Biology in VR Blog

Add comment

DavidOluwatimi - 29 Jul 2008 - 16:14

By adding particle systems to Meta!Blast we are intending to simulate natural phenomena resulting in visual enhancements. Thus aiding Meta!Blast to not only be of learning value, but it will also be engaging and visually stunning.

DavidOluwatimi - 28 Jul 2008 - 09:37

http://www.allmoviephoto.com/photo/2008_wall_e_009_big.html

DavidOluwatimi - 28 Jul 2008 - 09:37

http://www.allmoviephoto.com/photo/2008_wall_e_009_big.html

JohnMorales - 22 Jul 2008 - 15:18

Inverse Kinematics (IK) is applied to the skeleton structure joints in order to eliminate unnatural movements in the bones. Inverse Kinematics can be defined as the problem of calculating the angle of a desired joint in a hierarchical object. Human body has learned the ability of solving IK.

JennaLanger - 22 Jul 2008 - 09:17

Future Work

Meta!Blast will continue pursuing realism with the addition of these dynamic components. Future work includes visual authoring of the user interface, using particle systems to replace polygons on structural objects, and animations based on real-time motion capture. The game will continue to develop into an entertaining interactive educational game. Meta!Blast is being distributed to high school students and teachers for educational and research purposes.

JennaLanger - 21 Jul 2008 - 16:12

Background Work

Research has shown that students find games more interesting than classroom instruction. A study reported that 87% of students were more interested in learning from a game than in a traditional setting [games article]. But once we get these students playing the game, how can we keep them intrigued and entertained? According to Reiber, students are more likely to play an educational game multiple times if it includes dynamic graphics. The graphics are said to “enhance the motivational appeal of instructional activities” [games article]. If the student is motivated, they are more likely to continue the activity for longer periods of time.

Meta!Blast is a game of “edutainment”, meaning it consists of a balance between education and entertainment. The creators of the game want students to be entertained, but also want the biology to be a primary aspect. Entertainment is an “effective way to transmit information,” making the game a fun and effective tool for teaching biology [metablast]. A plant cell is a very complex concept that is hard to visualize. Kurt Squire of MIT suggests that allowing students “to interact with a model of a complex system…places learners in a unique position to understand the system’s dynamics” [MIT]. By using visual realism the students will stay immersed in the environment while interacting and learning from an accurate representation of the cell.

JennaLanger - 21 Jul 2008 - 09:09

Abstract

Meta!Blast is an educational video game about cell biology geared towards high school and college students. The game helps students visualize an accurate representation of a three-dimensional plant cell. Students learn cellular plant biology by exploring a virtual soybean cell and perform biochemical reactions to help keep the cell alive. Today’s video games are constantly improving graphics and visual effects. The same is needed for educational games in order to keep the user’s attention. The goal of this project is to animate characters, add particle systems to enhance visual realism, and create a look and feel that matches the artistic approach of the visuals to enhance the user experience. When completed, the game will be distributed to high school students and teachers for educational and research purposes.

DavidOluwatimi - 17 Jul 2008 - 15:33

Thylakoid representation simulating visual enhancement with distance within membrane

DavidOluwatimi - 17 Jul 2008 - 14:05

Thylakoid representation within the inner membrane. Inner membrane not shown

DavidOluwatimi - 17 Jul 2008 - 11:51

Here is the thylakoid which is within the inner membrane. Inner membrane not shown.

DavidOluwatimi - 16 Jul 2008 - 10:04

o Refers to 3- dimensional graphics that replicates

JennaLanger - 14 Jul 2008 - 09:16

The addition of skeleton animation and inverse kinematics gives Meta!Blast

Main
Hello Glen Galvin?
Log Out
Create personal sidebar
Main Web
Google Calendar
People
Blogs
Fun Things to Do
Logistics & Admin
HCI Website
Create New Topic
Index
Search
Changes
Notifications
Statistics
Preferences
Webs
Main
Sandbox
TWiki
TWiki Tip of the Day
SlideShowPlugin for presentations
Use the SlideShowPlugin to convert a topic with headings and bullets into a slideshow presentation. This …
Read on

characters realistic poses and joint movement by applying movement constrictions to the joints.

DavidOluwatimi - 10 Jul 2008 - 14:33

Simulate physics-based explosions when a player fires upon an attacking virus.

Particle-based models simulate visual fading with distance based on the real-world optics; a thylakoid in the foreground is seen with more detail while the cell membrane in the background visually appears faded in less detail.

JennaLanger - 10 Jul 2008 - 14:26

Examples

Duplicate explosions when a player fires upon an attacking virus.

Particle-based models simulate visual fading with distance based on the real-world optics; a thylakoid in the foreground is seen with more detail while the cell membrane in the background visually appears faded in less detail.

Optimize the visual effects of the foreground region in the game like a thylakoid that the player could see while reducing the visual effects of the background region like the back wall of the inner membrane. But as the player moves closer to it the visual effects will increase for the background; vice-versa for the foreground.

Tentative Schedule

Particle Systems (David)

- **Week 5:** *Particle Generators* - Rate, Burst
- **Week 5 - 10:** *Working Drawers* - Point, line, quad, sphere, metaballs, 3D nodes
- **Week 5 - 10:** *Particle Affecters* - Force-based, gravity-based, collision, material changes

Character Animation (John)

- **Week 5:** *Skeleton Hierarchy*
- **Week 6 - 7:** *Skeleton Animation*
- **Week 8:** *Attach Meshes to the Skeleton*
- **Week 9:** *Load Animations from Maya*
- **Week 9:** *Allow non-animation modification of the skeleton*
- **Week 10:** *Inverse Kinematics*

User Interface Look and Feel (Jenna)

- **Week 5:** *Basic Components* - Buttons, labels, text fields, text areas, combo buttons, panels, tooltips
- **Week 6:** *Complex Components* - Radio buttons, check boxes, spinners, combo boxes, progress bars
- **Week 7:** *More Complex Components* - Scrollbars, lists, tables, trees, windows, sliders, menus
- **Week 8:** *Icon Sets*
- **Week 9 - 10:** *Designing the Interface* - Positioning of components in the application

Research Articles

- physics_game.pdf: Electromagnetism Supercharged! Learning Physics with Digital Simulation Games
- protein_simulation.pdf: Case Study: An Environment for Understanding Protein Simulations Using Game Graphics
- reverse_engineering.pdf: Instructional Ethology: Reverse Engineering for Serious Design of Educational Games
- animation.pdf: Synthesis of Complex Dynamic Character Motion from Simple Animations
- digital_game-based_learning.pdf: Digital Game-Based Learning
- games_motiviation_learning.pdf: Games, Motivation, and Learning: A Research and Practice Model
- metablast_virtual_cell.pdf: MetaBlast? ! Virtual Cell: A Pedagogical Convergence between Game Design and Science Education
- VideoGamesAndFutureOfLearning.pdf: Video Games and The Future of Learning
- Cultural_Framing_of_ComputerandVideo_Games.doc: Cultural Framing of Computer/Video Games
- production_deployment.pdf: Production and Deployment of Educational Videogames as Assessable Learning Objects
- next_generation_learning.pdf: Creating Next Generation Blended Learning Environments Using Mixed Reality, Video Games and Simulations
- IJIS.doc: Video Games in Education
- designing_for_smart_player.pdf: Designing for the smarter player: usability design and user-centred design in game-based learning
- fulltext.pdf: On-the-fly Curve-skeleton Computation for 3D Shapes
- fulltext-walking.pdf: Human walking animation based on foot reaction force in the three-dimensional virtual world
- fulltext-IK.pdf: Analytical inverse kinematics with body posture control
- fulltext-skeleton.pdf: Computing hierarchical curve-skeletons of 3D objects
- p522-grochow-IK.pdf: Style-Based Inverse Kinematics
- p564-burtnyk-keyframe.pdf: Interactive Skeleton Techniques for Enhancing Motion Dynamics in Key Frame Animation
- skining.pdf: Curve skeleton skinning for human and creature characters

- a72-baran.pdf: Automatic Rigging and Animation of 3D Characters

HCI MOVIE

C++ Programming Project

- yahtzee.zip: yahtzee.zip

OpenGL? Programming Project

- jenna_atom.zip: jenna_atom.zip

Pre-Project Presentation

- metablast_progress_final.ppt: metablast_progress_final.ppt
- DraftAnimation.doc: DraftAnimation? .doc
- DraftAnimationII.doc: DraftAnimationII? .doc
- DraftAnimationIII.doc: DraftAnimationIII? .doc
- DraftAnimationIV.doc: DraftAnimationIV? .doc

*Fig 1 link

*Fig 2 link

- untitled.bmp: untitled.bmp
- particles2.bmp: particles2.bmp
- ParticlesSystemPoster.doc: ParticlesSystemPoster? .doc
- PaperIII.doc: PaperIII? .doc
- ConclusionAndFutureWorks.doc: ConclusionAndFutureWorks? .doc
- Animation.pdf: Animation.pdf
- metablast_paper_draft_1.doc: metablast_paper_draft_1.doc
- metablast_paperJohn_sg.doc: The references are at the Wiki
- androids_ishiguro15.pdf: androids_ishiguro15.pdf
- Animation17.pdf: Animation17.pdf
- exampleOfVideogame18.pdf: exampleOfVideogame18.pdf
- Uncanny14.pdf: Uncanny14.pdf
- v1n200116.pdf: v1n200116.pdf
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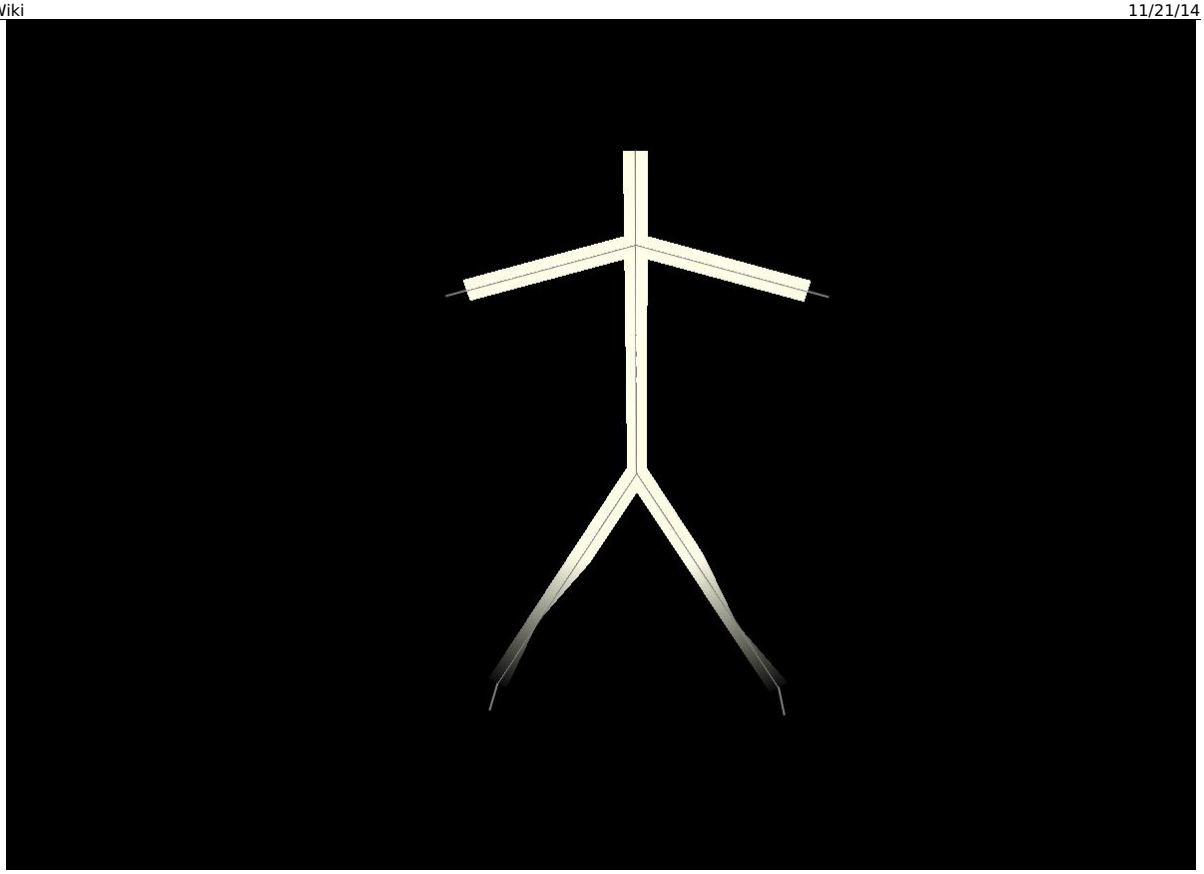
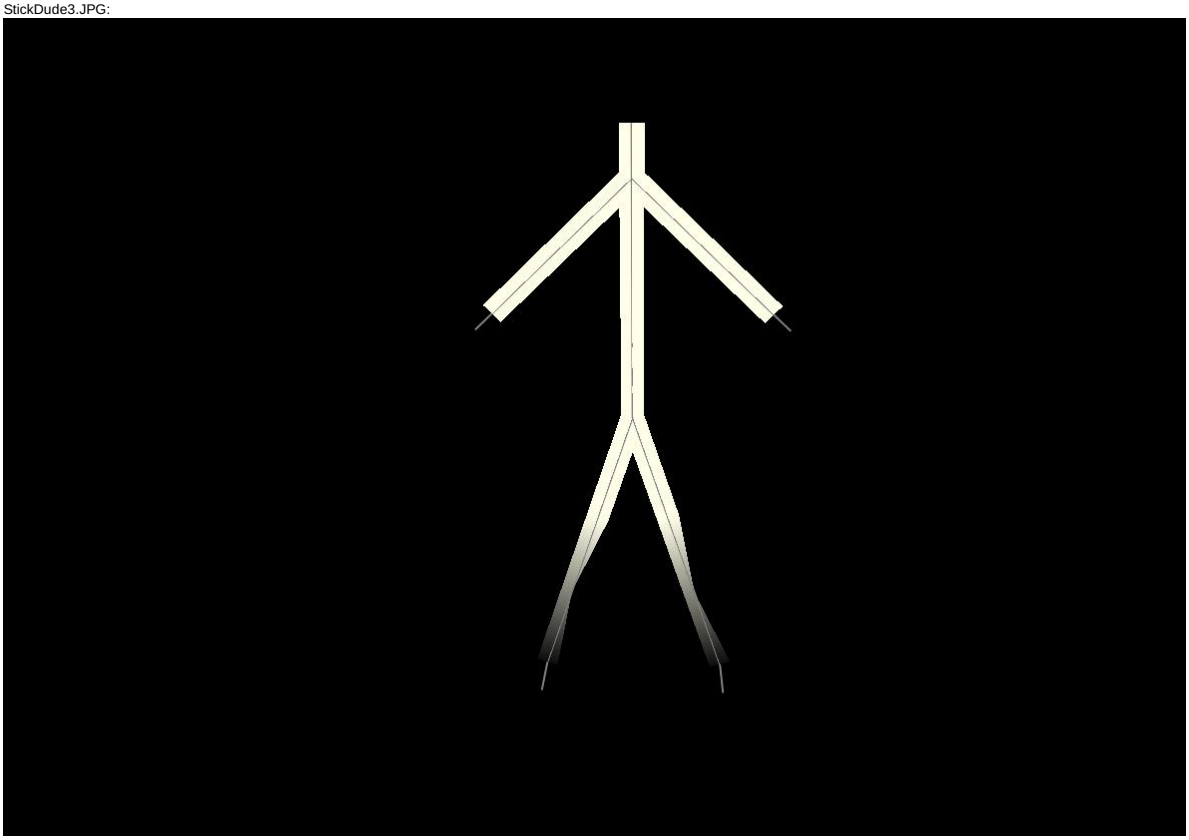
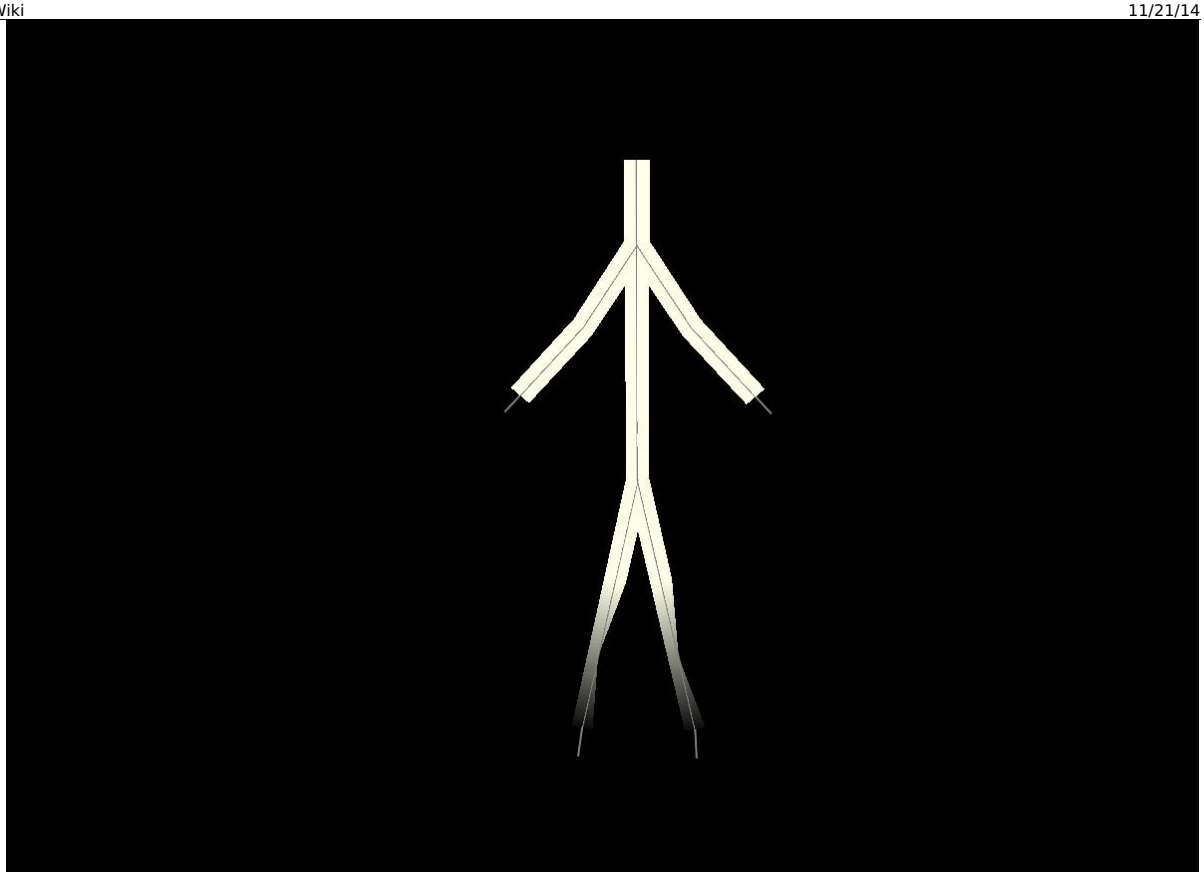
- davidResearch.doc: davidResearch.doc
- MetaBlast_Animation_paper2.doc: MetaBlast? _Animation_paper2.doc
- StickDude4.JPG:



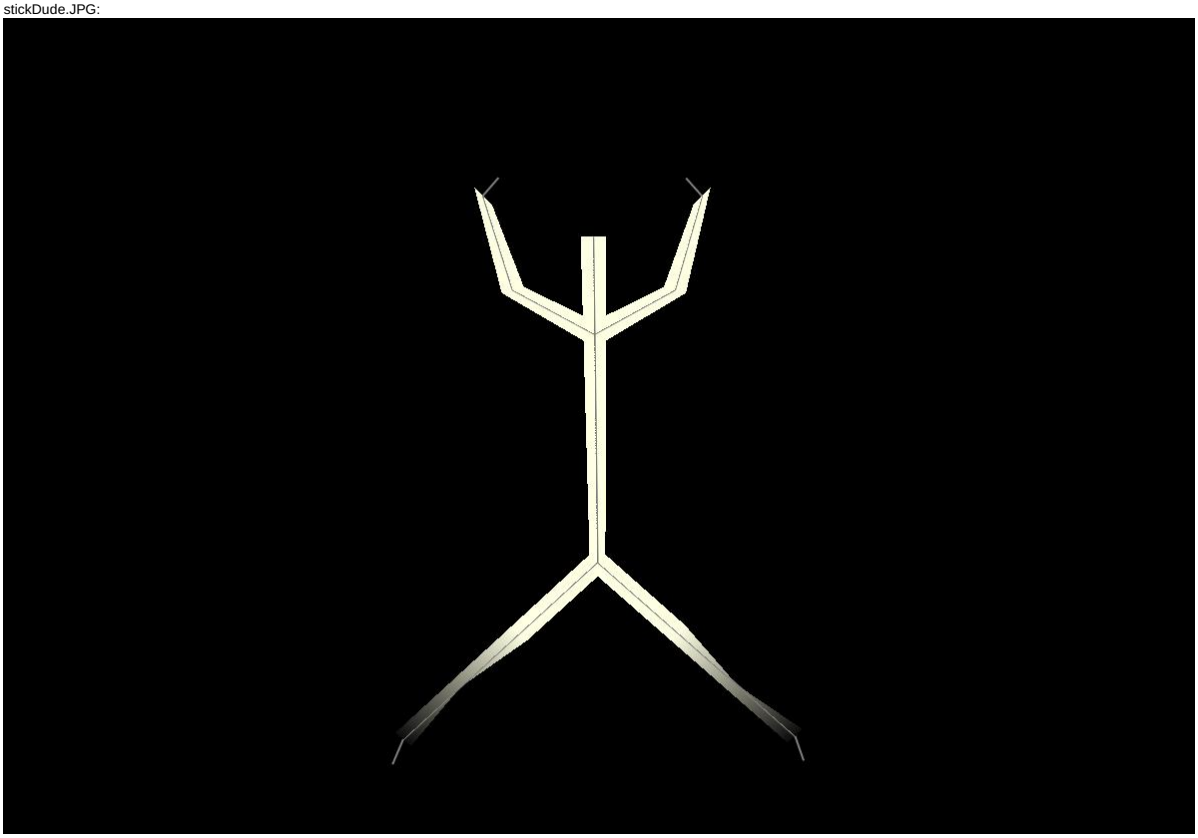
- StickDude3.JPG:



- StickDude1.JPG:



- stickDude.JPG:



- metablast_paper3.doc: metablast_paper3.doc
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