ADHD Diagnosis with VR

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Introduction

- Attention Deficit Hyperactivity Disorder(ADHD)
  - Inattention
  - Hyperactivity-Impulsivity

Introduction

- Treatment at early age may help prevent ADHD
- However, ADHD diagnosis is not as easy as other disorders
  - Not many qualified ADHD experts
  - Insufficient information to diagnose patient

Introduction

ADHD patients are increasing at a high rate in Korea

< 2017년~2021년 '활동성 및 주의력 장애' 성별 진료인원 >

(단위: 명, %)

구분	2017년	2018년	2019년	2020년	2021년	증감률 ('17년 대비)	연평균 증감률
계	53,056	59,602	72,452	79,238	102,322	92.9	17.8
남성	42,453	46,996	55,637	58,394	72,332	70.4	14.2
여성	10,603	12,606	16,815	20,844	29,990	182.8	29.7

< 2017년~2021년 '활동성 및 주의력 장애' 성별 총진료비 >

(단위: 백만 원, %)

구분	2017년	2018년	2019년	2020년	2021년	증감률 (17년대비)	연평균 증감률
계	37,882	44,482	58,072	65,277	86,952	129.5	23.1
남성	31,038	36,015	46,061	49,491	63,519	104.6	19.6
여성	6,844	8,467	12,011	15,786	23,433	242.4	36.0

ADHD patients and medical expenses 2017~2021,
"ADHD 환자 10만명 넘었다...5년 사이 92% 폭증", 2 Mar. 2023, Medical Times

Introduction

- We can assign a task to the patient, in the form of a game.
- VR allows us to collect accurate behavioral data
  - Other platforms like PC and Mobile cannot provide data related to actual movement

Goal

- Assign a VR task to the patient in the form of a game.
- Setup appropriate parameters to measure the patient’s performance.
- Collect the patient’s behavioral data in real-time.

Expected Results

- Simplify the process of diagnosing ADHD
- Create a database of diagnostic data
- Increase accuracy of ADHD diagnosis
- Fast result analysis

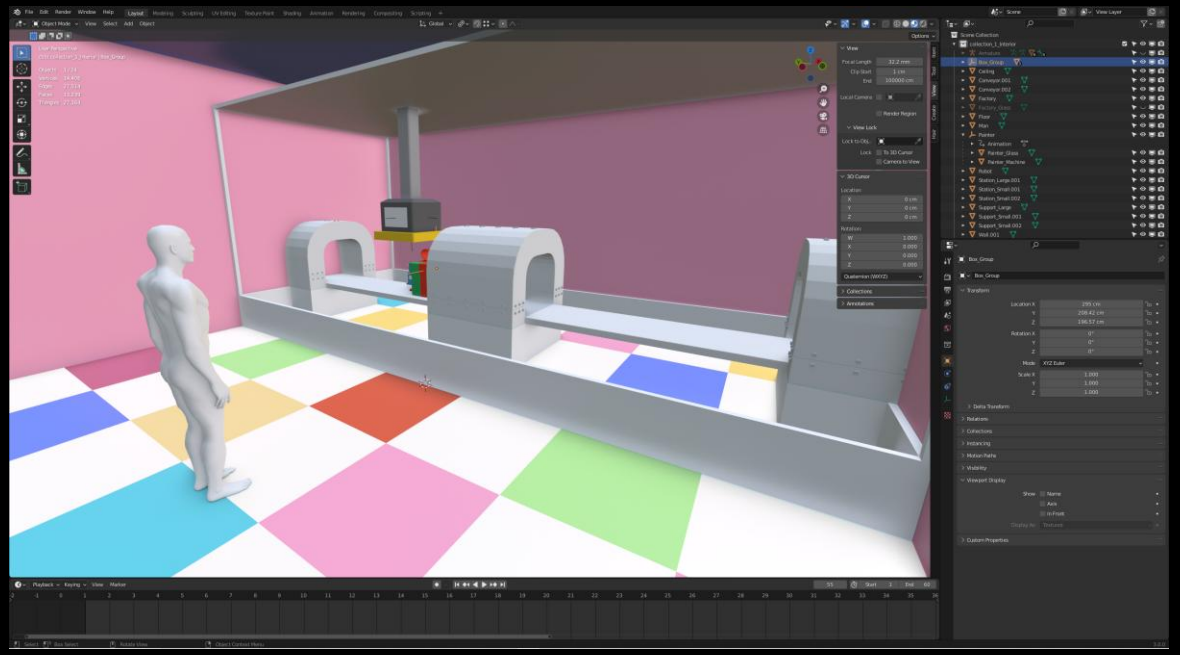
Software

Unity

Blender

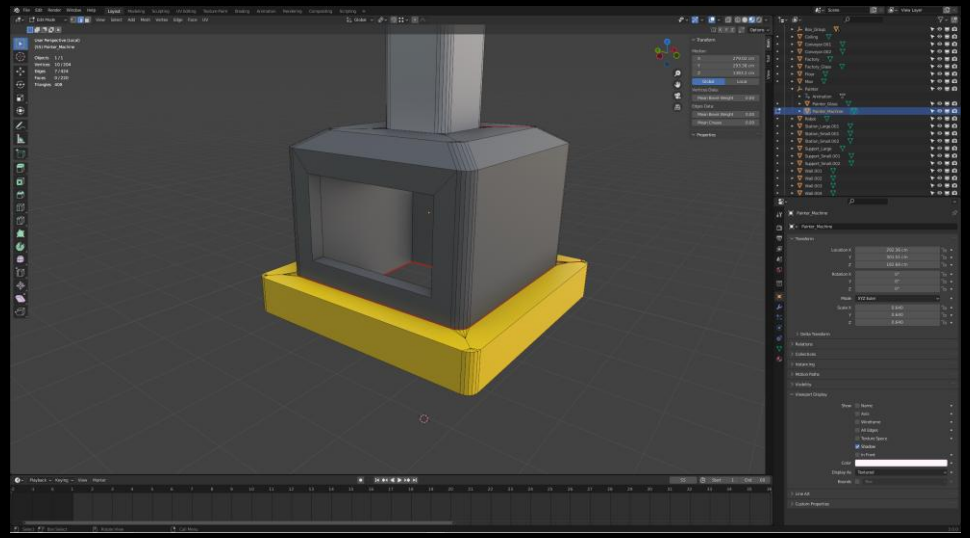
Game Concept

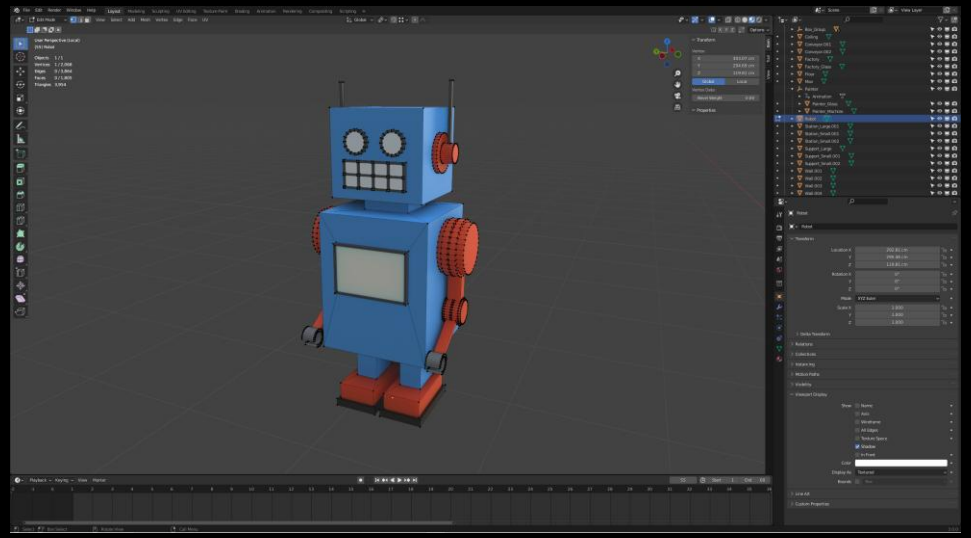
Toy Factory



Game Design

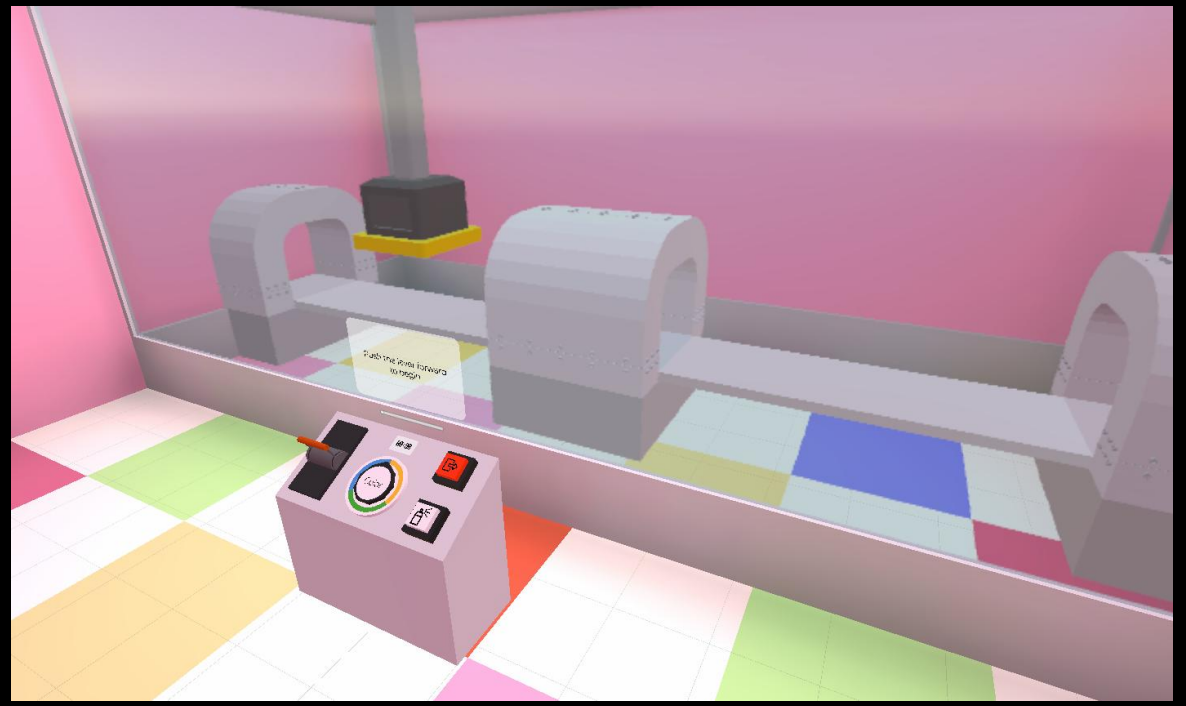
Modeling





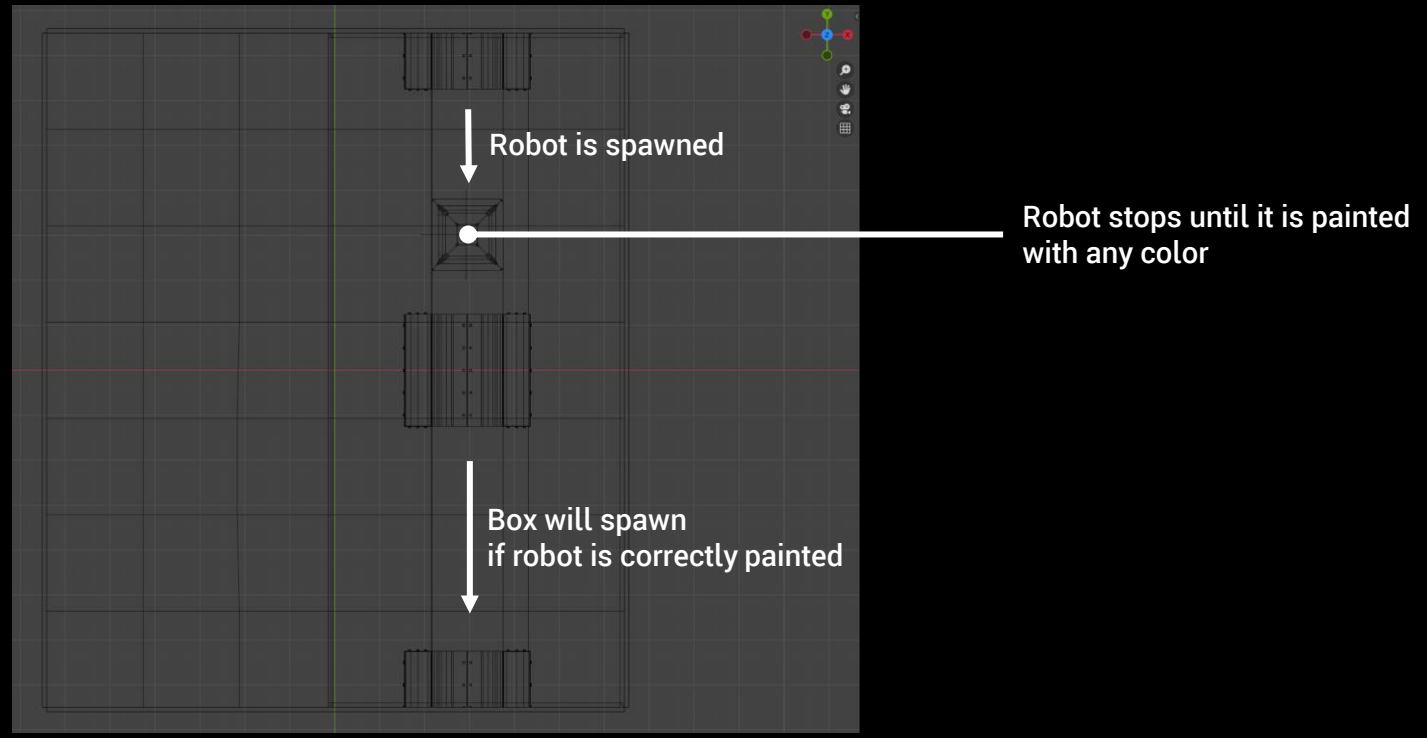
Game Design

Scene Setup



Game Design

Task : Paint as many robots within the time limit

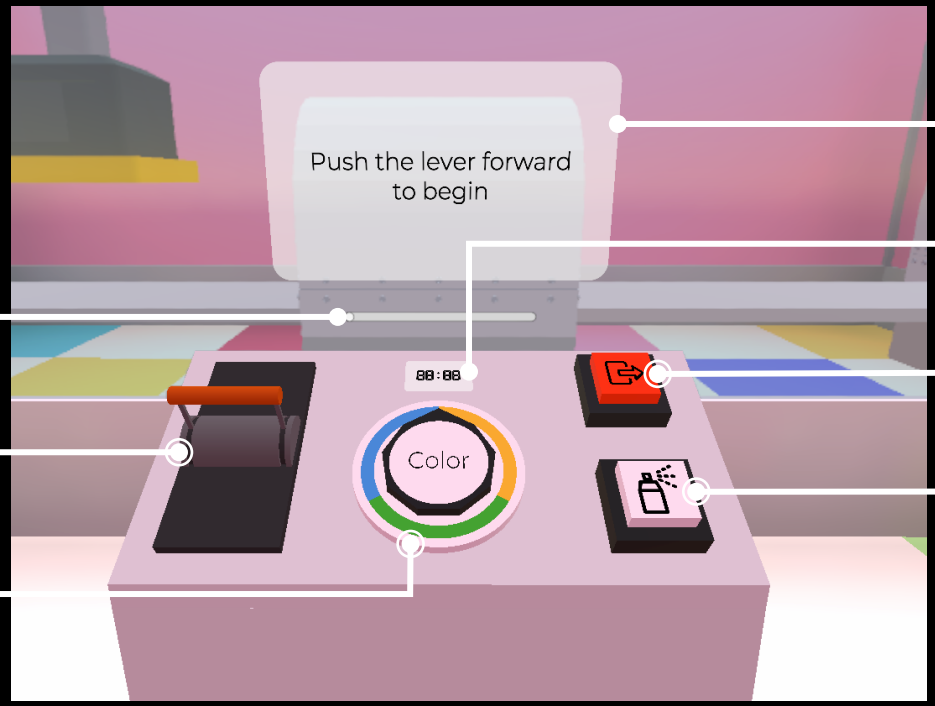


Game Design

Interactions

Game Design

Control Panel



Game Design

- Evaluates whether patient can carry on with repetitive, tedious task for a given time limit
- Buttons, wheel and lever only work at a sharp condition, allowing to check whether the patient is focused on the task

Demo

Conclusion

- The use of VR provided a wide variety of data.
  - More parameters can be added for additional data collection
- Data collection for diagnosis can be done outside of hospitals
- Use of various design patterns improved scalability and performance