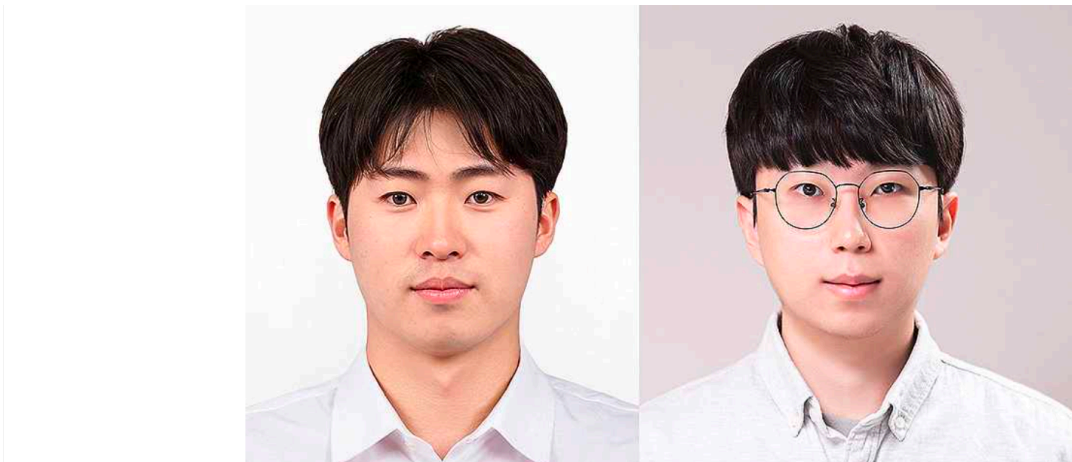


# GIST In-Chang Baek and Jin-Ha Noh students win 2nd place in international game artificial intelligence competition

- Applied the research results of content creation based on large-scale language models conducted by the 'Cognition and Intelligence Lab (Supervisor Professor Kyung-Joong Kim)' and participated in the 'ChatGPT4PCG' competition held in Milan, Italy and achieved results
- Proposed an automatic level generation algorithm for the game "Angry Birds" using the step-by-step physical reasoning ability and knowledge distillation technique of large-scale language models... "We will find ways to enhance the inference ability of large-scale language models and apply them to the game industry"



▲ The 'IJ-Bot' team that won second place in the 'ChatGPT4PCG' competition. (From left) In-Chang Baek, a student in the AI Graduate School's integrated master's and doctoral program, and Jin-Ha Noh, a student in the Institute of Integrated Technology's master's program.

The Gwangju Institute of Science and Technology (GIST, President Kichul Lim) announced that the 'IJ-Bot' team (Supervising Professor: Institute of Integrated Technology, Kyung-Joong Kim) consisting of In-Chang Baek, a student in the AI Graduate School's integrated master's and doctoral program, and Jin-Ha Noh, a student in the Institute of Integrated Technology, master's program, won an award at the International Game Artificial Intelligence Competition.

The 'IJ-Bot' team won second place in the 'ChatGPT4PCG' game content creation competition held at the IEEE Conference on Games in Milan, Italy in August, and received a prize of \$300 from the Computational Intelligence Society (CIS), a subsidiary of the Institute of Electrical and Electronics Engineers (IEEE).

'ChatGPT4PCG' is a competition to generate levels of the popular smartphone game 'Angry Birds' using large-scale language models, and the 'IJ-Bot' team applied the research results of generating reward functions based on Large Language Models (LLM)\* to improve the performance of LLMs.

Through this, the 'IJ-Bot' team was able to learn from a large amount of text data, such as GPT (Generative Pre-trained Transformer), to generate text-based responses similar to humans, and significantly reduce the learning time with only additional learning from the pre-trained model.

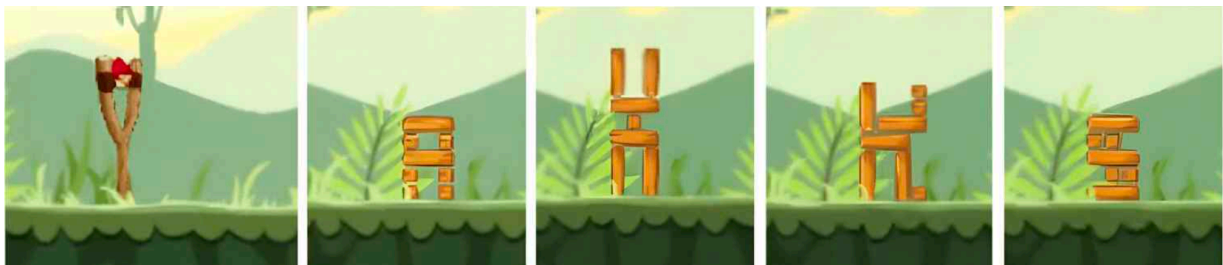
\* Baek, I. C., Park, T. H., Noh, J. H., Bae, C. M., & Kim, K. J. (2024). ChatPCG: Large Language Model-Driven Reward Design for Procedural Content Generation. In 2024 IEEE Conference on Games (CoG). IEEE. (In-proceeding)

The 'IJ-Bot' team also used continuous generation and knowledge transfer techniques based on 'multi-turn few-shot'\* to repeatedly evaluate the physical stability of the product by having a large language model perform continuous inferential thinking.

By configuring the process of content creation and evaluation to be repeated in this way, a large language model can learn stable structures on its own through continuous conversation contexts.

In addition, by training a low-capacity language model (GPT-3.5 Turbo) with problem-solving knowledge collected from a high-capacity, large-scale vision-language model (GPT-4V), they were able to mimic high-level problem-solving abilities with fewer resources.

\* multi-turn few-shot: A method of gradually improving the product by creating a continuous conversation context.



▲ An alphabet-shaped Angry Birds game level generated using a large-scale language model. Blocks of various shapes are combined to create physically stable structures.

The 'IJ-Bot' team has attempted various attempts to improve the performance of large-scale language models with the support of the 'MobileX Cluster-based Large-scale Language Model API\* Service (Responsible Person: Professor Jongwon Kim)', which has been in pilot operation at the GIST AI Graduate School since July.

\* API: A library for using large language models as a shared resource.

Student In-Chang Baek said, "Thanks to the passionate guidance of Professor Kyung-Joong Kim and the generous support of the AI Graduate School, we were able to discover that the Giant Language Model (LLM) is a new breakthrough in the field of game content. The IJ-Bot team will continue to work to enhance the inference ability of the Giant Language Model and find ways to apply it to the actual game industry."