

SEONUK KIM

Would you call
me an A.I.tist?

EDUCATION

- 2020 - NOW Junior, Double Majoring in *Industrial Engineering and Design*,
Ulsan National Institute of Science and Technology (UNIST)
- 2019 - 2020 Busan Baron Academy of Manga and Webtoon
- 2015 - 2019 Busan Science High School

EXPERIENCES

- 2023 - NOW Machine Learning Scientist, thingsflow of KRAFTON
- 2021 - 2024 Research Assisant, Expressive Computing Lab, UNIST
Design Lab Researching Human-centered AI and Interaction

► Generated by **stable diffusion**; sidelighting, masterpiece, best quality, realistic, masterpiece, cat astronaut, space helmet as **prompt**, nsfw, worst quality, low quality, censored, cropped hands, extra digit, fewer digit, fused anatomy, bad anatomy, bad detail, fused as **negative prompt** with 20 **steps**, euler a **sampler**, 12 **CFG scale**, and 1789328176 as **seed**



xDiffusers

Improving User Interface of Image Generative AI

Period

Mar. - Dec. 2023

Affiliation

Expressive Computing Lab

Collaborators

Yu Jin yujin0928@unist.ac.kr
Taeyoung Ko tyk0506@unist.ac.kr
Yousang Kwon yk7244@unist.ac.kr
Kyungho Lee kyungho@unist.ac.kr

Publications

International Conference

Seonuk Kim, Taeyoung Ko, Yousang Kwon, Kyungho Lee* (2023). Designing Interfaces for Text-To-Image Prompt Engineering Using Stable Diffusion Models: A Human-AI Interaction Approach. Proceedings of 10th International Association of Societies of Design Research Congress (IASDR)

Domestic Conference

Seonuk Kim, Yousang Kwon, Kyungho Lee* (2023). #taggenerator: How an Online Community Designs an Interface for Text Prompt Inputs Using aW NovelAI's Diffusion Model. Proceedings of HCI KOERA Conference (HCIK), 642-647.



GOAL



Easy-controlled TUI

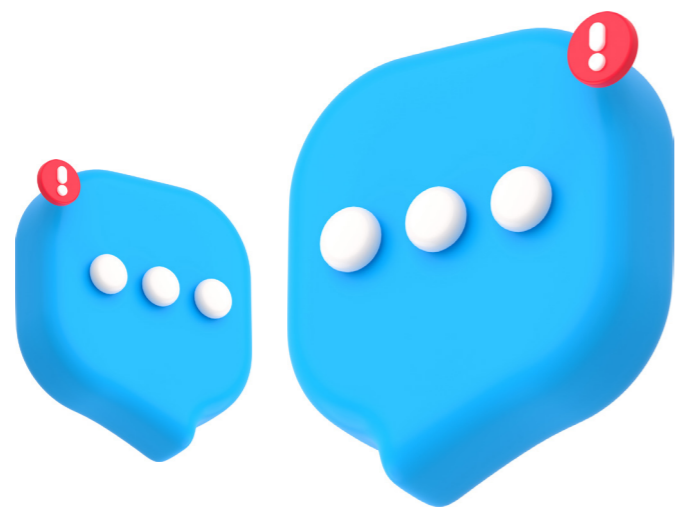


User-intended Image

xDiffusers aims to improve the user interface (UI) design of image generative AI. Stable Diffusion Web UI has different structures than traditional creativity support tools. So, users hard to generate user-intended images.

By developing new human-AI interaction, exploring how generative models influence the creative process. Also, new input, based on the tangible user interface (TUI), will make easier for users to generate user-intended images.

PROGRESS



Step 1 Field Study

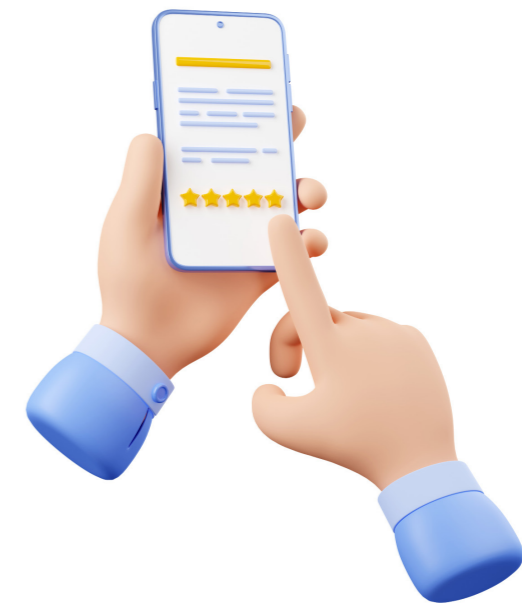
Defined as themes that behavioral patterns of image generative AI users observed in AI Art forum by using thematic analysis. Based on these qualitative and qualitative analysis, suggested directions for improving interface in our papers.

NOW
▼



Step 2 Interface Design

Currently, developing web-based graphical user interface (GUI) and ball joint doll-based tangible user interface (TUI). TUI should provide user convenience to input various integrated information such as pose, depth, and segmentation.



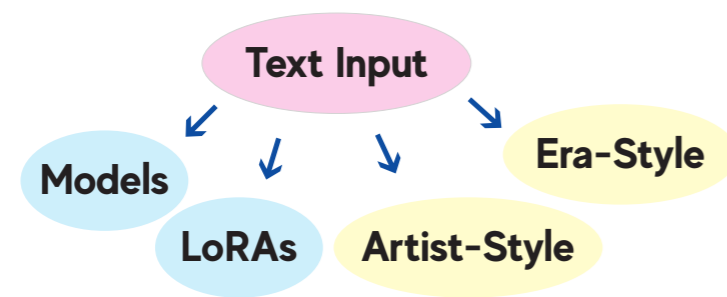
Step 3 Usability Test

Usability test will be progressed by developed UI. The Goal is to write paper that results and discussion show usability improvements by developed UI, and be accepted to CHI'24, top-tier human-computer interaction (HCI) conferences.

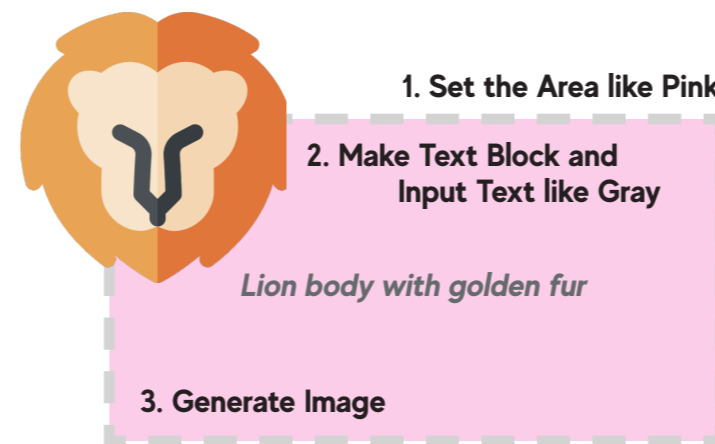
SUGGESTIONS of Field Study Paper

Object-based Interface²

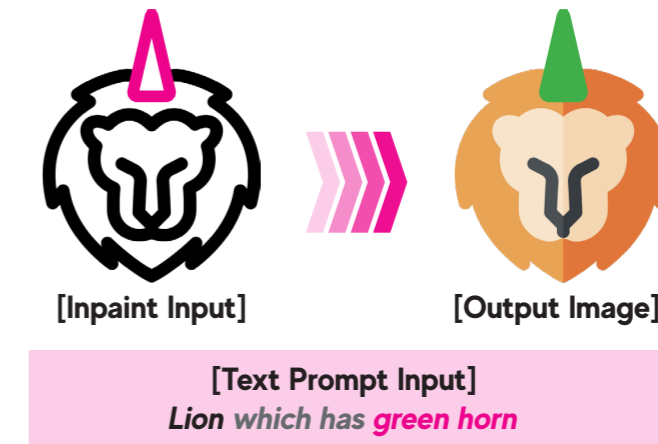
From Input Text Import Methods



Text-on-Image

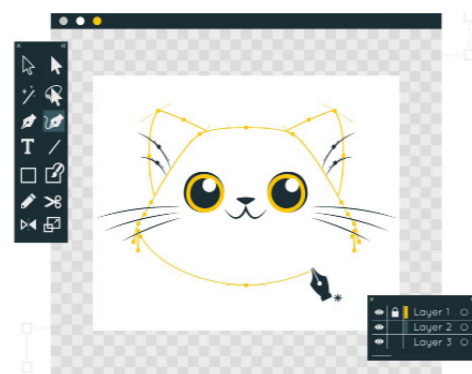


Color-Coupling



Digital Drawing Interface^{1,2}

Digital drawing interface for more freedom such as photoshop plugins



with Social Network^{1,2}

Interface with social networks that can share competitions and tutorials



Recommendation System^{1,2}

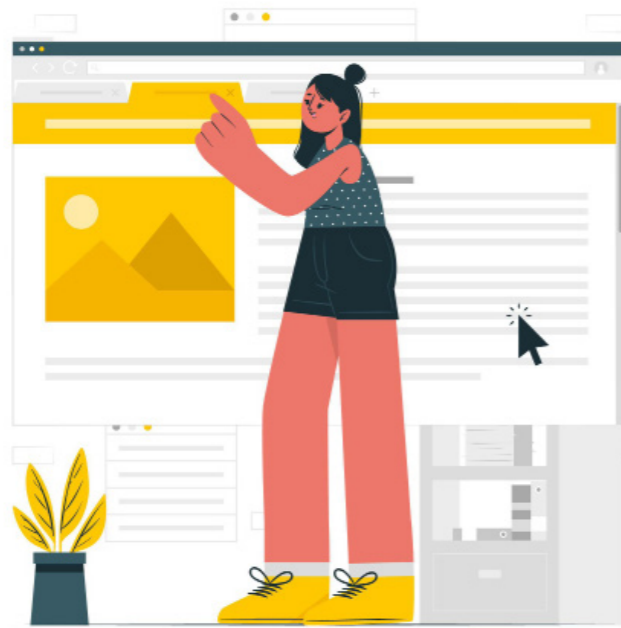
Recommended tags, extensions, models, hypernetworks, and LoRAs.



1. Kim et al (2023). #taggenerator: How an Online Community Designs an Interface for Text Prompt Inputs Using a NovelAI's Diffusion Model

2. Kim et al (submitted on Apr. 16th, 2023). Designing Interfaces for Text-to-Image Prompt Engineering using Stable Diffusion Models: A Human-AI Interaction Approach

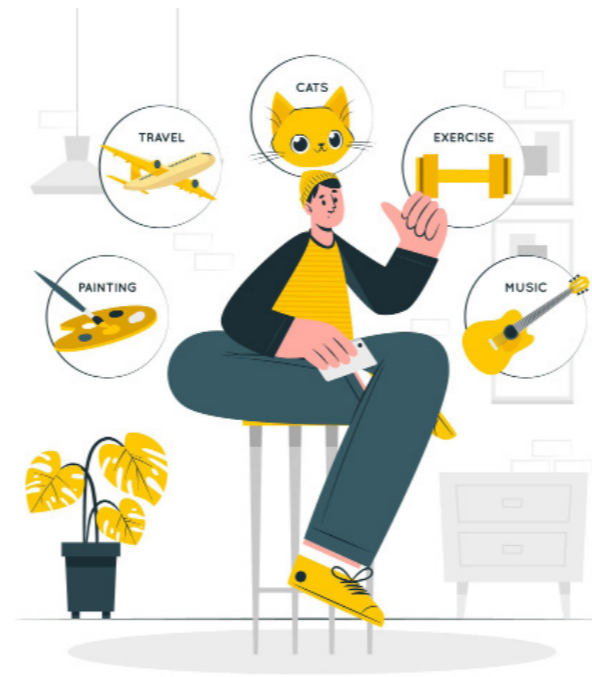
METHODS of Field Study Paper



Case Study

Case study on the Arcalive AI Art channel posts and users as subjects.

Collected 78,911 posts in the Arcalive AI Art channel as subjects. 1068 posts with at least 10 recommendations was used for thematic analysis, and 1321 posts that received 10 or more recommendations for classification.



Thematic Analysis

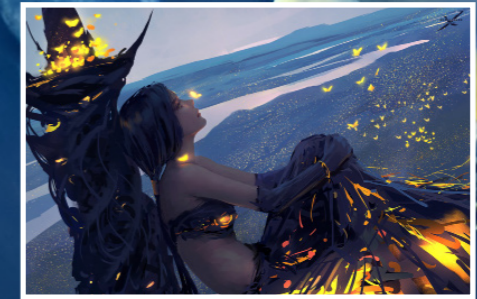
Summarize recommended posts. Repeat clustering. Define 8 themes.

Evaluated the services that users have developed to support and web UI extensions of the AUTOMATIC 1111 with 8 themes. Then, suggested directions for improving the user interface based on the insights from results.



Quantitative Classification

Validate each post whether fits into 8 themes. Get statistics and insights.



* **Style image** used to generate the right-background image

Period

Jan. - May 2022

Client

LG Household & Health Care

Affiliation

Expressive Computing Lab

Collaborators

Yousan Kwon
Taeyoung Ko
Sojeong Yoon
Kyungho Lee

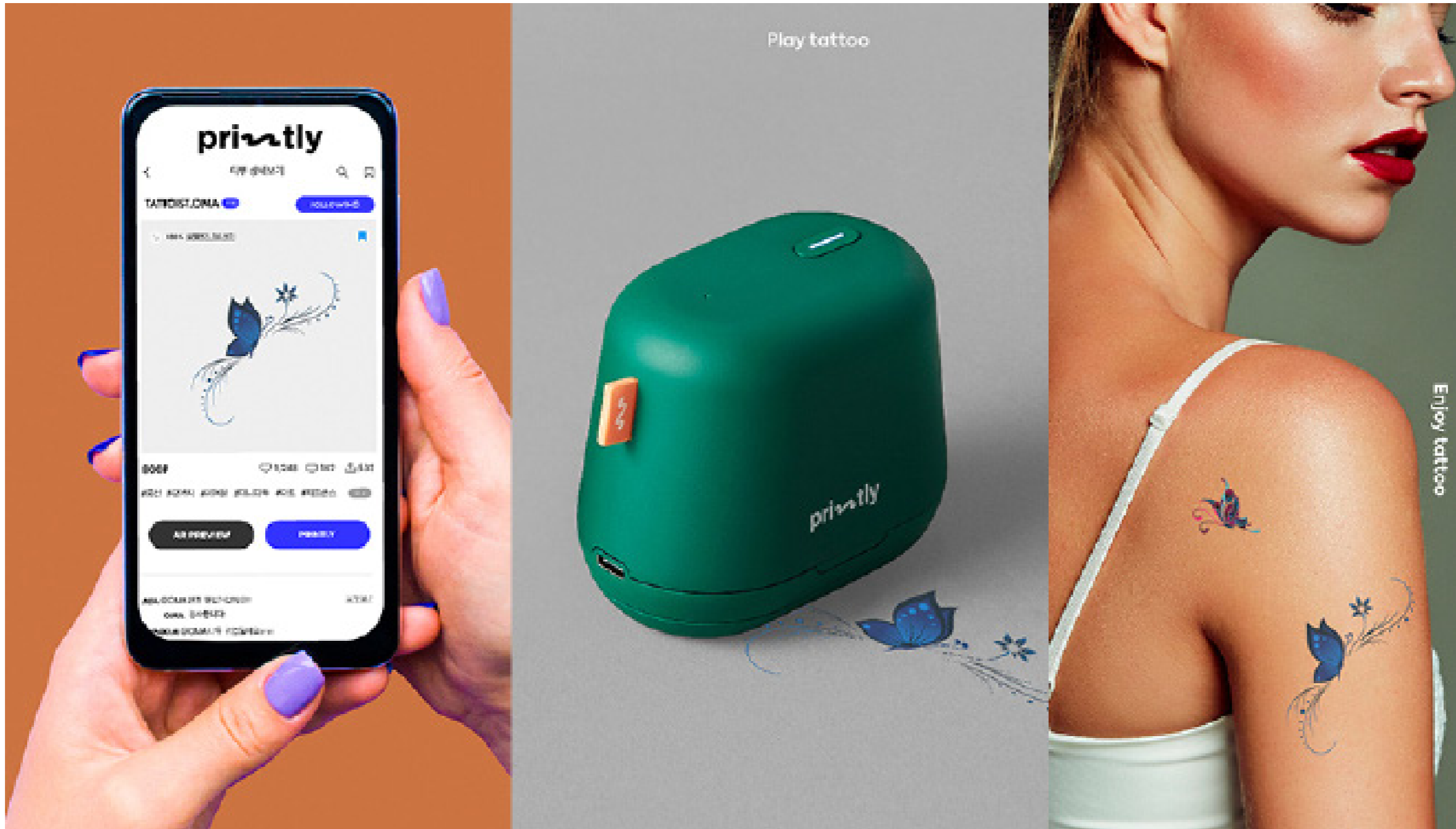
yk7244@unist.ac.kr
tyk0506@unist.ac.kr
ysj17000@unist.ac.kr
kyungho@unist.ac.kr

Contributions

- Reviewed the Style Transfer State-of-the-Art models
- Built Style Transfer Pipelines
- Controlled Library Version and Built Virtual Environment
- Tried Different Combinations of Inputs and Style Images to make sure the Output satisfied the Consumer

TAILORED S/W for LG Tattoo Printer, Print.ly

Developed Software of Mini Tatto Printer, Print.ly



STYLE TRANSFER



Input images are regenerated as stylized images by transferring the styles that trained from the images. Above images were style-transferred by state-of-the-art (SOTA) models during industry-academia joint research.



PIPELINES

Virtual Environment for Python using Anaconda



Main Contributions

- Set up the Ubuntu and CUDA environments to run the software.
- Crafted the requirements.txt for installing libraries to set virtual environment.
- Checked compatibility with the other pipelines.
- Fixed environmental conflicts and structure of pipelines.
- Compared the speed of SOTA models and the quality of output images.
- Built style transfer pipelines by functional programming for easier importing.

2nd KAIST-POSTECH-UNIST Data Science Competition



Customer type predictions and Advertisement decision-making

Period

Oct. 2022 - Jan. 2023

Result

2nd Place out of 43 teams

Team

Seonuk Kim (Leader) d02reams@unist.ac.kr
Seongwoon Jo whtjddns1234@unist.ac.kr
Seokhyun Ahn iamseokhyun@unist.ac.kr
Joochan Oh astr0naut@unist.ac.kr

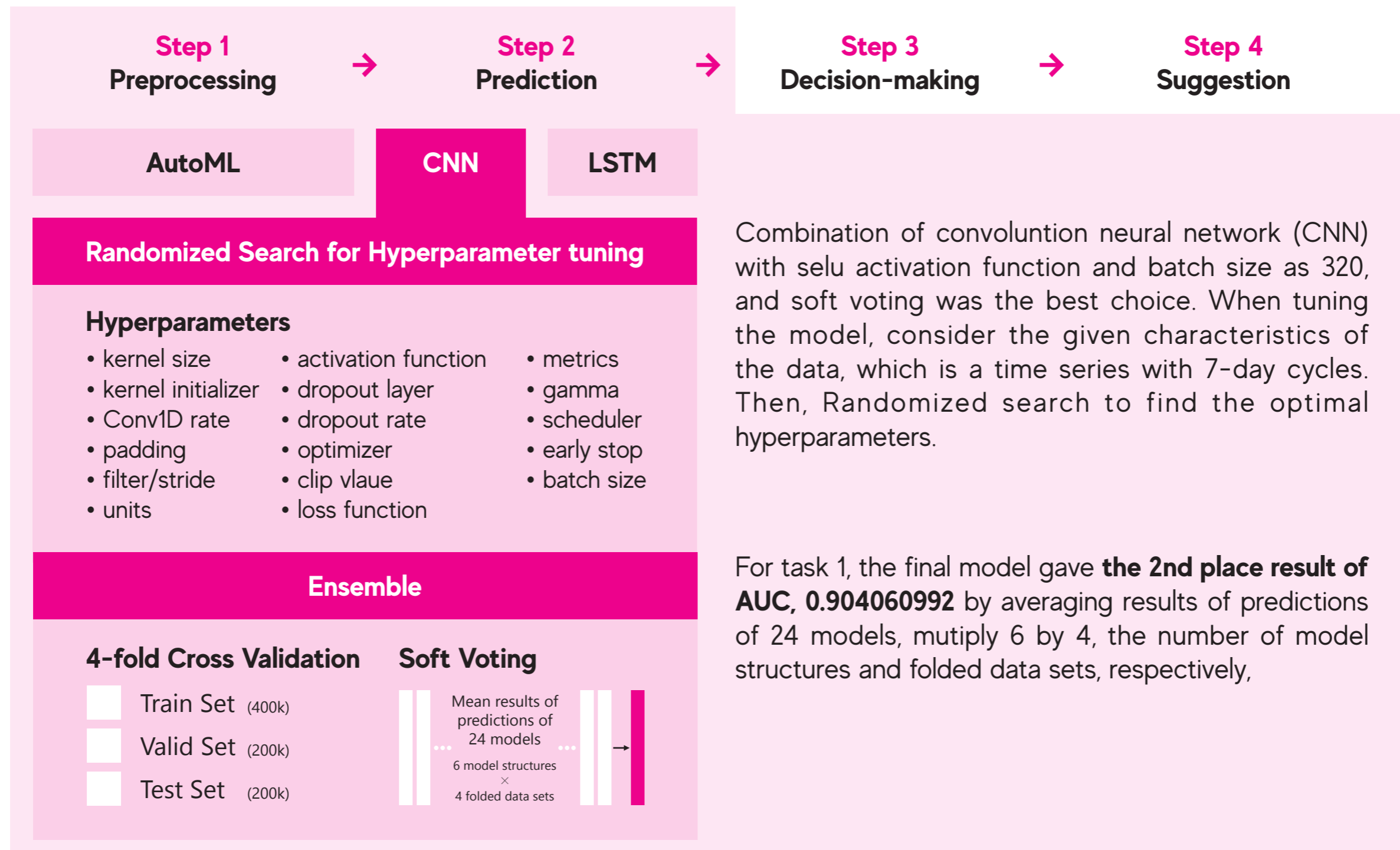
Sponser

Hana Bank, Lunit, MakinaRocks, Fast campus, ECMiner

Host

Korea Advanced Institute of Science and Technology (KAIST)
Pohang University of Science and Technology (POSTECH)
Ulsan National Institute of Science and Technology (UNIST)

PROCESS



PROCESS

Step 1
Preprocessing



Step 2
Prediction



Step 3
Decision-making



Step 4
Suggestion

For Task 2, Bayes' Decision Rule approach and simulated annealing were tried. One of the simulation techniques, simulated annealing, was applied and gave **the 3rd place result, 36.2822m won.**

For Task 3, built and applied the formula that applied bounce rate, with **the 3rd place result, 122.4171m won**

In the final presentation, (1) suggesting to add new related features in the data, (2) ways to improve the model, and (3) effective advertising to target the businesses for improvement of the Hana1Q app, and ended the competition in **the 2nd place**

Bayes' Decision Rule

Simulated Annealing

For Task 2, Exploring Local Maxima using SA

$$\text{maximize } \sum_i \frac{\text{expected value}}{\text{cost}} (500000 \times 0.01 \times y_i - 400) a_i$$

$$\text{total expected net profit} = \sum_i 500000 \times 0.01 \times n(y_i = 1 \cap \hat{y}_i > P) - 400 \times n(a_i = 1)$$

For Task 3, Bounce Rate-based Expression

$$\text{task 3 importance} = \frac{1}{1 + e^{\frac{\log 1128}{2} - \log \frac{A}{B \times C}}} \quad \left(\begin{array}{l} \text{Max} = 0.97109 \\ \text{Min} = 0.02891 \end{array} \right)$$

Presentation, Approches for Suggestion

Data

Model

Advertisement Service



Contact

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More Information

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GitHub github.com/seonukkim