different jaw lip activation level multipliers. Which can be animated more intuitively.

JALI model requires manual labor such as aligning audio to plain text or phonemes. This lead to research to automate such process. This approach requires extracting viseme and jaw-lip model sequence from audio.

2.1.2 VisemeNet

2.2. MeshTalk

2.3. D3DExpression

2.4. Discussion

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