

DG8010 - Game Development - W2023

RESEARCH OUTPUT #2

**THE MATRIX
RESURRECTIONS**

A case study of Unreal Engine being
used in virtual film production



Instructor: Dr. Kris Alexander
Student: Kathy Zhu
#501206353

GENERAL DESCRIPTION

- 2021 sci-fi action film, sequel to *The Matrix* (2003)
- Presents fascinating visual effects and stunt choreography, like the original film did
- Implemented techniques and methods commonly seen in game development
- Example of how the use of **virtual production** is expanding visual potential in filmmaking (image 1)



Image 1: the dojo scene environment was created in Unreal Engine 5

UE APPLICATION

- Entire VFX process done in Unreal Engine, including shaders, geometry adjustments, and lighting (although some camera movements were done in Maya)
- Virtually created scenes were combined with live action in front of greenscreens
- UE's **real-time ray tracing** allows for powerful, realistic simulations
- Effective for creating quick iterations
- Particularly efficient for generating lighting variations



Images 2 & 3: entire environments are modelled and rendered in Unreal Engine



The Matrix Awakens (2021)

- **2021 open world video game** & tech demo
- Co-developed by Epic Games (using Unreal Engine 5) and Warner Bros.
- Set within the world of The Matrix, where players could interact with realistic characters and digital environments
- AI-driven events evolve in real-time; slight variations in player action could trigger different results, creating **deeper level of immersion**

Image 4: The Matrix Awakens video game

INDUSTRY TRENDS

- Virtual production **offers flexibility and efficiency** by reducing reliance on physical components and bringing in digital imagery
- Reduces production time, better connects different parts of the workflow, and has more control over final visuals
- 2022: global virtual production market valued at **1.82 billion USD**; expected to expand to **~6.9 billion USD by 2030**

Unreal Engine - Industry Leader

- Used in **160+ major motion pictures and TV series** productions
- Effective in creating a non-linear editing and animating workflow (image 5)
- Two essential virtual production tools used with UE: LED screens & motion-tracking cameras

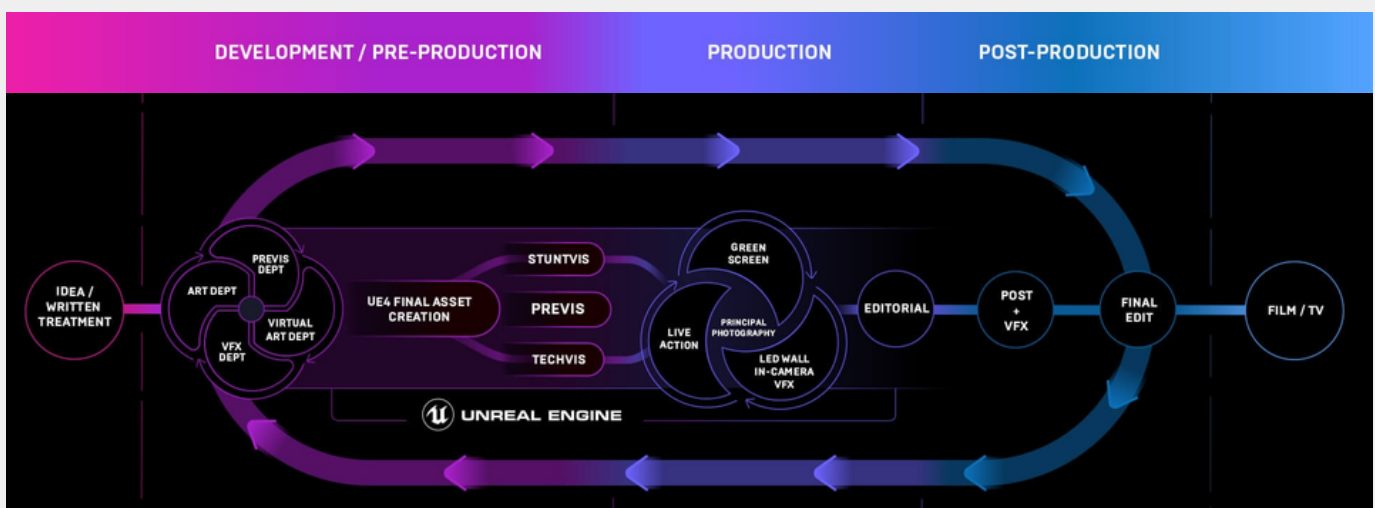


Image 5: Unreal Engine creates a seamless virtual production workflow, across every stage

COMPETITOR ANALYSIS

Recent Movies Using VP

- Avatar
- The Batman
- Dune
- Black Adam

Recent TV Series Using VP

- The Mandalorian
- Star Trek: Discovery
- Westworld
- Love, Death + Robots

Why The Matrix Resurrections (& The Matrix Awakens) is Unique

- Immersive, interactive experiences rendered and presented in **real-time** instead of relying on large teams of technicians
- Includes photorealistic metahuman characters
- Blurring boundaries between **film and game**; visually demonstrates a potential interpretation of the Metaverse

SOURCES

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