3D particle word system with WebGL

Fabio Vittorini

fabio.vittorini@stud.unifi.it

Computer Graphics and 3D

UNIVERSITÀ
DEGLI STUDI
FIRENZE

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DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE

July 2017

3D particle word system

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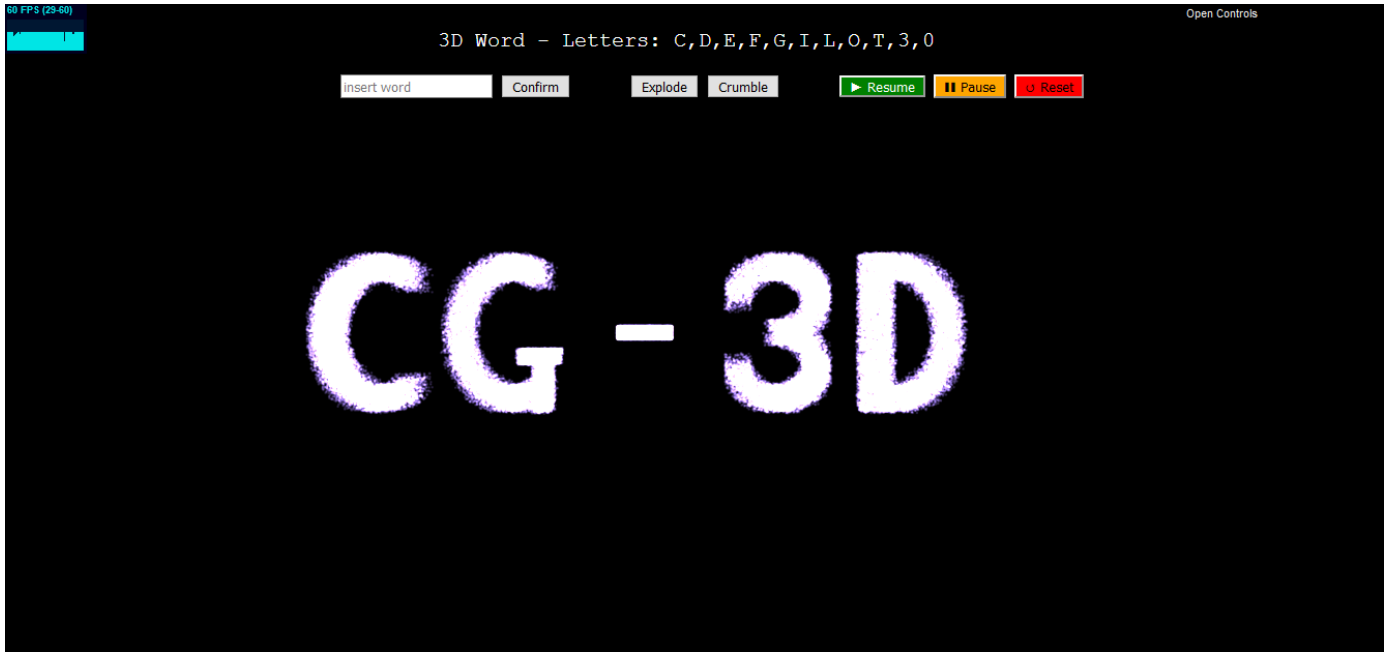
3D particle word system is an application that allows the user to create a simple 3D text using grups of particles.



- The user can interact by rotating, moving, exploding and crumbling the word or changing some options like color, number of particles, transparency etc...

Software and Libraries

The application is based on **WebGL**, a javascript API based on OpenGL for rendering 2D and 3D graphics within any compatible web browser inside an HTML *canvas* element.

With WebGL is possibile to use javascript functions within OPENGL ES API to manage and view graphics results on the browser.

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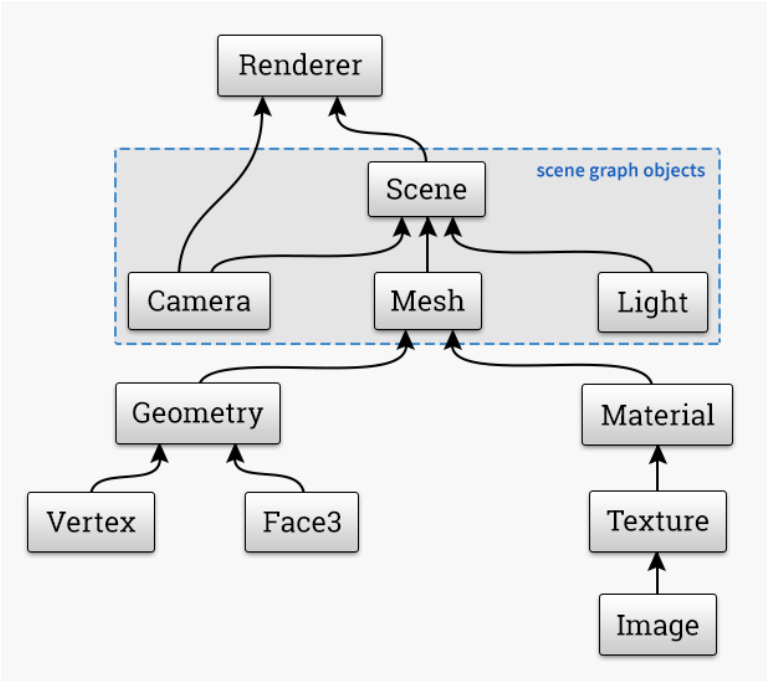
- The application uses **three.js**: a 3D Javascript library that allows to create and use simple scenes using javascript classes.



- The aim is to create objects among which the camera and the *particle system* that they will be added to the scene and then rendered.

The particle system

The **particleSystem** class represents the core of the application, where are managed the *vertex* and the *fragment* shaders and all groups of particles. Each group contains the particles that will form the corresponding letter in the right position.
One single particle is represented by some properties like position, velocity and color that are initilized when it is created.

The **shaders** manage the motion and the color of the particles using some attribute variables like the starting position, the velocity, the color and other uniform variables like the time, the scale, the gravity etc..

The project

- The project is composed of few *javascript* files in the js folder including the *three.js* library, the particeSystem class in *GPUParticleSystem.js* and the classes used to manage the option dashboard and the state of the GPU.
- There is also an image used as texture of the particles.
- To start the application the user simply have to open the main file called *index.html* located in the main folder where the system is initialized.

The application - Start

- When the application starts, it generates by default 10000 blue particles per second up to 250000 to create the text *"CG-3D"*

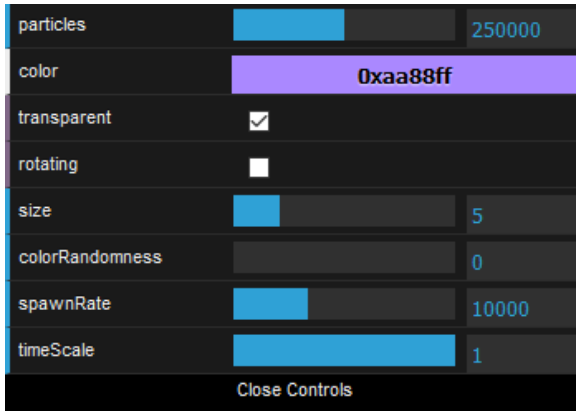
- The text rotates around y-axes and the user can interact by turning it, *stopping*, *resume* or *reset* the particles generation to default values.

The application - Text & options

- The user can insert a new simple text in the texinput field *"Insert word"* using the available letters at the top and clicking the **Confirm** button to view the 3D word.

Options

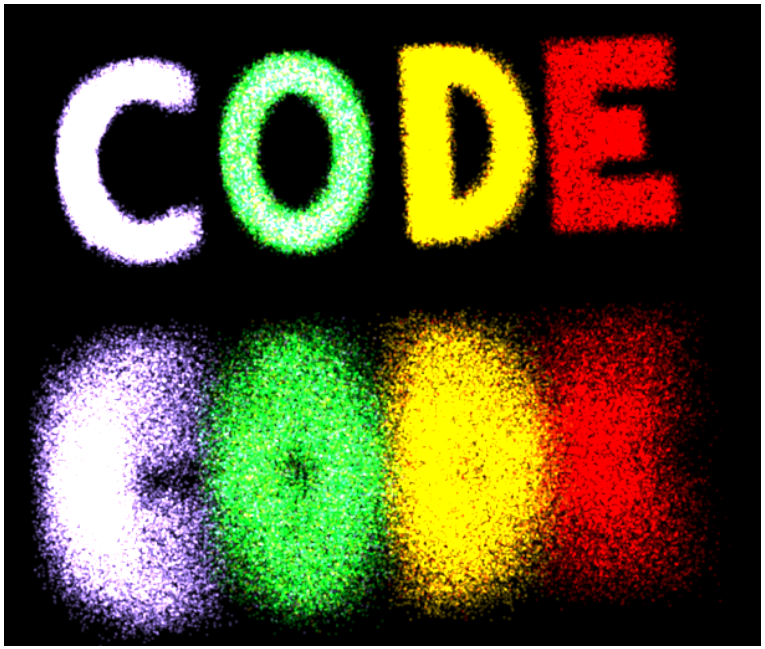
The user can also change some options like the color, the size, the number of particles per second, the time scale and the transparency using the dashboard on the top right corner.



Changing the number of particles the user has to choose and confirm a new word in the textfield.

The application - Interactions

The user can explode the text by clicking on the **Explode** button or drop the particles down by clicking on the **Crumble** button



Conclusions

This application is just an example of the use of webGL and the three.js library and it can be improved strarting from the performances and arriving to the implementation of new letters, features or options.

The source code is available on github
https://github.com/ilvitto/3D-Particle-Word-System.git