Conducting Cartoon Consonans: Using Phonetics to Improve Lip-Sync Animation

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This project was an attempt to improve upon the standard practices of animating characters’ mouth movements in animation with the ultimate goal of creating a blueprint for a proposed improvement of automatic lip-sync software. In “limited” animation, a form of animation that uses various methods to reduce the number of frames necessary to animate such as in broadcast cartoons, it is common for character designers to create a “mouth chart” of mouth shapes for prescribed phonemes to match the words of a voice actor to an animated character’s mouth movements. In recent years, animation software, such as the industry-standard Toon Boom Harmony, has incorporated features to automate this process by “reading” audio files to assign these designed mouths to a character’s speech; however, this software is often notably inaccurate and lacking in quality. Furthermore, the archetypal mouth chart is notably lacking and linguistically inaccurate, leading to a notable “flapping” of characters’ lips. Thus, this project sought to study and apply phonetic anatomy to create a blueprint for a mouth chart that was representative of officially recognized International Phonetic Association phonemes that could be used not only to improve yet expedite the process of lip-sync animation but could serve as the foundation of an advanced and accurate auto lip-sync software. To do this, the anatomy of the vocal tract was studied to be replicated in 2-D design, and footage of the student researcher speaking various phonetically transcribed phrases was “rotoscoped,” or traced over in animation, to isolate the movements of the mouth for analysis. Ultimately, this not only produced a mouth chart blueprint that was more comprehensive yet simplified for limited animation and viable to be used in auto lip-sync software but also revealed an expedited process for manually animating lip-sync through the use of phonetic transcription.