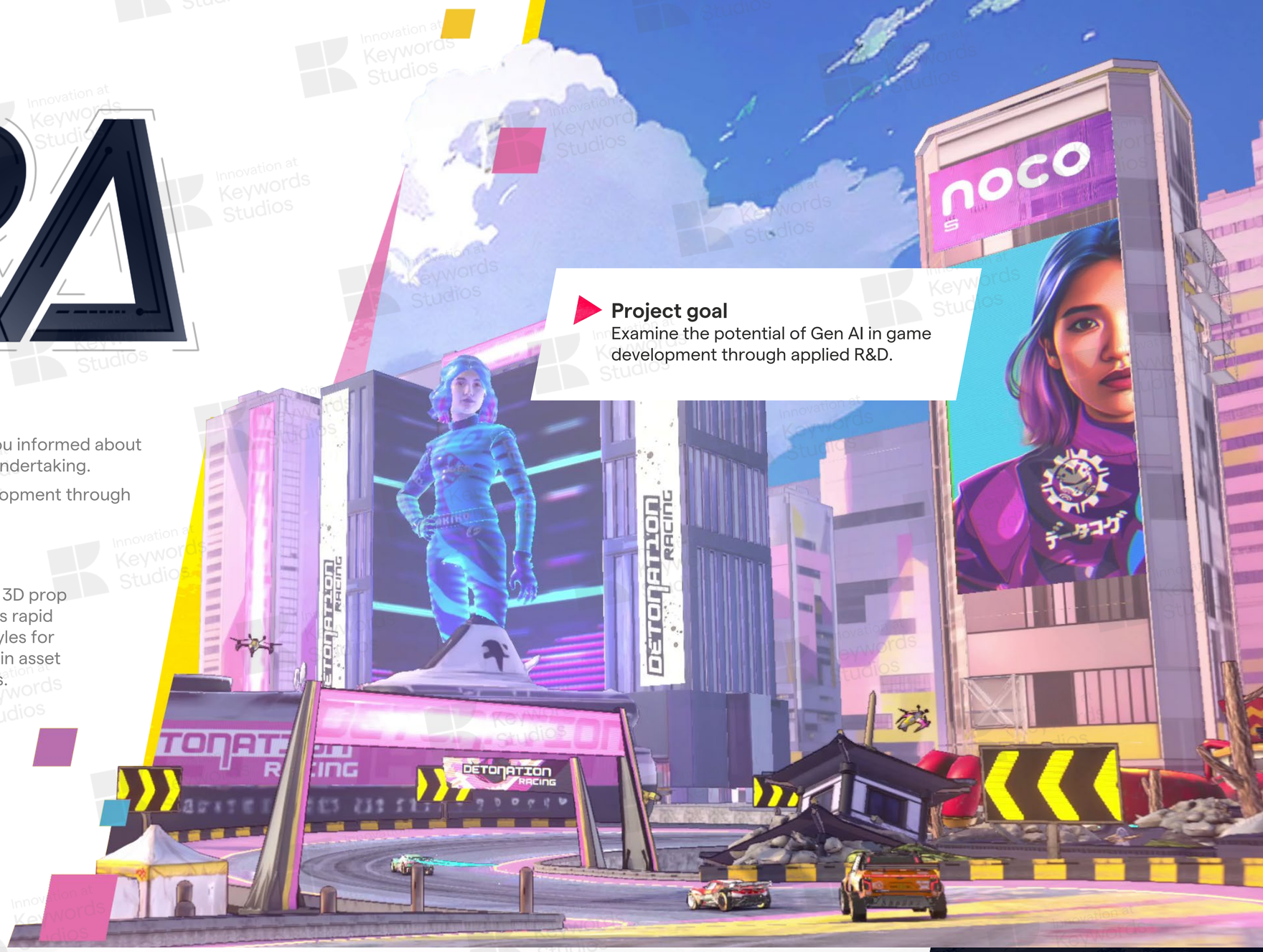
KARA

Newsletter – Issue 009

Welcome to the KARA newsletter. These newsletters will keep you informed about the research and development that the KARA project team are undertaking.

The project goal is to examine the potential of GAI in game development through applied R&D.

Project goal
Examine the potential of Gen AI in game development through applied R&D.



Contents

This newsletter explores an innovative GAI enhanced pipeline for 3D prop and building creation. We examine how this technology facilitates rapid iteration, expands content diversity, and unlocks unique visual styles for game development. The article details the integration of AI tools in asset production, focusing on efficiency gains and creative possibilities.

Content list:

IMPORTANT: Inclusion of tools in this newsletter does not imply their clearance for use.

What is KARA?

In 2023, Project AVA took on the challenge of utilising Generative AI tools to assist in the design and development of a videogame from scratch. This applied R&D approach gave us the best insights into the true potential of AI for video game development.

The AVA team went to GDC in 2024 to report on their findings (watch the video).

KARA is the continuation of this effort. Using Electric Square's *Detonation Racing* as a case study, the team's plan is to remaster the game using pipelines infused with Generative AI tools.

The goal of KARA is to further enhance our expertise in Generative AI for game development. This includes a focus on how GAI tools can boost 3D art pipelines.

GAI-infused 3D asset creation

Introduction

Props are crucial elements in video games, shaping the atmosphere and visual style of in-game environments. Creating immersive settings typically requires a large number of 3D assets. Well-crafted props substantially enhance the game's aesthetic, improving player experience and supporting narrative elements.

This issue examines the integration of AI into our 3D prop and building creation pipelines for the Detonation Racing remaster. We explore how this approach aimed to optimise asset development, potentially reducing production time and improving the visual fidelity of game environments.

PIPELINE SPOTLIGHT

Standard 3D asset pipeline

1/5 Concept & reference

Concept Artists develop detailed sketches or digital artwork to visualise ideas and establish the overall aesthetic. They collect reference images and create mood boards to guide the style and inform the design process.

2/5 3D mesh creation

The process starts with creating basic 3D shapes to establish proportions and scale. Detailed sculpting is then added to develop intricate features. Finally, the high-polygon model is simplified for efficient real-time rendering, balancing visual quality with performance requirements.

3/5 UV unwrapping & texturing

Flatten the 3D surface into a 2D layout for texture application. Create and apply physically based rendering (PBR) textures using industry-standard software such as Substance Painter or Adobe Photoshop.

PIPELINE SPOTLIGHT

Standard 3D asset pipeline

Standard pipeline

4/5 Materials & shaders

Develop material properties and custom shaders to enhance the visual appearance of assets within the game engine. This process optimises how surfaces interact with light, ensuring realistic and visually appealing renderings that align with the project's aesthetic goals.

5/5 Engine integration

Import 3D models and textures into the game engine. Configure materials and shaders for optimal visual quality and performance. Fine-tune asset parameters to achieve the desired look whilst ensuring compatibility with the engine's rendering capabilities.

PIPELINE SPOTLIGHT

AI infused 3D asset pipeline

From concept to creation

We began by evaluating available 3D asset generation tools, focusing on key factors: Output quality, time efficiency, cost, licensing terms and integration capabilities. This assessment guided our tool selection process, balancing creative needs with practical considerations.

AI infused pipeline

1/4 Concept art generation

Controlling artistic style is essential during the conceptual process in Midjourney. We used consistent prompt language and style images to guide the AI. It is crucial to develop strong concepts during this stage, as they form the design foundation.

Tool used:

Midjourney

KARA prompt elements:

The style is that of a CG anime film. The overall render is heavily graphically stylized, featuring ink brush marks and a touch of realistic materials. There are yellow and pink markings on it. The background is white.

2/4 3D mesh generation

Create 3D assets with 3DAI Studio or Tripo, using Midjourney concepts and prompts as inspiration. This process generates an initial mesh, serving as a foundation for further refinement and optimisation.

Tools used:

TRIPO

3DAI.

32935 Tris Generation Time: less than 5 mins.

PIPELINE SPOTLIGHT

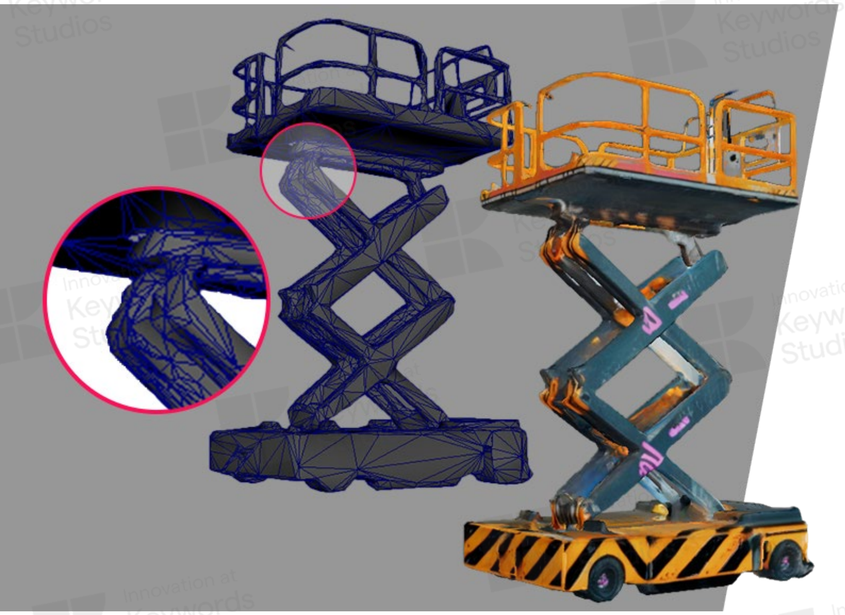
AI infused 3D asset pipeline

ProOptimizer

Once a suitable mesh was generated, our artists employed automated tools within the 3D software to streamline the optimisation process. In 3ds Max, we utilised ProOptimizer for this task.

3/4 Asset optimisation using traditional 3D tools

Optimisation is crucial to meet platform requirements and adhere to the game's technical budget. We use traditional 3D software to refine mesh topology, reduce polygon count, and adjust UVs, ensuring efficient performance.



6733 Tris mesh. Optimisation time: around 15 mins.

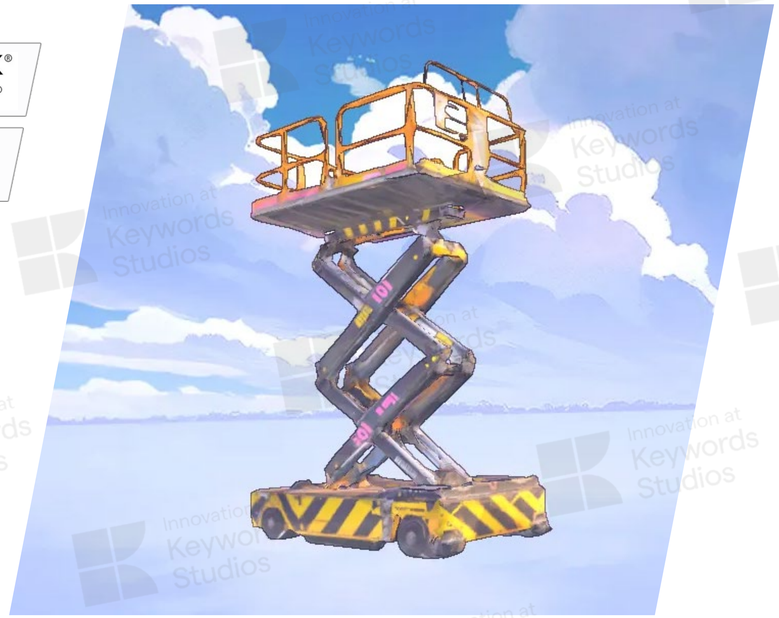
Tool used:

AUTODESK® 3DS MAX®

Maya

4/4 Engine integration

Integrate the optimised 3D assets into Unity. Fine-tune the visuals through colour correction and material properties to enhance the intended artistic style and maintain visual cohesion.



Tools used:

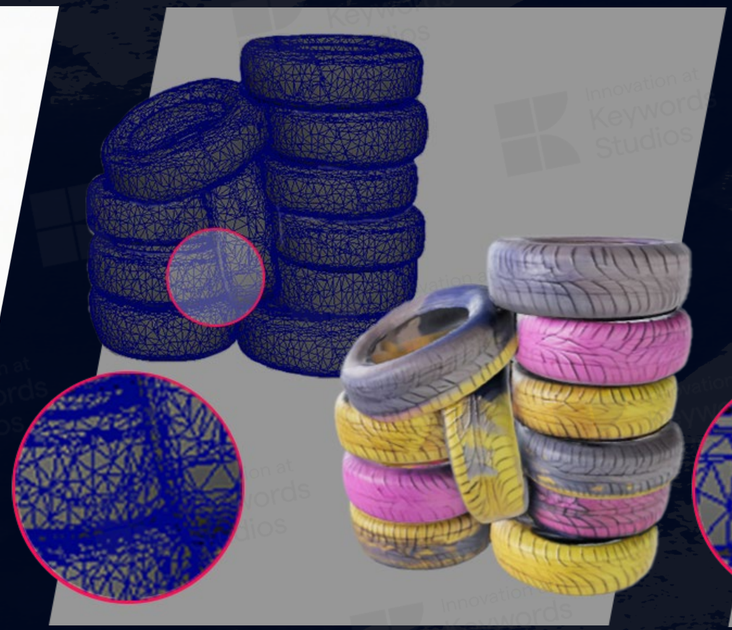
Unity

PIPELINE SPOTLIGHT - EXAMPLES

AI infused 3D asset pipeline

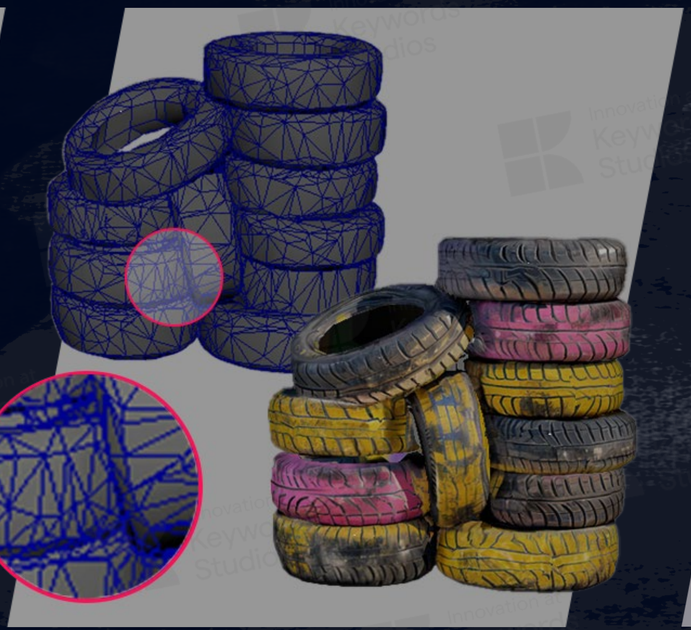
1/4

2/4



176939 Tris Generation Time: less than 5 mins.

3/4



5828 Tris mesh. Optimisation time: around 15 mins.

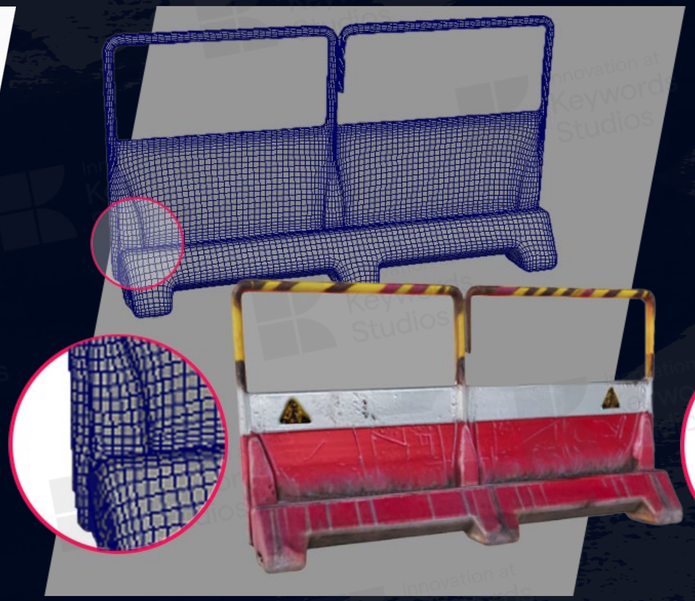
4/4

PIPELINE SPOTLIGHT - EXAMPLES

AI infused 3D asset pipeline

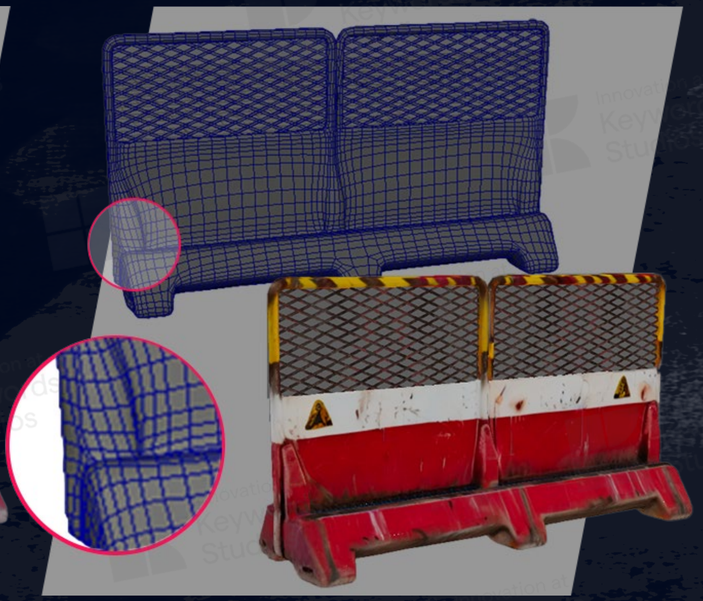
1/4

2/4



30886 Tris Generation Time: less than 5 mins.

3/4



10740 Tris mesh. Optimisation time: around 15 mins.

4/4

CASE STUDY

Construction site

"an industrial, work-site atmosphere"

2021 - Original release

NOW - GAI assisted remaster

CASE STUDY

Construction site

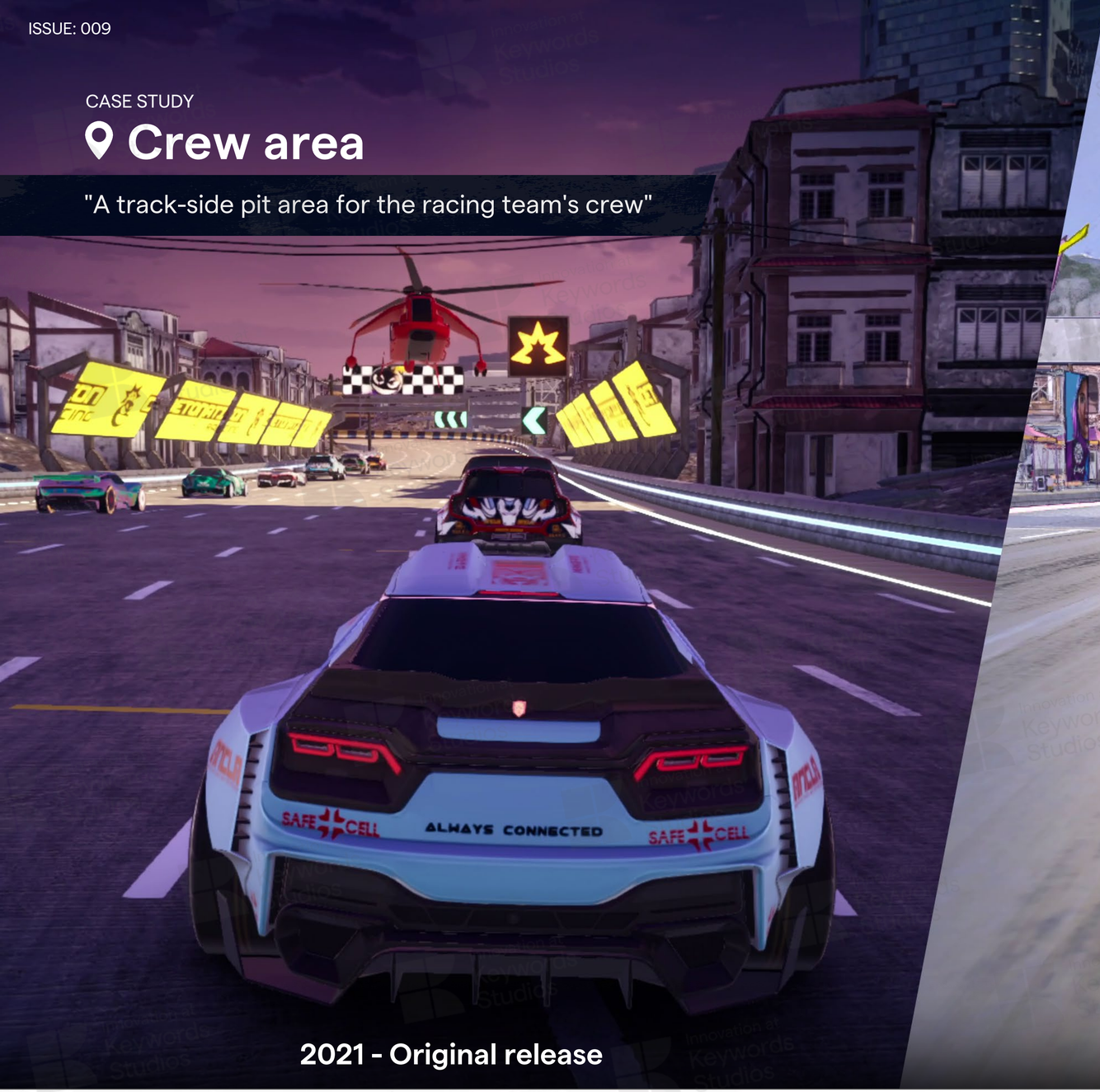
"an industrial, work-site atmosphere"

NOW - GAI assisted remaster

CASE STUDY

Crew area

"A track-side pit area for the racing team's crew"



2021 - Original release

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CASE STUDY

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"A track-side pit area for the racing team's crew"

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CASE STUDY

Bay area

"inspired by a coastal waterfront vibe"

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CASE STUDY

Bay area

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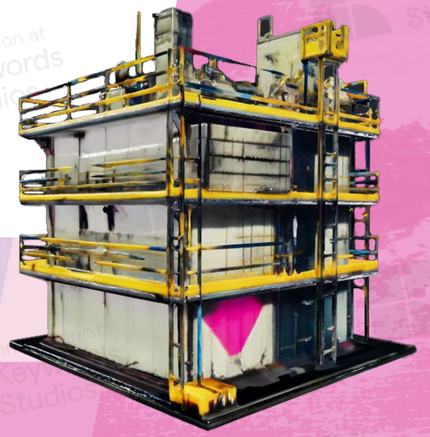
PIPELINE SPOTLIGHT

AI infused 3D asset pipeline

Pipeline conclusion

The utilisation of AI-generated assets in this remastering project enhanced efficiency whilst simultaneously exposing the limitations of contemporary AI tools in game development. To optimise outcomes, it is important to refine AI training methodologies and implement GAI assisted workflows more strategically. This approach will serve to maximise benefits and reduce potential drawbacks.

AI serves as a valuable complementary tool in the remastering pipeline for racing games, particularly in expediting prototyping and asset generation. A hybrid approach, where AI assists but artists maintain creative control and refine the output, proves most effective. As these tools evolve, they should offer artists more creative freedom within the GAI assisted process, further enhancing their ability to realise their artistic vision while leveraging the efficiency of AI.



Thank you.