SAKUGA ANIMATION IN HARMONY

by

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ABSTRACT

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'Sakuga' is colloquially known to be a style of Japanese animation (anime) characterized by dynamism, fluidity, and attention to detail. It helps to make a scene livelier, more realistic, and exciting, and is typically used for action scenes. With RETAS Studio being the industry-standard 2D animation software in Japan, its Western counterpart, Toon Boom Harmony, does not see much use in the anime industry. This project attempts to create a short sakuga animation of a dragonfly using Harmony. The dragonfly's trajectory is initially mapped out in the software, followed by sketches of the key frames defining its movement. The in-between frames are then sketched out while making sure there are enough images to achieve a fluid "sakuga" aesthetic. A motion blur effect is used for the background to convey the speed at which the insect is flying. The end result is compared to existing examples of sakuga animation, and it is evident that the effect is achievable using modern Western industry-standard software.

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CHAPTER 1

INTRODUCTION

This project is a short animation of a dragonfly inspired by sakuga animation from Japanese anime. "Sakuga" (作画） simply translates to "drawn pictures" but the term has come to be associated with fluid, dynamic animation, especially in anime (Hobbes Sakuga Merch). Toon Boom Harmony is currently the industry-standard 2D animation software in the US (6sense), but it does not see much use in Japan as RETAS Studio dominates the anime industry (Sevakis). As RETAS Studio is highly expensive, this project attempts to reproduce the Sakuga aesthetic using Harmony.

Since hand-drawn animation forms the basis for the vast majority of anime (Coats), this project also relies mostly on pictures drawn frame by frame. The subject matter was kept simple so that maximum attention could be given to the animation process within the limited time available – the dragonfly flies into view, performs a few antics, and the scene ends. This visual is then compared to existing examples of sakuga animation.

CHAPTER 2

BACKGROUND

Although sakuga is primarily associated with anime, it is not exclusive to anime in the sense that fluid and dynamic movements can be seen in 2D animations from all over the world. Disney's classics such as *Snow White and the Seven Dwarfs*, *Bambi*, *The Little Mermaid*, *Mulan*, *Tarzan*, etc. are well known for their fluid and lifelike animations. As a matter of fact, Japanese animation – especially in its earlier days – was far more limited in motion compared to its Western counterparts. Popular titles like *Ranma ½* and *Sailor Moon* are examples of older anime that relied heavily on "limited animation" (Eberle).

With the advent of computer-generated (CG) 3D animation, the animation industry in the Western world has largely moved away from the hand-drawn method, with larger studios like Disney, Pixar, and Dreamworks focusing almost solely on 3D animation; well-known titles from this era include *Toy Story*, *Frozen*, and *Kung Fu Panda*. This is due to CG animation being faster, cheaper, and less labor-intensive than the traditional method of painstakingly drawing, coloring, and refining every frame by hand (Brajer). The commercial success of these films has also encouraged studios to keep investing in these technologies. The realm of 2D animation in the West has also moved away from hand-drawn animation towards puppet animation, which – similar to 3D animation – utilizes rigs to manually move drawings, reducing the need for multiple individual drawings (Adobe); a good analogy for this would be attaching puppet strings to a drawing. Popular 2D animated titles like *Rick and Morty*, *Steven Universe*, and many others were made using

this method.

The industry in Japan, however, still predominantly uses hand-drawn animation. Due to the arduous nature of this process and the sheer amount of 2D animated series and movies produced by Japan every year, the bulk of anime is still reliant on limited animation so as to cut costs and meet deadlines. However, anime becoming the largest medium of hand-drawn animation means that the unique charm of fluid hand-drawn animation is now predominantly found in anime. This is what has come to be known as "sakuga", a temporary but drastic change in the animation quality of an anime for the purpose of making a scene more impactful. The popularity of sakuga has led to various websites and social media accounts compiling and disseminating sakuga sequences. A prominent, recent example of sakuga animation can be seen in episode 27 from Season 4 of *Attack on Titan*, in which the bulk of the action scenes from the 11-minute mark onwards are animated in this style. The difference becomes obvious when these scenes are compared to action scenes from prior episodes or from the same episode before the 11-minute mark.

Since the Western industry relies mostly on rigged animation nowadays, Harmony's features are heavily geared towards this method. Nevertheless, Harmony can still be used for hand-drawn animation and, in principle, should be able to produce sakuga animation as well, which is what this project attempts to do.

CHAPTER 3

METHOD

Initially, the movements of an actual dragonfly were studied. Although Sakuga animation for an action scene typically deviates from realistic proportions and movements for dramatic effect, it is important and useful to have real life references so that baseline proportions can be established and broken when appropriate.

The next step was to formulate an idea for the actual animation sequence. The dragonfly's trajectory across the screen throughout the animation was mapped out using a simple black square as a reference point. The following graphs show how the position and scale change over time as the dragonfly comes into view diagonally from the top left, makes a few linear movements, moves away from the camera, and then quickly moves back towards the camera. This feature of Harmony was utilized due to it being far more efficient and reliable than changing the position and scale manually through drawings.
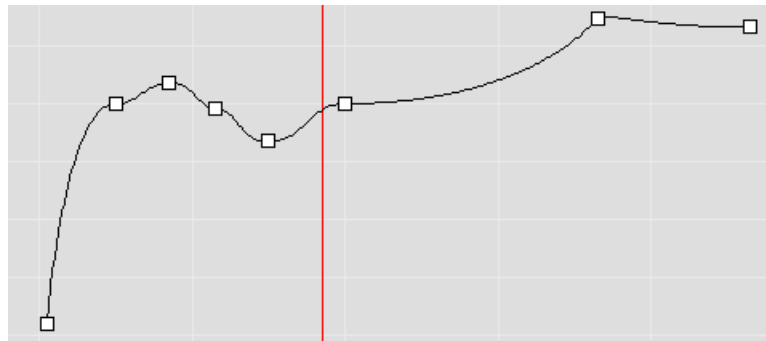

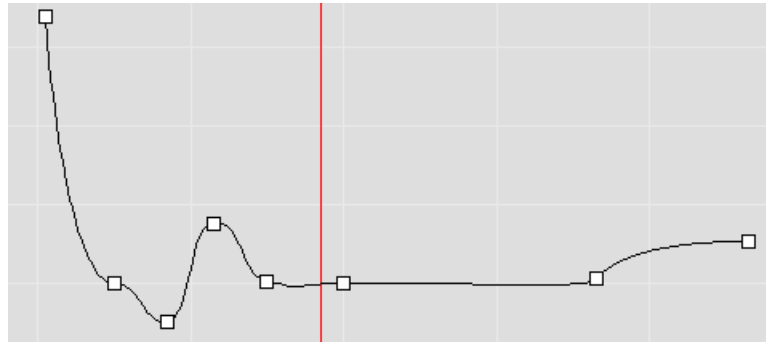Figure 3.1. Change in horizontal coordinate over time

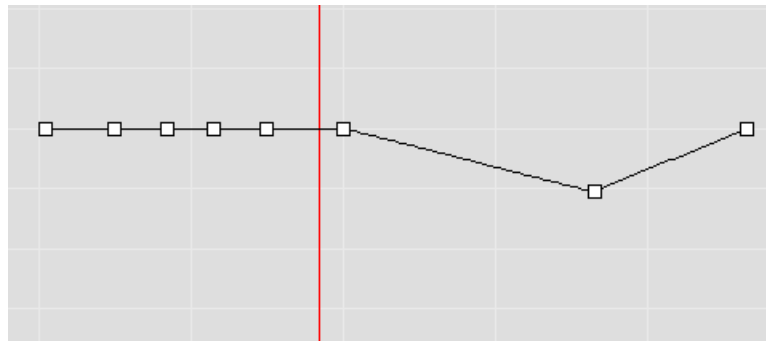Figure 3.2. Change in vertical coordinate over time

Figure 3.3. Change in scale over time

These graphs do not cover the final 18 frames of the animation because those frames were scaled and positioned manually for a less controlled and more chaotic visual.

Since it was decided that the dragonfly would be rotating along the axis of its body, the first few drawings were of its body making the sideways turn. The wings were not yet drawn because having them on a separate layer in the software allows for more control. These drawings eventually served as key frames for the animation.
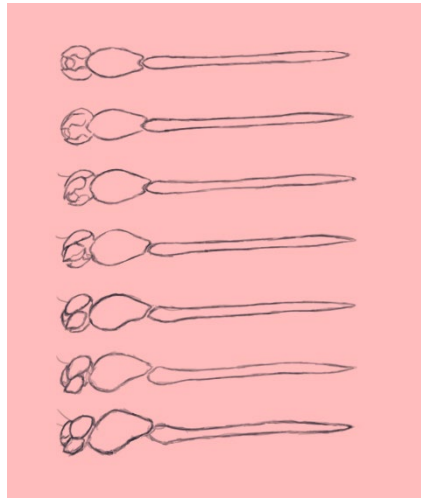
Figure 3.4. Base drawings (background altered for contrast)

Once the in-between frames were drawn and the sideways animation looked smooth enough, the sequence was copied and pasted in reverse for the dragonfly returning to its original configuration for the finishing spin. Several frames were skipped for the reverse sequence in order to achieve faster motion.

Traditionally, anime runs on 24 frames per second (fps) and 2 frames per image, which leads to 12 images being shown per second (Anime News Network). Changes can be made to the frame rate when necessary. This animation runs on 24 fps and 1 frame per image, leading to 24 images per second for double the fluidity of a typical anime scene.

In order to achieve a continuous "buzzing" effect for the wings, the drawings for the wings were made to change drastically with every frame. Moreover, these drawings are random, chaotic shapes that only vaguely resemble actual dragonfly wings. Since the human eye would never make out the shape of a dragonfly's wings while it is flying, the buzzing visual tends to favor randomness and constant change.

In a similar vein, the dragonfly's main body shows deformations in the form of motion lines in multiple frames. As discussed earlier, deviations from realistic proportions

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are common in sakuga as they make the animation more dramatic. Additionally, motion

lines and arcs both inside and outside the body help to further sell the illusion of movement.

Figure 3.5. The dragonfly's illustration in frames 46 and 88
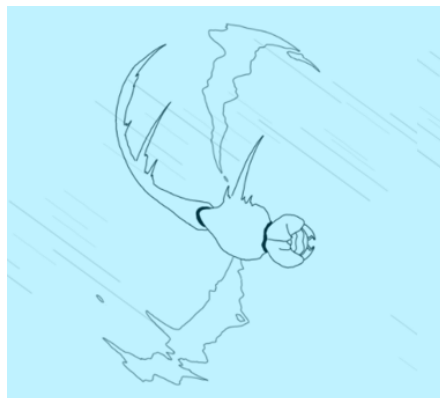

Figure 3.6. The illustration in frame 97

Figure 3.7. The illustration in frame 99

A constant motion blur running in the background helps to convey the speed at which the insect is flying. A second motion blur running along the dragonfly's body further amplifies this effect. This is a quick and effective way to convey high speeds without fully illustrated backgrounds when the camera follows the moving object or character.

Harmony's onion skin feature can be used to show much of the dragonfly's trajectory in a single image. The following figure shows a frame with prior positions in red and upcoming positions in green.
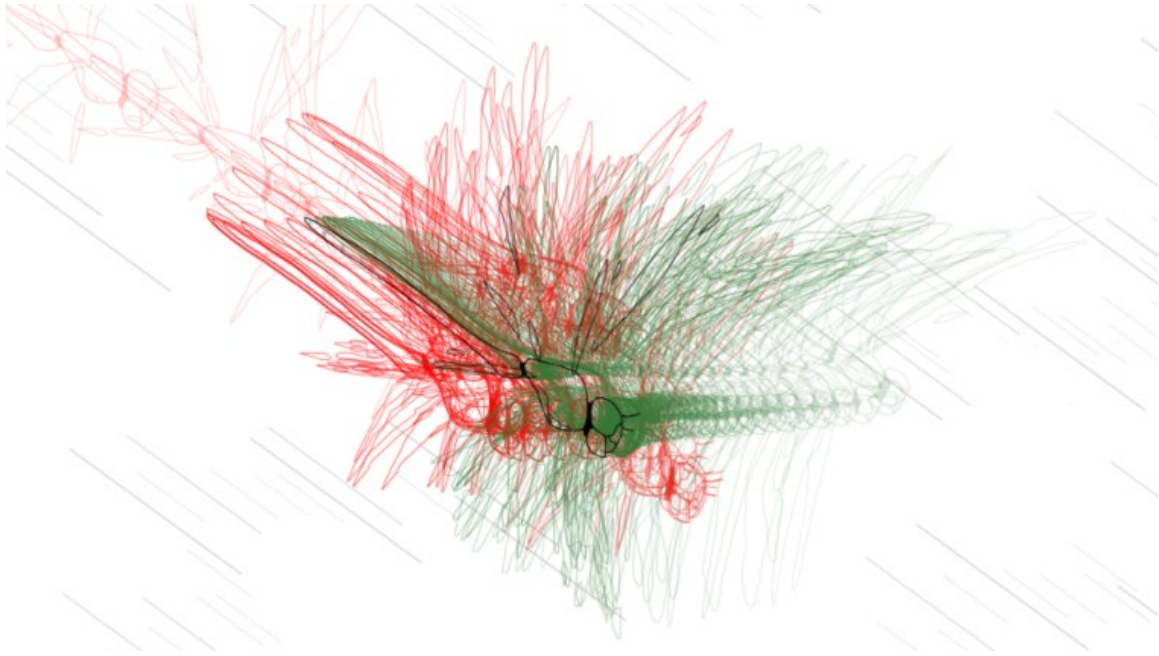

Figure 3.8. The dragonfly's trajectory

CHAPTER 4

RESULTS AND DISCUSSION

The animation can be viewed in its current and most updated state by using this QR code:


Figure 3.9 Animation QR Code

Presently, the animation is hardly 5 seconds long and lacks color and detail, and this is in spite of countless hours of work. This goes to show how time-consuming and laborious the process of hand-drawn animation is, especially when being done by a single artist and animator.

The first sakuga animation this project may be compared to is a short sequence from *Kill la Kill* animated by Yoneyama Mai, in which the heroine spins her weapon in a manner similar to the way this dragonfly spins (Post 214637). The still frames reveal chaotic shapes that break the weapon's original model completely but follow the direction of motion, complete with the use of motion blur and arcs to better sell the illusion of movement. Although there is a degree of subjectivity involved, it can be argued that the two animations are noticeably similar.

The second animation that can be used for comparison is a short sequence from *Spirited Away* animated by Hideaki Yoshio that shows glowing embers from a heated furnace (Post 225340). The embers rely on randomness similar to the dragonfly's wings. It may be argued that the embers look far more realistic while the wings look somewhat stylized.

From these results, it is evident that the Sakuga aesthetic, or at least something close to it, can be achieved using Harmony. Improvements can be made via the addition of color, backgrounds, special effects, and additional frames to make the animation longer and more impactful.

.APPENDIX A

ALL ANIMATION FRAMES
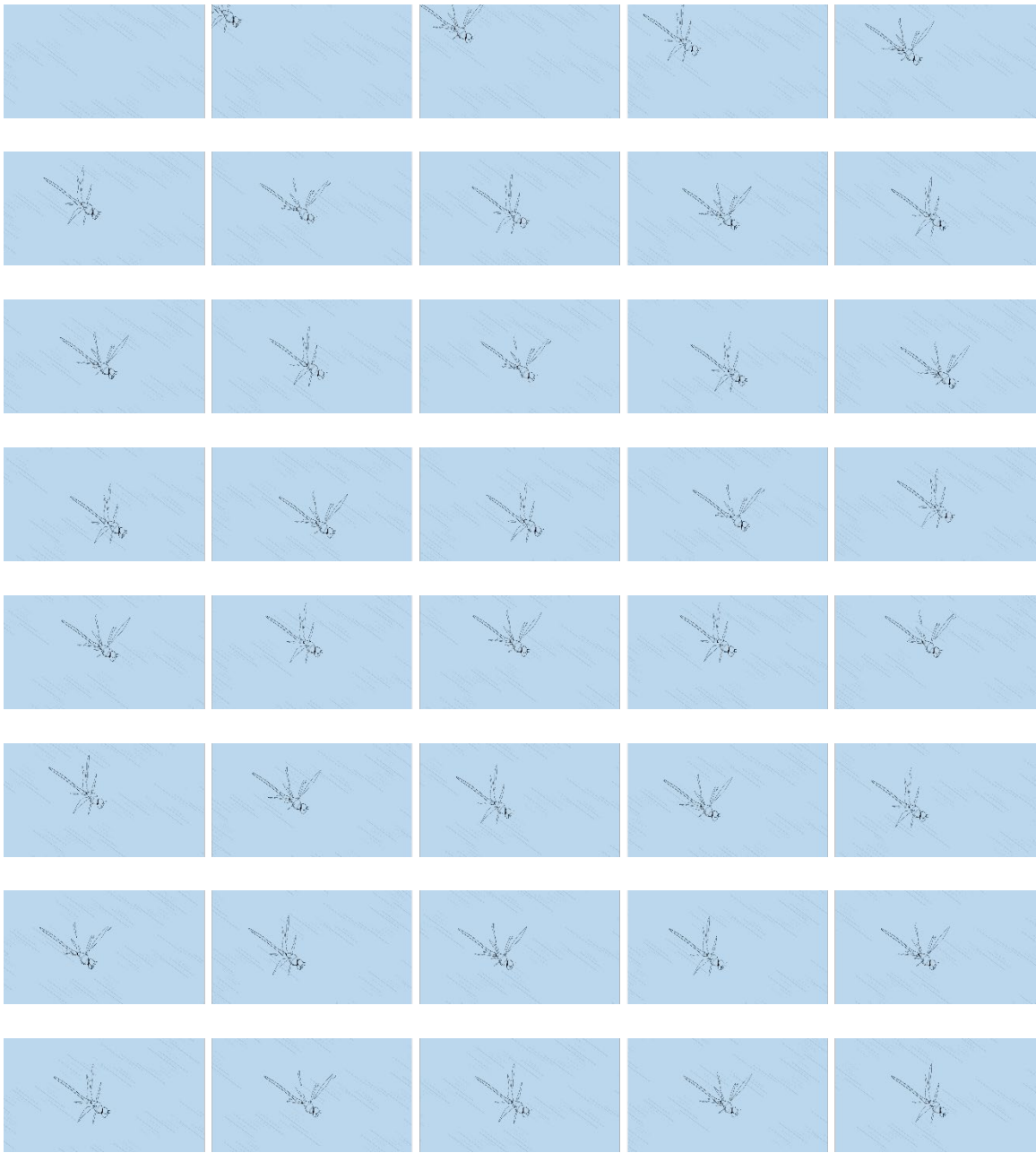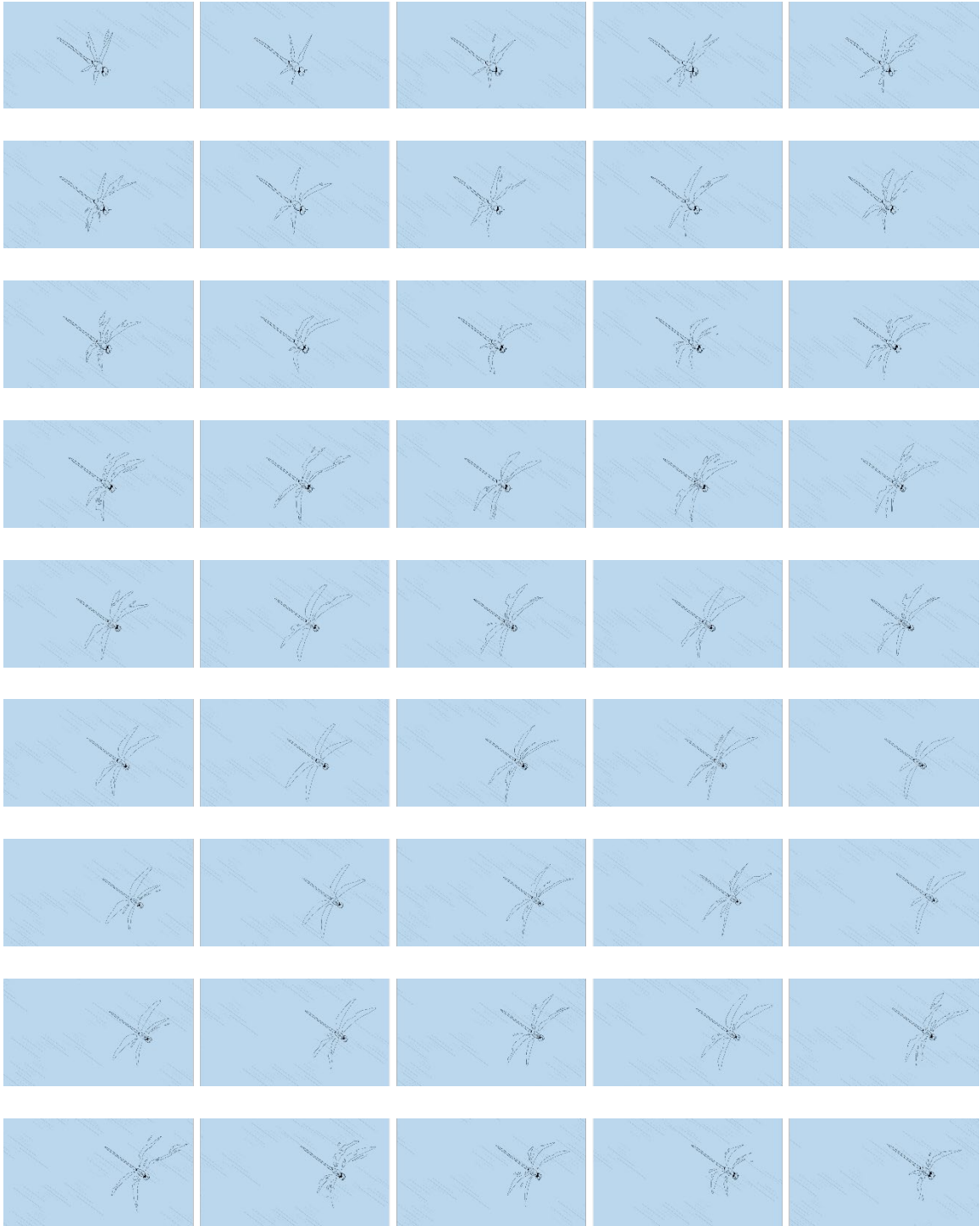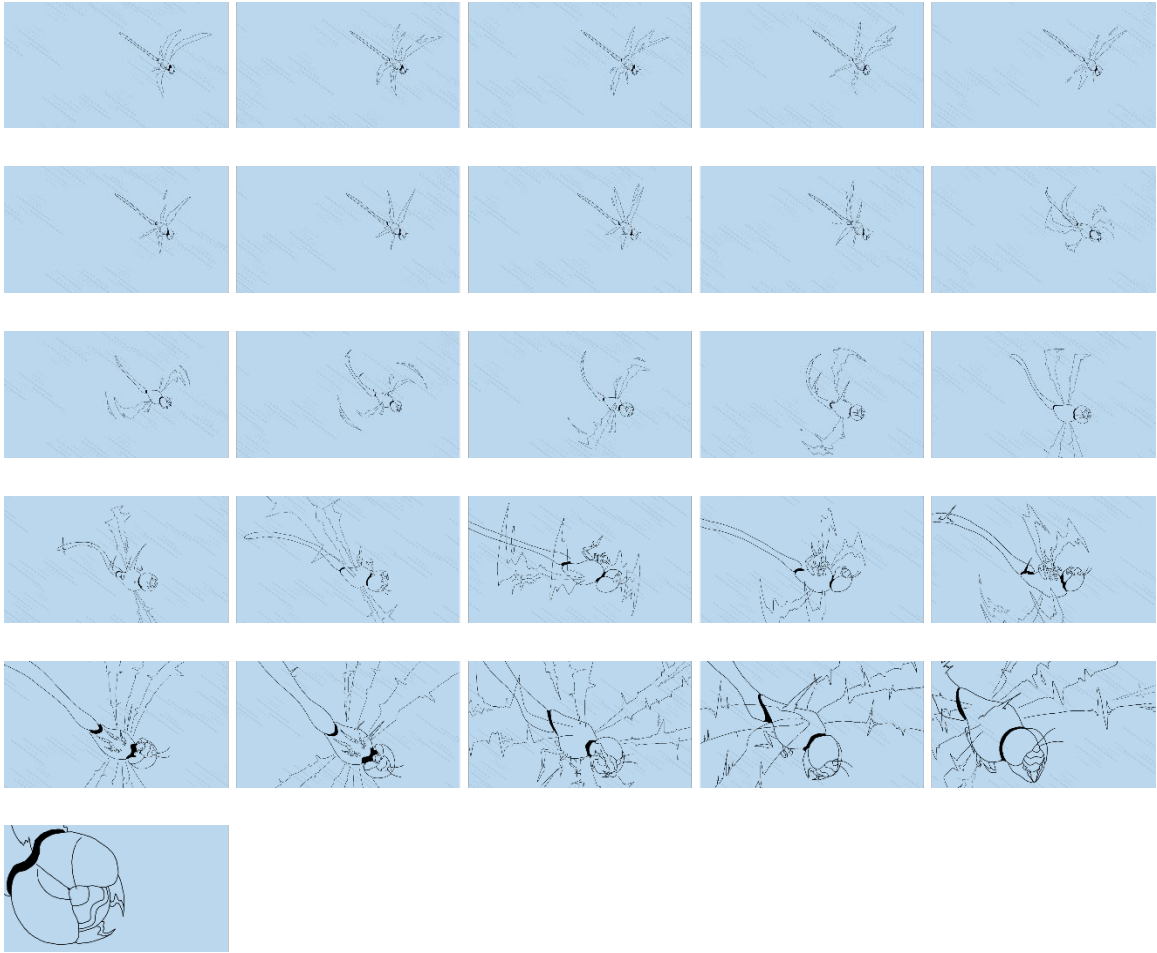
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BIOGRAPHICAL INFORMATION

Farhan studied animation and interactive media at The University of Texas at Arlington and intends to work in the animation and gaming industry in the United Sates or Japan.