

Makuta

Customer Success Story
Hyderabad, India

Autodesk® 3ds Max® software
Autodesk® Maya® software
Autodesk® Mudbox® software

“The ability to efficiently output rendered passes from 3ds Max really assisted us in ensuring render jobs could be efficiently managed with separate render presents designed for environment, fly, wing 3D motion blurring and foreground objects.”

-Pete Draper
Co-founder and CTO
Makuta Effects

Creativity on the fly

Top visual effects firm uses Autodesk® 3ds Max® and Autodesk® Maya® to create a fantasy film about a housefly with a vengeance, *Eega*.



Image courtesy of Varahi Chalana Chitram Productions, Makuta VFX.

The advent of Visual Effects (VFX) in Indian motion pictures, driven by improving skill sets and better technologies, has had a spectacular effect on the quality of films. Until recently, VFX were largely used as a device to deftly shift the drama in a movie, but today it can easily control the reins of an entire movie.

Varahi Chalana Chitram's *Eega* is the perfect example of VFX playing a dominant role in the narrative of a movie. The movie is about a murdered man who is reincarnated as a housefly to avenge his death. It is not just a story about a domestic pest with a vengeance; it's also about watching a feature film from a fly's point of view.

SS Rajamouli, the Director of *Eega*, approached Makuta Effects, a VFX firm set in Hyderabad, founded in 2010 by industry veterans Adel Adili, Pete Draper and RC Kamalakannan. The Director had in the past collaborated with the trio on his epic movies *Magadheera* and *Maryada Ramana*, Makuta Effects was his first.

“The Director approached us and asked if we could handle such an ambitious project. We knew him well and knew this (feature film) would be a challenge without a shadow of doubt. After some consultation with the team members, we came back with a resounding ‘yes’,” says Pete Draper, co-founder and CTO of Makuta Effects.

The project was really enticing by all accounts because nearly 99 per cent of the environments were to be computer generated and they in fact were. Makuta Effects was mandated to create the principal animation of the fly, in addition to lighting, rendering, and compositing the character

so that it appeared natural in its interaction with the surroundings.

Designing the fly

A good actor expresses a lot through facial expressions and body language. But in the case of a fly, the challenge lies in its eyes that constitute 80 per cent of its face. How does one express love, anger, and other emotions through the eyes of a fly.

Also one could not recreate a real fly because it would have appeared too grotesque to display its physical characteristics on a 40" screen. While the animation worked well for the most part, the model of the fly didn't. After several design iterations, a smart and stylish version of the fly was finalized.

The VFX firm used Autodesk 3ds Max and Autodesk Maya software for modelling, animating and rendering the character. While the body model and shaders were based on the morphology of an Indian housefly, its facial features were tweaked to make it more presentable. The anatomy of the fly was sculpted using a combination of traditional polygon modelling and Autodesk® Mudbox® software, and some ‘cheats’ were introduced to enable the character to express emotions.

“The rig itself went through several revisions until it could do whatever the animators wanted to do, such as pushing the character around without popping, a technique in which we imitate film characters being animated by stop motion. The action was tough due to its anatomical constraints; in some shots the animators had to get the fly up on its hind legs, which pushed the rig to the extreme,” says Draper.

The animation team at Makuta used a dual-rig set-up with CAT (Character Animation Toolkit) used for the rigging within 3ds Max as well as additional custom attributes to drive the hair systems.

Since the final design of the fly was locked late in the process, there was very little time to actually set-up environments, light, render, and composite the shots. In fact, 70 per cent of the movie was completed in the last seven months of its production. That was possible only because a huge portion of sequences without the fly were produced in advance.

Every environment that the fly interacted with was created before the shoot. The reason: The camera couldn't capture the fly from the ground level because of the size of the lenses. Also, the slightest camera shake appeared like an earthquake, so all these portions were computer generated in advance to speed up the production. Simultaneously, the lighting had to be matched along with careful high-detail modelling and camera takes with extreme close-up.

Challenges

One of the biggest challenges was the trench episode which involved a highly detailed 3D environment with crashing water destroying all in its path, chasing the fly after it had been reincarnated. This involved a lot of digital sculpting of geometry, highly detailed textures, and procedural materials to generate the final look and feel, along with the high-density fluid simulations that had to hold up to close camera scrutiny.

The sequence meant a lot of procedural modelling of assets, procedural materials and textures, and

some good old-fashioned polygon pushing. However to get the level of detail required, the team needed to work with assets that had around 8 million polygons just for the outer wall of the trench and another several thousands of polygons for a single rock.

There were 70 versions of rock types duplicated procedurally thousands of times over the trench geometry using a custom system that the team built to place the rocks logically in the environment based on size, disturbance, and erosion parameters.

"If we had stuck to using geometry, the entire system would have fallen off. To get around the limitations we baked out every rock type to a mental ray® proxy and then 'instanced' the lot within the scene. Apart from an additional particle system to generate smaller rock debris, the entire environment was rendered with mental ray proxies which meant we could push the envelope with respect to detail," says Draper while adding that his team kept adding detail such as twigs, leaves, debris and stones, resulting in a scene that had over 5.3 billion polygons.

In contrast, another scene involved the fly travelling through the A/C duct of a car which, again, was totally CGI. The toughest part here was to grunge up the environment as much as possible to make it look like a used car while still being able to see different materials. It was also challenging to strategically place lights in an environment which should realistically be pitch-black.

"The A/C system was designed as a conduit sequence to get the fly back into the car but still had to have a level of danger for the fly and the

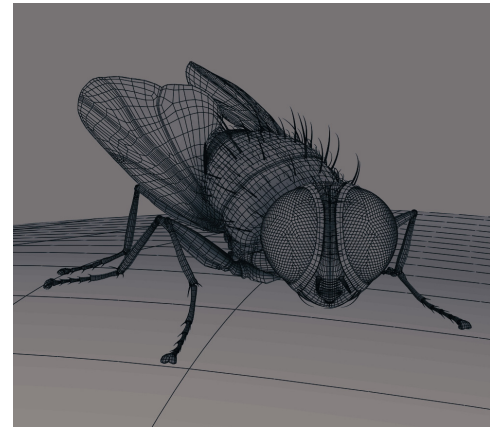


Image courtesy of Varahi Chalana Chitram Productions, Makuta VFX.

audience who were travelling alongside. This was one of the sequences that went perfectly well from the conception stage till the final product, as we designed the fly's and camera's path as if it was a 'one-take wonder'." adds Draper.

The camera animation was designed to give audiences the experience of being carried along with the fly, buffeted by winds and struggling to stay in the frame, so the camera work was kept quite loose intentionally. This was also procedurally controlled by controllers that were designed to add some secondary animation with respect to the orientation.

Solution

Even though Makuta was rendering purely in 3ds Max, the company needed to design a Maya version of the fly primarily for its exterior suppliers as they had Maya pipelines. However in some circumstances the company ended up rendering some of their sequences. Maya's inclusion into Backburner really helped cut down the render setup and submission times.

"Thankfully, the mental ray® materials which were present in 3ds Max and Maya allowed us to do a port, however some elements such as replicating the hair were more problematic. The ability to efficiently output render passes from 3ds Max really assisted us in ensuring render jobs could be efficiently managed with separate render presents designed for environment, fly, wing 3D motion blurring and foreground objects," adds Draper.

Makuta Effects worked on *Eega* for approximately 18 months, excluding time for initial script development and consulting. Over 2,200 shots were completed for the film, with 85 per cent of those completed in-house. The rest were executed by domestic and international suppliers, assigned and supervised by the Makuta team. It is said that an adult fly doesn't live more than 15-20 days, but here is a movie that immortalizes the fly, and to a large extent humanizes it.



Image courtesy of Varahi Chalana Chitram Productions, Makuta VFX.