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Panchatantra Storytelling using Hand Gesture and Digital System

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Abstract: India Modern day's pre-school education focuses significantly on activity based learning. It is been observed that activity based learning encourages the small activities such as alphabet recognition game, word recognition game, story-telling and several different technologies for kids education. Kids often love stories and can learn better through animation. Most of the digital content available today is generally cartoon and animated small feature films were there is no interaction with the characters. Because of this the creativity, interaction and conversation skills of kids are not been truly utilized. The unidirectional education problem is solved by offering animated storytelling platform to the kids. A system is developed where the teacher student communication is improved, where a teacher can sit with the student and can create their own digital story telling platform using hand gesture based system that control the characters in such a way that kids can use their hands to move along the characters and build their own stories and interact with the characters.

Keywords: Digital storytelling, hand gesture, education, edutainment, human-computer interaction.

I. INTRODUCTION

In acknowledgment for kids extensive beneficial outcomes on instructional method, Informative recreations or genuine amusements for preparing purposes have turned out to be massively main stream. As an advanced type of conventional narrating, advanced narrating frameworks risen in the course of the most recent couple of years and have exhibited intense instructive capacities, which empower kids to express themselves and coordinate with others amid story execution. Narrating is basically one of the first structures of showing, which can be utilized as a technique to educate morals, values, and social standards and contrasts. Computerized narrating following the same well-known systems like traditional narrating can push youngsters to get a few mechanical aptitudes and work in gatherings and reinforce the bonds between each other. As another social advantage, advanced narrating can likewise help handicapped youngsters or, on the other hand understudies with learning challenges to expel the hindrances of correspondence with grown-ups and peers and overcome the powerlessness to concentrate on their emotions or contemplations by giving them with chances to assume dynamic parts. In any case, storytelling is not just about portraying. In its fundamental shape, narrating is generally consolidated with signals what's more, expression. Oral narrating can likewise be joined with other body developments, e.g., moving to upgrade the narrating through acknowledgment, recognition and emotional order of stories. Starting here of view, describing won't in a manner of speaking favourable position a tyke's appreciation of story structures, yet moreover treat distinctive limits, for instance, subjective capacity besides, physical coordination in the midst of execution with the guide of various media. A computerized narrating framework for kids using Dot Net is built which underpins hand movements as info yet require no hand contact or touching. Considering a manikin's operation many-sided quality for youthful youngsters, we utilize hand-signal acknowledgment innovations to improve operations and give natural interface, in which kids can utilize hand motions to control characters to perform story. Introduced a novel narrative assistance with gesture control and computer animation to manipulate 2.5D characters, Implement a model of the digital storytelling framework to help youthful youngsters to build up their related aptitudes.

II. RELATED WORKS

Over a decade there is lot of growth in storytelling. Research scholars having been working on finding out interactive methods for teaching and make progress in digital technologies. The advanced growth in virtual reality technologies provides the possibilities that allow students to experience the virtual learning environment in highly interactive and natural ways. There are many techniques recognized and invented till date.

Compared to the traditional oral storytelling, digital storytelling in more compelling and engaging format, which provide users more interactive and immersive experience to assist narration. Interaction methods primarily used in the previous research are limited to the traditional human–computer interface (HCI) technologies, such as keyboard and mouse (e.g., [1,2]), handheld remote controller (e.g., [3]), and touch screen, including mobile phone and tablets (e.g., [4]). Saturated with digital media in their daily lives, they

require more interactive learning environments, multimodal feedback, and meaningful learning experiences, which bring new challenges to the current digital storytelling. The new generation of the digital storytelling system is expected to offer a novel and immersive way to captivate learners' interests in a new horizon and improve the quality of teaching and learning.

Storytelling Alice [1] introduces computer programming to learners using 3D animated stories. Wayang Authoring system [2] is a web-based visual story authoring media for children, which enables children to use Virtual puppets to create stylised digital stories. Inspired by the traditional Chinese shadow puppetry, Shadow Story [3] is designed for children to use a Tablet to create digital shadow puppets and perform story cooperatively on a projection screen. In Mousawi's [5] research, an iPad was used as a storytelling tool to help teachers and parents evaluate and improve the communication skills of Arabic children. In the educational program "From the Ancient to theModern Tablets", target users can help a digital agent to time-travel back in a 3D Immersive eLearning Environments [6].

Storytelling is not simply describing. Close to oral portrayal, the advancement of different capacities is additionally fundamentally critical for youthful youngsters, e.g., space and object cognitive capacities. On the off chance that effective easy to use communication strategies, which are more instinctive and common, are given by advanced narrating frameworks, at that point the extra capacities (cognizance and motor coordination) will likewise be considered. Here, Storytelling is developed to target children between 4 and 9 years.

III. METHODOLOGY

The framework outline is examined which includes the novel sign example and additionally the educational contemplation specified beforehand.

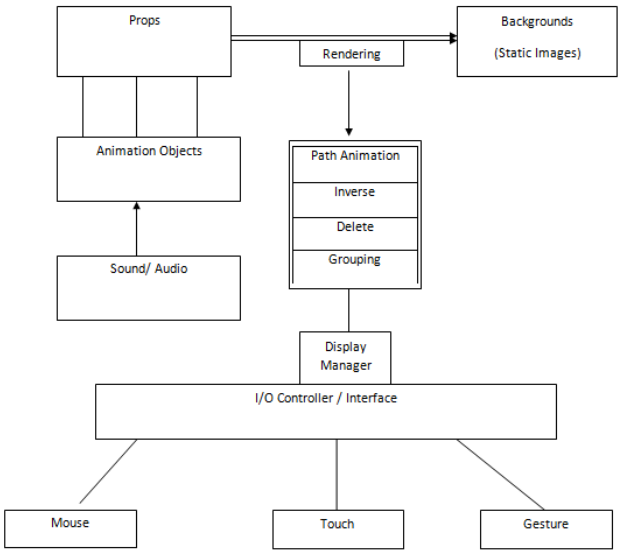

Fig. 1 Proposed architecture

A. *Consist of the Following*

1) Props: Props are individual animation objects. Animation consist of props its location and its coordinates on the screen. In 2.5D animation props are rendered against background (rendering).

2) Object Animation: It is a form of stop motion animation that involves the animated movements of any non-drawn objects such as toys, blocks, dolls, etc. which are not fully malleable, such as clay or wax, and not designed to look like a recognizable human or animal character. Object animation is often combined with other forms of animation, typically for a more realistic effect (e.g., Model Animation or Puppet Animation to add more complex movement or depth to the characters). For example, a toy car can be animated without a driver, but is more often animated with a character easily seen driving the car.

3) Path Animation: It is the one, by means of which the prop, without user intervention can move in a predefined path. A path animation controls the position and rotation of an object along a curve. Also, Path animation is a way of animating an object's translation and rotation attributes by specifying a NURBS curve as the object's trajectory. The object automatically rotates from side to side as the curve changes directions.

4) Delete: By using delete any animation object can be deleted from the scene.

5) Grouping: By using grouping multiple animation objects can be combined and moved together as one object.

6) Display manager: is the one which keeps the frame rate constant, we are going to use anti-aliasing display methodology, which reduces the amount of flicker.

7) I/O Controller Interface: It is going to process the event generated by the mouse, touch and gesture (we are going to use Intel's real-sense technology for hand gesture).

8) Inverse: Inverse refers to the use of the character to determine the desired position in the Specification of the movement of a scene.

The framework is profoundly instructive as far as story skill as well as cognitive capacity and motor coordination.Our preliminary conception is as follows: given the background and characters, children will try to make their own stories and try to finish the whole story narration, and at the same time, children can simply use hand motion to control the movement of the various characters and interact with playthings in virtual scenario to assist narrating. Through this procedure, their narrative ability will be nourished. Using hand gestures for controlling the prop, their motor coordination ability will be trained. In interaction with virtual items having different properties and roles in the story, their space and object recognition capability will also be developed. The structure of our aims for training is shown in Fig. 2.

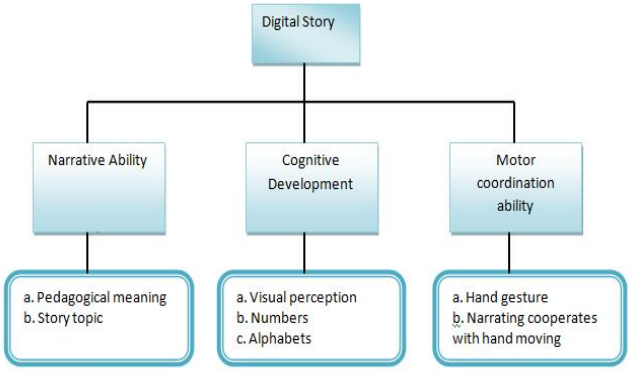

Fig 2 : Three fundamental abilities.

The component-level interaction within the system is shown in Fig. 3. Firstly, a story platform is provided. Second, players use hand motion to manipulate the prop through Intel's Real-sense camera, which can automatically track hand motion and recognize hand gestures. Image data from the camera are obtained and interpreted into motion control commands by the host computer. Finally, as visual feedback, the prop's responding animation is provided to performer, and then, performer adjusts their hand gestures/movement to push the story forward and narrate the story.

IV. IMPLEMENTATION

Storytelling is mainly composed of three parts: input, motion control, and output, as illustrated in Fig. 4. The input part processes the sensor data captured from motion sensing camera and passes it to the next stage. Motion control interprets the data subsequently and determines prop's location. The output module updates prop's performance in virtual environment as the feedback. We utilized a Real-sense camera by Intel in our system as the HCI sensor device to track hand gestures, which can provide a high fidelity finger tracking.

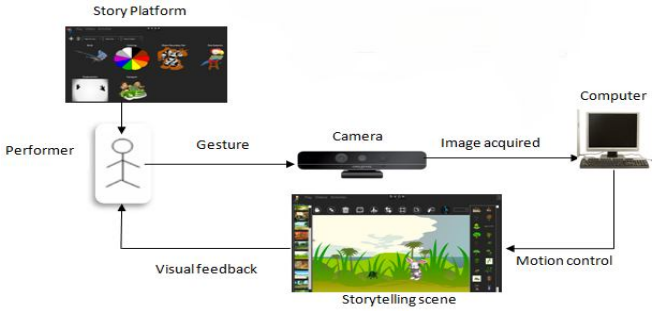

Fig. 3 System interaction component diagram

For ease of controlling by children, four intuitive motion controls are defined such as right, left, move downward and upward, which are mapped to different hand gestures, as illustrated in the upper four rows in Table 1.

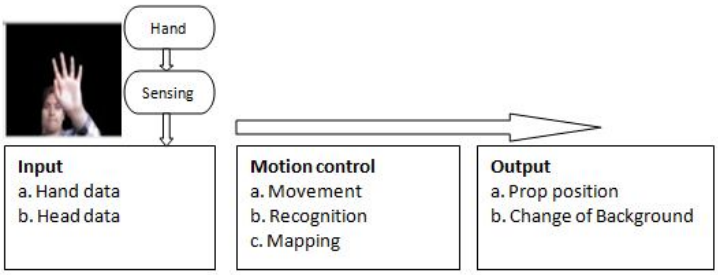

Fig. 4 The implementation mainly consists of input, motion control, and output.

Table.1 Hand gesture set of for single hand

Hand gesture	Movement	Target action
	Move Right	Prop moves to right
	Move Left	Prop moves to left
	Move Down	Prop moves downside
	Move Up	Prop moves upside
	Grip	Click event to select prop
	Stretch	Release the prop

V. RESULT

A. Evaluation

1) Method: All participants were trained to familiarise themselves with the gesture controller after detailed explanation of the experiment. In the experiment, each child has carried out three trials of the story. Following the provided key story points, all children were engaged with the activities with great interests and built their own stories by interacting with the digital characters. During playing, some minor frustrations (or difficulties) were observed, such as picking selecting the characters with fist, failing to move the character at once, or using a second hand to support the main hand in operation, etc. Getting around these difficulties also made the children feel rewarded and find the game interesting. An overview observation is that:

a) All of the children could finish the activity with few faults after a couple rounds of repeating.

b) All of the children could narrate the story with more complex words of their own language.

2) Participants: A few kids participated by four 5–8-year-old young children has been conducted for pedagogical evaluation with permission from their parents who were informed about the nature of the study and its purpose.

B. Subjective Evaluation

Three subjective criteria are included in the subjective evaluation of the young player's performance: smoothness of hand movement, and accuracy of hand/avatar location and vivid narration

Smoothness is the characteristic of performers' coordinated hand gesture movement.

Location accuracy determines the accuracy of the player's hand that manipulates the avatar to a certain location in the virtual scene.

Vivid narration requires young children to use rich expressions to create a clear picture and use vocal tones to suit the story. It enables the audience to be fully engaged and emotionally involved in the story.

VI. DISCUSSION

Basic hand gesture set is used instead of more complex hand gestures. Due to the young participates limited motor control ability and the cognition capability, difficulty in training the young players to use the complex hand gestures. Simple hand gesture is more adaptable for children by providing a natural and intuitive way for interaction at a basic level.

One limitation of the user interface comes from the hardware. The Real-Sense device can only detect hands and fingers within the tracking area. Once player's hand moves out of range, the system can easily lose track and the prop will keep still and stay, where it is until the hand moves back within the detective area and is recognised again by the controller.

VII. CONCLUSION

A digital storytelling system that consist of famous Indian storytelling book "Panchatantra", which will help the kids to have natural interaction with teacher, this will also help them to enhance their cognitive skills and innovative skills as well as numeral and verbal skills. Further, as observed kids learn faster than just the normal verbal communication. We have introduced various activities with storytelling like numbers, alphabets, shapes and colouring that helps a kid to increase his capacities in all the fields. The usability of the system is preliminary examined in our test, and the results which showed that young children can benefit from playing with this framework.

VIII. FUTURE SCOPE

It will be possible to introduce complex gesture set for older age group if a new experiment framework will be designed. Furthermore as this framework is developed for kids between ages of 4 to 8 we can add few more activities that help the higher age group kids. This framework can be used in schools for easier and interactive fun learning.

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