

Title:

Procedural data generation in Far Cry 2

Track:

Programming

Presentation Format:

60-minute Lecture

Audience Level:

Advanced

Brief Session Overview:

This session presents an overview of some of the principal procedural data generation approaches used by the Far Cry 2 development team in building a large and seamless dynamic world. It shares some of the lessons learned and proposes general development strategies to attacking similar problems.

Concise Presentation Description:

This session presents an overview of some of the principal procedural data generation approaches used by the Far Cry 2 development team in building a large and seamless dynamic world. It relies on those case studies to share some of the lessons learned and propose general development strategies to building typically production intensive assets through a procedural approach. Attendees are proposed a different way of viewing and approaching data creation that could inspire them to consider procedural generation for future titles.

Intended Audience & Prerequisites:

This lecture is intended for programmers, technical artists or generally any technical game developer involved in the specification, design or creation of a game content authoring pipeline. A good understanding of modern video game production workflow and traditional animation, art and design assets creation pipelines is recommended.

Session Takeaway:

Attendees get an insight on procedural approaches that could be applied to their own game production. Furthermore, they learn from the successes and trials of the Far Cry 2 production team on the benefits and pitfalls of developing and using such production pipelines. Finally, some recommendations are given to ease their development.

Extended Abstract:

In introduction, the attendee learns the goals of the session and also what the lecture is not about: an in depth low level analysis of the algorithms involved in the procedural methods used in Far Cry 2 (FC2). The accent will be on presenting ideas which will be closely supported and illustrated by concrete innovative or derivative procedural methods developed for FC2. Throughout the session, the attendee is brought back to tools and processes that are supporting the following features and the results they enabled. First, the procedural sky system is a component that permits a dynamic time of day as well as dynamic clouds and weather patterns. Second, the vegetation asset creation pipeline permits the creation of complete assets that are partly defined algorithmically. Third, the procedural biome generation system empowers our content creators to rapidly populate square miles of game area. Finally, the procedural animation layers permits a rich variety of movement and actions to characters and a better adaptation of their movement to the environment. All of those systems deal with procedural data and face some of the challenges described by Ken Perlin in his work on procedural animation workflow.

The first goal of the presentation is to break the traditional brute force mindset of data production that is typical of game developers. Through a quick analysis of the past and present, the attendee

is brought to understand the reasons that justify taking the procedural route, but also the reasons to avoid it. A concrete example of the pipeline and production strategy used for FC2 in building destructible environments is presented as an example of how brute force approaches can often not be future proof.

The attendee is then presented with the concrete gains that the FC2 team derived from their procedural mentality to data creation. Each of those gains, be they opening up innovation fields, saving on production costs or improving on turn around time are clearly illustrated through the aforementioned systems.

Likewise, the attendee is presented the drawbacks of such approaches as lived during the 3 years production period of FC2. A concrete example of a failed procedural sky system is presented to highlight the challenges of building systems that offer an interface that permits artistic control. In addition, the potential for such developments to become research and development sinkholes or quality bottlenecks is presented. Furthermore, the pipeline complexities of such approaches and the potential testing nightmare that they might represent are illustrated.

Moreover, the attendee is presented with recommendations in approaching similar challenges and given concrete examples to support those recommendations. The lecture presents how designing the interfaces to systems that are fundamentally alien to content creators used to a more traditional method is easily one of the biggest hurdles. Furthermore, the dangers of deadlocking on programming efforts for quality improvements and on frustrating the content creators used to be empowered to deliver such improvements are demonstrated and best practices are proposed in avoiding such issues.

The underlying guiding thought of this presentation is that the industry needs to embrace or at least contemplate procedural and non traditional asset creation solutions to face the challenges of increasing scope and technical complexity. Moving away from brute force asset creation can enable our fundamentally interactive medium to keep away from the very long iteration cycles of computer graphic movies, favor technical innovation and help keep costs in check on the long run.

Presentation Materials:

Power Point Presentation

Video Clips of tools and editor usage

Video Clips of in-game footage

Based on room setup, hardware availability and relevance, those videos would be replaced by runtime in-game and tool chain presentations.