Multimedia and computer animation

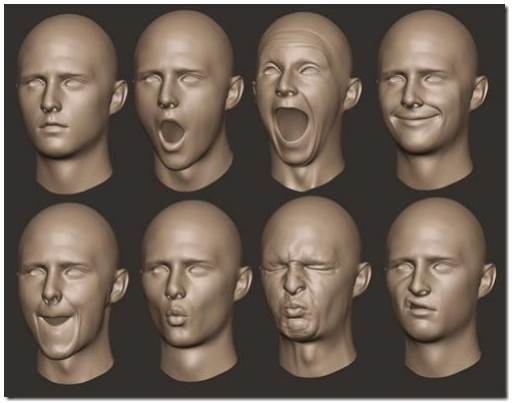
Exercise - Animating a human face

From the lecture (or not)…

- Historical development
  - Volumetric models
  - Curve-based models
  - Polygonal models
- Controlling a model
  - Via muscle and muscle fiber simulation
  - Using Visemes
    - Can be mapped to phonemes, although multiple phonemes can be expressed with the same viseme

Viseme

- Multiple standards
  - Facial Action Coding System (FACS)
    - Ekman P, Friesen WV, Hager JC (2002). *Facial Action Coding System: The Manual on CD ROM*. Salt Lake City: A Human Face.
  - MPEG-4 FBA
    - https://visagetechnologies.com/uploads/2012/08/MPEG-4FBAOverview.pdf
- Typically realized using blendshapes
- Driving parameters can be generated
  - Manually
  - Based on an audio track



Viseme - driven by sound

- Typically using a ML model
  - Samples are recorded, i.e. 60 min. of speech
  - Visemes are annotated in the track
  - A classifier is trained on the data
    - The result is probabilities of each viseme being present in the speech
- There exist complete solutions (including pre-trained models) even for Unreal Engine
  - OVRLipSync plugin
    - we will use this one
  - OpenLipSync
    - Open-source replacement for OVRLipSync
    - https://github.com/KyuubiYoru/OpenLipSync

Viseme Name	Phonemes	Examples	Mild Production	Emphasized Production
sil	neutral	(none - silence)		None
PP	p, b, m	put, bat, mat		
FF	f, v	fat, vat		
TH	th	think, that		

Source of the table: https://developer.oculus.com/documentation/unreal/audio-ovrlipsync-viseme-reference

UnrealEngine Metahuman

- Realistic model of a human
- Can use for free with UE
- Contains a rig for controlling the whole body and the face
  - There are several prepared poses available for the face rig, including visemes

Today’s task

- Explore the Metahuman face included in the project
- Try out the OVRLipSync plugin functionality
- Drive the face using the OVRLipSync plugin
  - We will need to set up visemes as blendshapes (animation curves)
  - Then we can connect the plugin component to the curves to control the face

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