Gaze-Based Interaction in Cinematic 360 VR

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Outline

• Cinematic 360 VR
• Gaze-Based Interaction
• Non-Linear Storytelling
• Media Authoring
• Case Study

Cinematic 360 VR

Omnidirectional Video

• Equirectangular Format
  - Latitude / Longitude Parametrization
• Stereoscopic Layout
360 Video Player

- Texture Map to Sphere
- Skybox / Panoramic Shader

Spatial Sound

- 3D Sound
- Ambisonics Format

Gaze-Based Interaction

Interaction Mechanism

- Flow of Control

VR Camera ➔ Gaze Detection ➔ VR Interactive Item ➔ Gaze Action
**Gaze Detection**

- VR Eye Raycaster

![VR Camera]

- ROI

**The Hot-Spot**

- Creates Interaction Event

![ROI Rectangle]

**Gaze Action**

- Action Trigger

![Button, Box Collider, VR Interactive Item, Hotspot Button]

**Non-Linear Storytelling**
Timeline

- Narrative Structure

Time-Flow Control

-Playable Director

  - Gaze Interaction Track
    - Non-Linear Narratives
    - Viewer's Gaze Direction

Clips

- Clip Element (Gaze Track)
- Clip Types (Gaze Interact)
  - Marker
  - Player
  - Jumper
  - Spotter
  - Trigger
  - Timer
  - Choicer

Marker

- Identifies a Time Instant in the Timeline
**Player**

- Activates Playback of Audio or Effect

**Jumper**

- Changes Current Time to Marker Location

**Spotter**

- Implements Hot-Spot for Audio

**Trigger**

- Triggers an Action of Interaction Game Object
**Timer**

- Start Time-Dependent Jump to a Mark

![Timer Diagram]

**Choicer**

- Controls Jump to Element of a Markers Set (based on interaction behaviour)

![Choicer Diagram]

**Interaction Objects**

- Perform Action Based on Narrative Interactivity
- Connect with Clips of the Gaze Interaction Track
- Incorporates a VR Interactive Item Component

**Media Authoring**

- Basic Interaction Objects
  - Audio Source
  - Gaze Rotation
  - Gaze Marker Selector
**Audio Source**

- Controls Audio Playback
- Used for
  - Voice-Over
  - Music
  - Ambient Noise
  - Sound Effects

**Gaze Rotation**

- Changes the VR Camera Direction
- Cut Viewer’s Gaze
  - Location in Panoramic Image

**Gaze Marker Selector**

- Selects a Marker Label
  - Based on Procedural Criteria
- Used in Combination with Choicer Clip

**Interaction Idioms**

- Language of Non-Linear Interactive Narrative
- Defined by Combination of Gaze Interaction Clips

- Some Useful Idioms
  - Jumper + Marker
  - Trigger + Player
  - Spotter + Player + Marker
  - Timer + Jumper + Marker
  - Choicer + Markers
**Jumper + Marker**

- Skip to a Different Time

**Trigger + Player**

- Gaze-Based Play of Game Object

**Spotter + Player + Marker**

- Selective Temporal Play of Alternative Audio Clips

**Timer + Jumper + Marker**

- Loop in a Sequence until Time Expires
Case Study

Context

• Oculus / Facebook

Searching for Aloyo

• 2017 Creators Lab 2.0 Program
• Partnership

• Synopsis
Aloyo, a twelve-year-old girl living in Lira, Uganda, sits among other children around the fire to tell their story during war; what they saw, where they went. Mixing early oral storytelling tradition and contemporary Virtual Reality narrative, blending fiction and non-fiction elements, CHILDREN DO NOT PLAY WAR narrates the memories, dreams and daily lives of the children who returned from the war and about how they recovered their childhood.
Children Do Not Play War

“Thanks.”

– Luiz Velho