

Agritainment: 3D Collaborative Space for Training Agricultural Experience with Entertainment Elements

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Snapshot: (a) crop simulator with sowing seed, (b) crop simulator with disease and insect simulator, (c) economic simulator with buying seeds (d) map tool

Abstract

We propose an Agritainment (agriculture with entertainment) framework, where users can learn how to cultivate plants and to breed livestock. To make an agricultural training joyful, we implement 3D collaborative space for training agricultural experience, which transforms monotonous training experience into realistic experience. Technical details include (1) multi-user networking, (2) realistic plant grow-up modeling, and (3) storytelling approach for immersive experience.

Keywords: agriculture, simulation, multi-user, crop/livestock

1. Introduction and Motivation

Farming simulation and game experience has been presented by various formats. On-line agriculture simulation game provides textual information with photo images on farm working [Christophe L.2010], and on-line agriculture simulator has been focused on mass simulation of farming and breeding [Tom L. Richard et al. 2007].

However, users cannot experience what is really farming and breeding by non-realistic text and photo images in such simulators and image based games.

In this paper, we implement a 3D virtual collaborative space for agriculture training using multi-user on-line game framework. To make it more realistic, we design and implement a simulation engine, which supports (1) L-system generator with smooth interpolation scheme for plant model, (2) historic environment simulation for weather, disease, and insect simulation, and economic changes.

2. Our Approach

Agritainment system is based on our 3D game engine platform, and the details of client and server engines/tools are as follows.

(1) Client engine: it comprise of OpenGL based 3D simulation engine, network interaction engine, GUI interface, and quest and tutorial engine, (2) Server and SNS (social networking system) engine: it comprises of database and multi-user server module,

XML parser (we implement XML based agriculture simulators), network module, search module, and user management module including visiting users' farm management.

Based on our 3D game engine development, we focus on storyline design and realistic farming simulation. The details are as follows.

(1) Storyline design tool: it comprise of farm map tool, characterization tool (for user and NPC animation), automatic UI design generation tool, and resource packing tool, (2) Crop simulator: we provide six most popular crops (carrot, potato, pepper, strawberry, cabbage, melon, pumpkin and sweet potato). We simulate installing pillar, sowing seed, fertilizing, thinning out, weeding, tie-up crops and harvesting process based on crop database, (3) Livestock simulator: we simulate three livestock (cow, pig and chicken) based on livestock database. Livestock can be vaccinated to prevent disease and user can clean animal husbandry for keeping livestock clean. (4) Weather simulator: based on the user selection on the specific area in South Korea, we simulate temperature and precipitation effect using last ten years of historic weather data for the area, (5) Disease and insect simulator: we define an activation condition for disease and insect occurrence, and once met, we simulate dieback, downy mildew, plague, anthracnose, tobacco budworm and click beetle based on disease and insects database. User can buy insecticide and spray it to cure crops, (6) Fertilizer simulator: we simulate nitrogen, phosphates and potash fertilizer. user can buy and shot fertilizer, (7) Business simulator: we simulate user's buying seed and breed, user's selling crops and adult livestock, user's storing harvested crops for selling it at proper price. We use 2010's wholesale crop price and livestock price of Korea,

3. Evaluation

We tested our system with sample group who have strong interest in farming, and the result show that most users can learn the basic agricultural knowledge without fatigue or give-up.

References

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