3D Asset Generation: A Survey of Evolution Towards Autoregressive and Agent-driven Paradigms

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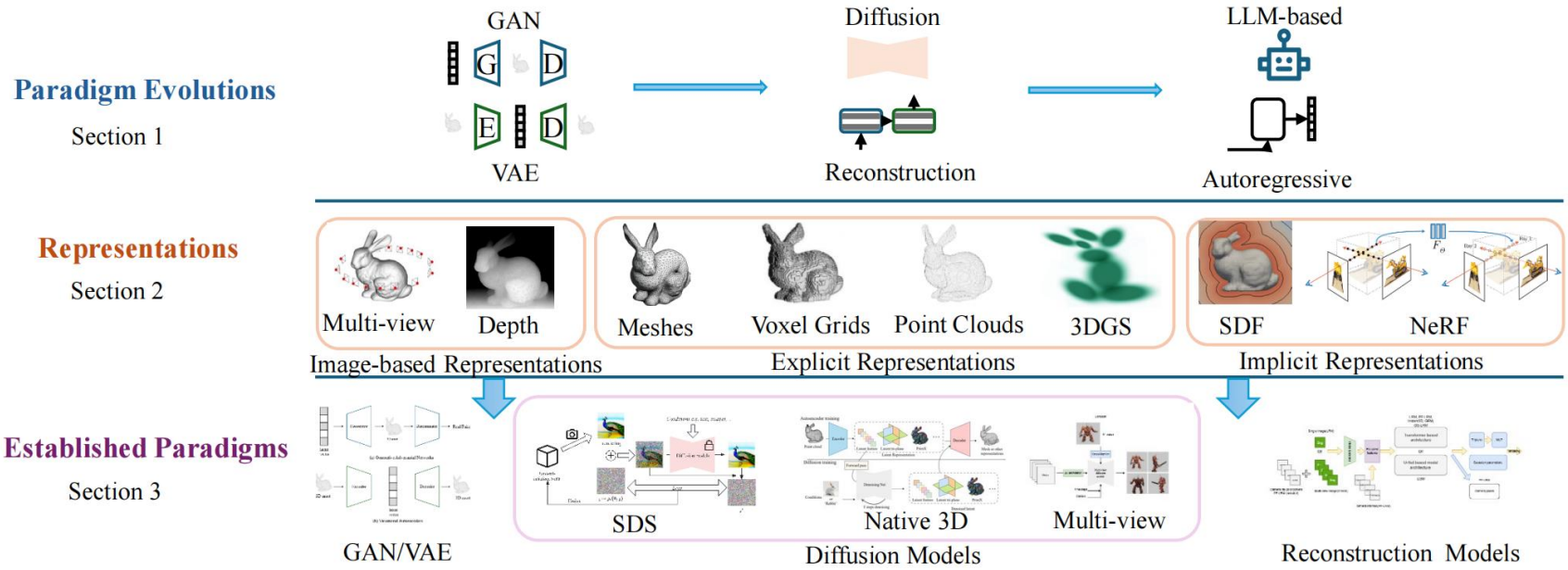
Problems & Ideas

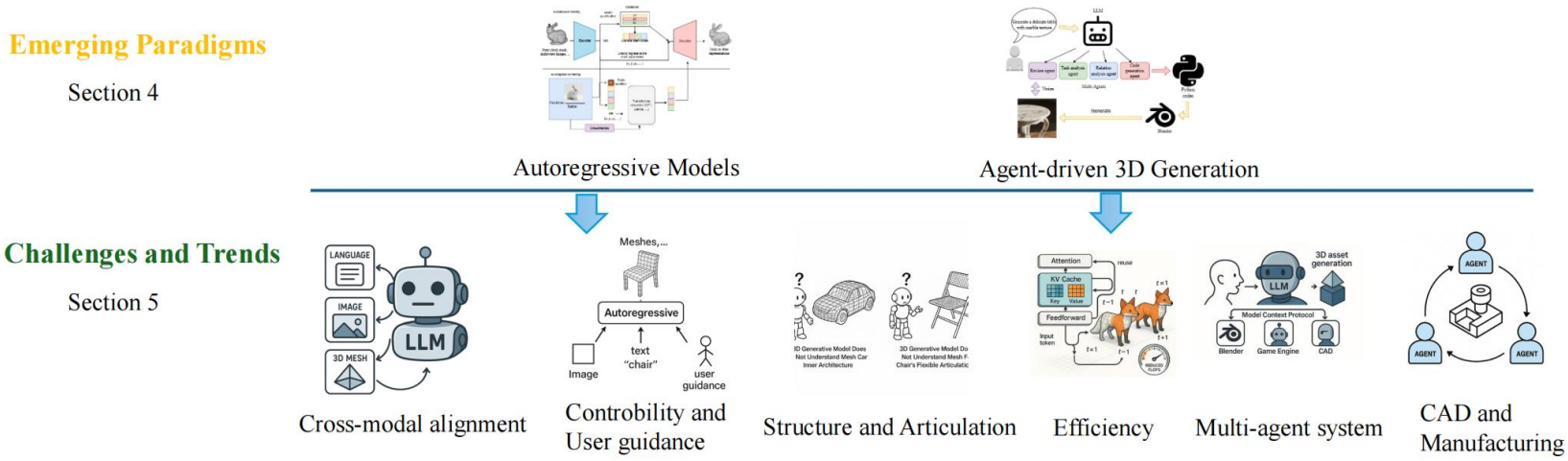
- Established 3D Generation Paradigms:
  - Face challenges in achieving high geometric and appearance fidelity.
  - Lack intuitive user control and struggle to generate ready-to-use assets.
- Emerging Paradigms:
  - **Autoregressive Models:** Use sequential token generation for finer control and structured outputs.
  - **Agent-driven Approaches:** Use LLMs to interpret complex instructions for intuitive and flexible 3D creation.



This figure illustrates the established paradigms in 3D asset generation, from early GANs to modern Diffusion and Reconstruction models.

Main Contributions

- Contributions of This Survey:
  - **Systematic Review of Paradigm Evolution:** Traces the evolution of 3D asset generation from early GANs/VAEs to current models, identifying the key bottlenecks driving the need for a paradigm shift;
  - **Analysis of Emerging Paradigms:** Provides a focused analysis of Autoregressive and Agent-driven models as the foundation for the next generation of 3D technology;
  - **Identification of Future Trends:** Outlines the key research directions and challenges for the field.



This figure illustrates the emerging paradigms in 3D asset generation, Autoregressive Models and Agent-driven approaches, along with future research challenges and trends.