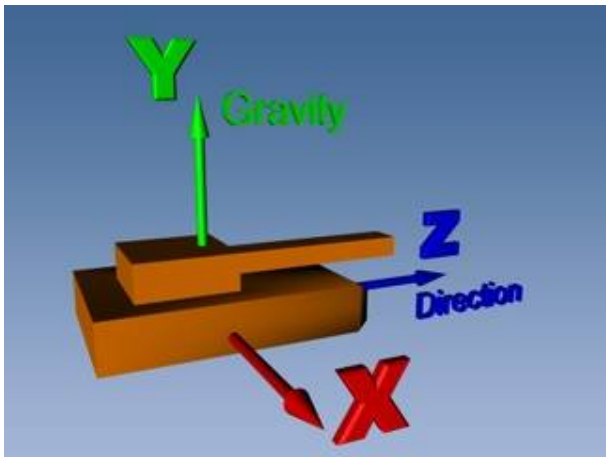
Little Brain v. 0.2 – User Handbook

Little Brain is a plugin created to manage an automatic and intelligent behaviour of the crowds.
At the moment it's only at an early stage. However it's possible to carry out simple simulations.
It's a *TAG* type plugin, located in the tags' list and named "**Little Brain**"

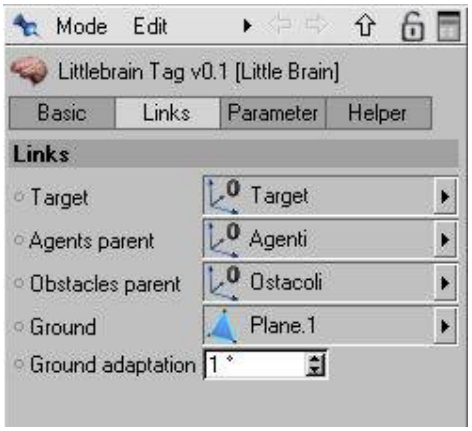
It corresponds to the following icon:



The above picture represents the axis' scheme exactly like the program assumes.
The direction is axis **Z**, and axis **Y** is the gravity.
<u>It's extremely important that even the object used like ground has the same axis' alignment, otherwise strange results could occur.</u>

The plugin icon opens three different panels:

1. Links' Panel



Different "entities" must be entered: the target, the agents, the obstacles and the ground.

Target: it's a common object. The point which all agents will try to reach. The target can be moved during animation

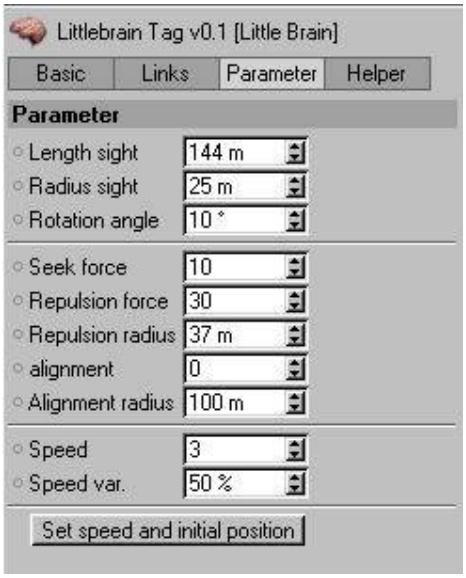
Agents parent: This object contains the agents: the protagonists of the simulation. At the moment the plugin is able to control 100 agents. Each element which is inserted as the agent parent's son, becomes an agent. On the other hand the agents' sons are not considered and they move simply because connected to the agent object.

Obstacle parent: the obstacles, like the agents, has to be

inserted into this object. The obstacles are always objects type “spline circle”. Any different object is ignored. The trick is to make the circle object surround the shape to be used as an obstacle.

Ground: It’s the reference to a polygonal object to which the agents must follow during simulation. This object must be polygonal. At the moment it’s not possible to use any type of nurbs objects.
In case no ground object is specified, the agents keep their Y value constant.
Through parameter ***ground adaptation*** it’s possible to specify in degrees the variation’s maximum value of the inclination between a frame and the next one. If this value is put to zero, the agent’s inclination is immediately equal to the normal inclination of the polygon below.

2. Parameters’ Panel



The parameters contain the variables which control the simulation. The simulation is composed by three different forces plus one. If the agent is not in contact with an obstacles, its behaviour depends on the forces of seek, repulsion and alignment.
But if the agent is in collision with an obstacle, the three forces are ignored and the agent tries to avoid the obstacle.

The first three parameters define the “sight” of the agents, that is the capacity of seeing the obstacles.
The sight is a rectangle projected by the agent towards the direction the agent is moving on.

Length sight: defines the rectangle length.
Radium sight: defines the rectangle width.
Rotation angle: specifies how much a collision must rotate once it has been calculated.

The following panel contains the parameters which control the agents’ behaviour in case no obstacles is perceived.

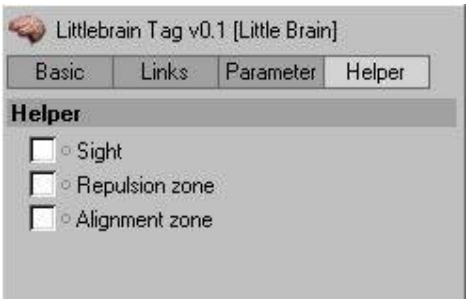
Seek force: it’s the component which define the weight to seek the target.
Repulsion force: it’s the component which define the dismission of an agent from the other ones.
Repulsion radius: defines the zone in which the repulsion force works.
Alignment force: it’s the component which define the agents’ alignment movement (like military march).
Alignment zone radius: defines the zone in which the alignment force is operative.

In the last panel there are the last two parameters which define the agent’s speed.

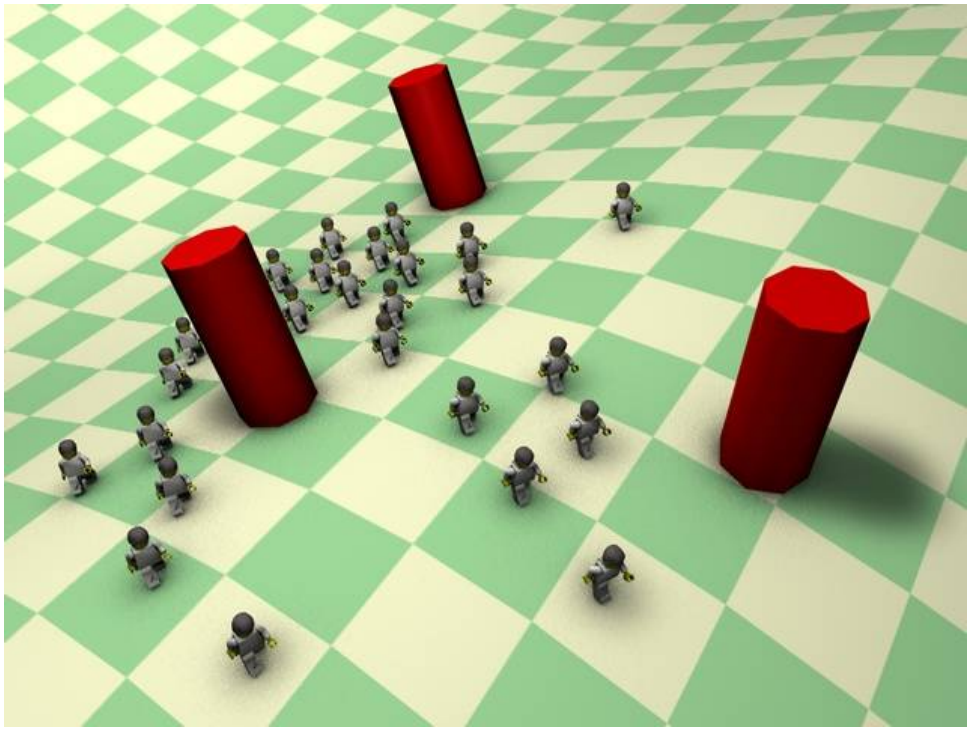
Speed: specifies the agents’ movement speed.
Speed variation: it’s possible to insert a variability of the speed between one agent and the other. Inserting a value equal to 50% on a speed set to 3, the result is an agents’ speed between 1,5 and 4,5.

Compared to the other parameters, these last two are not directly assigned to the agents, but it is necessary to click the bottom button called “**Set speed and initial position**”
This button assigns to each agent its speed and set also the initial position of the agents to the present one.
N.B.: The simulation can’t start if the agents’ initial position is not defined.

3. Helper



These parameters simply display the different zones defined for the simulation. The process in not affected in no way!

Sight: shows the rectangle defined for the sight.
Repulsion zone: shows the defined repulsion circle.
Alignment zone: shows the defined alignment circle.

The simulation starts by pressing the Play button in cinema 4D.