

Visual Recognition Game for Autistic Children

Project Design & Technical Documentation

1. Project Overview

This project is a **visual recognition and cognitive training game** designed for autistic children. The game focuses on improving: - Visual recognition - Categorization skills - Shape and object differentiation - Attention and response accuracy

The game progressively increases difficulty by: - Introducing more objects per round - Using visually similar objects (apple vs ball) - Reducing display time - Introducing distractor items

The game will be built in **Unity** and deployed using **WebGL** so it can run inside a web page.

2. Gameplay Flow

2.1 Core Gameplay Loop

1. Show the target object (example: Ball).
2. After a short delay, show multiple objects on screen.
3. User selects the correct object.
4. Provide positive feedback (sound, animation, icon).
5. Difficulty increases over time.

2.2 Difficulty Progression

- **Level 1:** 2 choices, different categories (ball vs car).
 - **Level 2:** 3-4 choices, simple differences.
 - **Level 3:** Similar objects introduced (apple vs ball).
 - **Level 4:** 5-8 choices.
 - **Level 5:** Similar objects + randomized orientation.
 - **Level 6:** Timed rounds.
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3. Core Features

3.1 Visual Stimulus System

- Displays object images.
- Supports PNG/JPG assets.
- Animations for showing/hiding items.

3.2 Target Object Display

- Shows the object to be identified.
- Optional: voice-over that names the object.

3.3 Object Selection Grid

- Dynamically generates a grid of objects depending on difficulty.
- Random placement of correct answer.
- Supports 2–12 items on screen.

3.4 User Input / Interaction

- Click/tap selection.
- Highlight on hover (desktop).
- Touch-friendly hitboxes.

3.5 Feedback System

- Positive reinforcement animations.
 - Sound cues (optional mute).
 - Non-negative failure response.
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4. Accessibility Features (Important for Autism)

- Minimal distraction UI.
 - Simple colors and high-contrast backgrounds.
 - No sudden flashes or harsh animations.
 - Slow-paced transitions.
 - Optional sound and voice-over.
 - Customizable difficulty.
 - Optional parental controls.
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5. Tools & Technologies Required

5.1 Unity Engine Components

- **Canvas UI System** (buttons, images, layout groups)
- **Animator** (feedback animations)
- **ScriptableObjects** (store object data)
- **EventSystem** (mouse/touch input)
- **WebGL Build Tools**

5.2 Scripting Tools

- C# scripts for:
- Game manager
- Difficulty controller
- UI controller
- Object loader
- User progression tracker

5.3 Audio Tools

- Simple positive tone sounds
- Optional narration

5.4 Graphics Tools (Optional)

- Photoshop/Figma for creating shape images.
- Free asset packs (if needed).

6. Unity Project Structure

```
Assets/
├── Scripts/
│   ├── GameManager.cs
│   ├── DifficultyController.cs
│   ├── ObjectItem.cs
│   ├── UIManager.cs
│   └── FeedbackController.cs
├── Images/
│   ├── TargetObjects/
│   └── DistractorObjects/
├── Audio/
│   ├── PositiveFeedback/
│   └── VoiceOvers/
├── Prefabs/
│   ├── ObjectButton.prefab
│   └── FeedbackEffect.prefab
├── Scenes/
│   └── MainMenu.unity
```

```
| | Game.unity
| | Results.unity
```

7. WebGL Build Requirements

- Enable WebGL in Unity Hub.
 - Lightweight UI (avoid heavy particle effects).
 - Texture compression enabled.
 - Keep memory usage low (WebGL is limited).
 - Full-screen browser support.
 - Mobile browser compatibility.
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8. Data & Progress Tracking

Optional but useful:

- Track correct/incorrect answers.
 - Store progress in browser local storage.
 - Allow session continuation.
 - Parental dashboard overview.
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9. Future Expansion Ideas

- Add levels for counting, sorting, or matching.
 - Add customizable difficulty settings.
 - Add multiple categories (animals, fruits, vehicles).
 - Add reward system (stars, badges).
 - Add voice recognition for children who want to verbalize the answer.
 - Multiplayer/teacher-assisted mode.
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10. Conclusion

This document outlines the required tools, features, and structure needed for a Unity-based WebGL visual recognition game tailored for autistic children. Its focus on accessibility, progressive difficulty, and minimal distractions ensures a calming and educational experience.