Title : A Design Method of Children Playground Based on Bionic Algorithm.

Summery : Playgrounds can be regarded as vital in terms of releasing children's high energy, positive self-development, exploring children's skills, self-esteem and success, as well as children's cognitive, physical and mental development. Here we propose a way to help design a children's playground through bionic algorithms. It is realizing to increase the diversity of children's games, and it can better correspond to the surrounding environment. Such facilities are often seen in kindergartens, where play facilities are usually placed in corner to ensure that the other area of the open space is sufficient for other functions. Piaget argues that games are the most basic way of communication that occurs before language and art. Games are also a means for children to explore and understand the world. Children need a platform to play games, and this platform needs to provide game possibilities but there is no certain game setting. Mr. Mitsura Senda suggested that the play space designed for children should base on circle path. The circle must contain a landmark place, large and small gathering places for children to play games, need to have a shortcut route, and be designed as a "porous" space. Slime mold is a widespread eukaryotic microbe growing in nature. Physarum Polycephalum can solve several spatial planning problems. The results show that slime mold can spread the path in the most time-saving way. We will apply the slime mold algorithm to draw grid paths in different terrains. The playground entrance can be used as a starting point for food and slime molds. Designers can avoid obstacles in the surrounding environment, such as buildings and green belts, by adjusting the position of the playground entrance. The algorithm generates paths for six different terrains including regular and irregular contours, flat ground and undulating terrain. We will use three basic design ideas to demonstrate facility design. First, we obtain the basic geometric shape according to the outline of the intercepted path. Second, we cut out this section of the path and then stretch it to make it more suitable for the ups and downs of the terrain. The ESO algorithm can generate holes with a bionic structure, which meets our vision for children's playground facilities. A series of actions such as running, touching and sound of children will trigger different lighting effects. This can turn playground facilities into public art at night through different lighting interaction mechanisms.

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