



Qawqaa: Auditory Habilitaion System for Children with Cohclear Implant using Virtual Reality

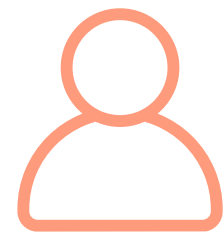


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AVRAR: Applied VR/AR - Immersion, Accessibility and Emerging Trends

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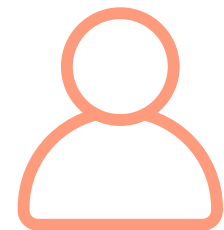
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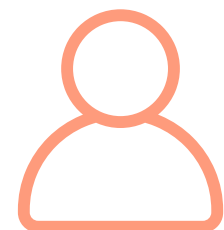
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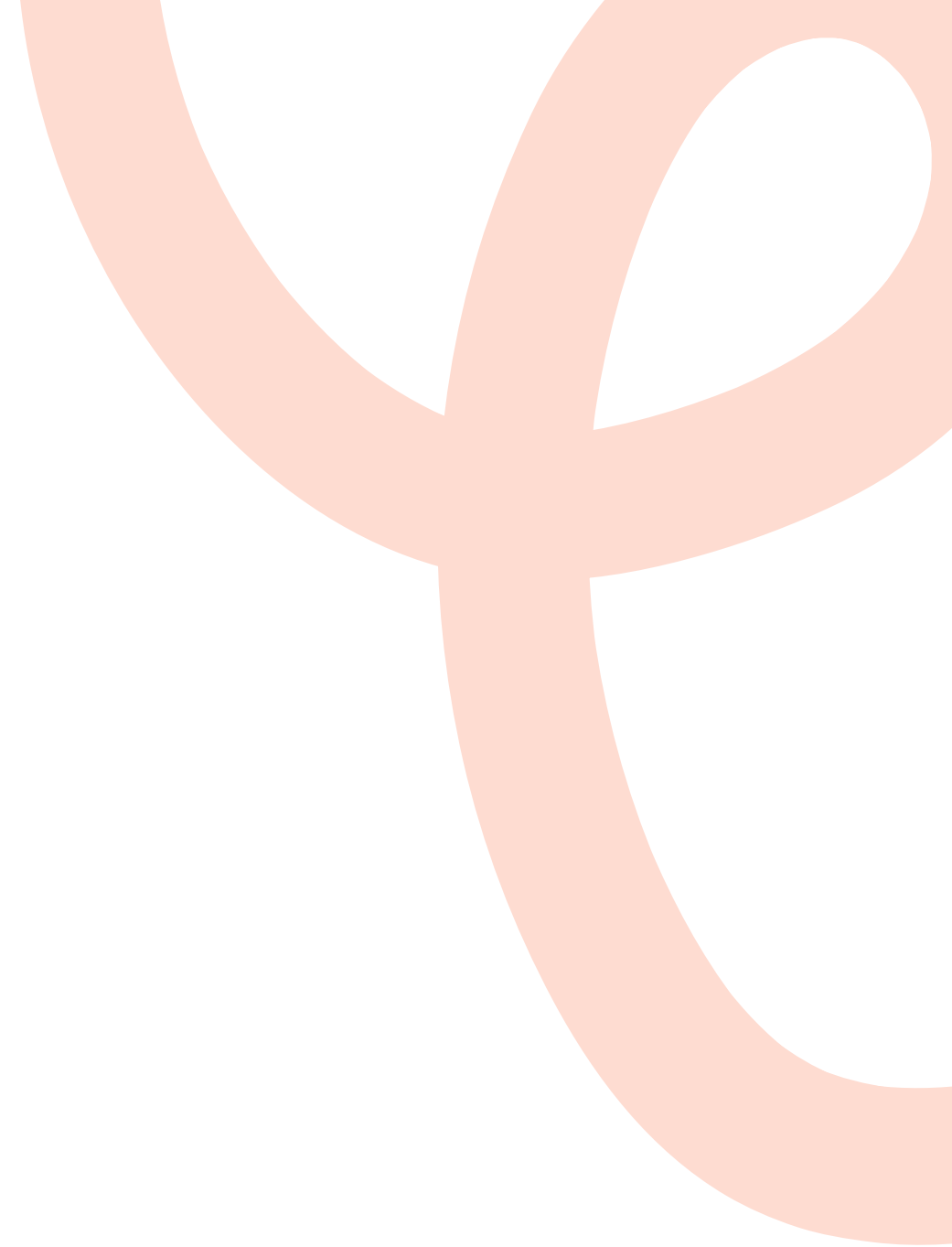
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Outline



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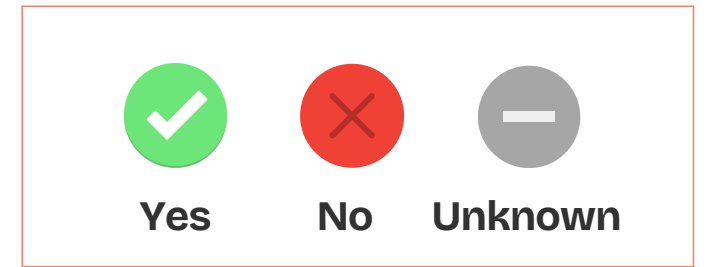
Problem statement

- In the Kingdom of Saudi Arabia (KSA), the prevalence of childhood Sensorineural hearing loss (SNHL) ranges from 1-4 per 1000 live births [1]



- Habilitation after cochlear implant surgery is essential for children with severe to profound hearing loss. However, accessing auditory habilitation and speech therapy poses challenges, including availability, cost, and accessibility. These obstacles restrict their ability to maximize the benefits of cochlear implants.

State of The Art



Bears [2]

Rannan [3]

Karawan [4]

Qawqa'a

Platform

VR only

Web

Mobile

VR for children & Web for specialist

Support Arabic



Engaging Experience



Home Training



Admin Monitoring



Progress Tracking



Hearing Enhancement Activities



Proposed solution: Qawqa'a

- Qawqa'a is an immersive virtual reality game tailored for Arabic-speaking children aged 8-12 who use cochlear implants.
- Its primary goal is to facilitate and enhance the auditory habilitation process in a fun and engaging manner.
- Through a series of carefully designed games, Qawqa'a aims to improve various aspects of hearing skills, including sound localization, word identification and speech perception.
- In addition, Qawqaa provides a web-based monitoring and tracking side for habilitation center administrators, facilitating efficient tracking of a child's progress and skills within the game.

Solution Description



VR Side

Home Environment



Sound Localization Environment



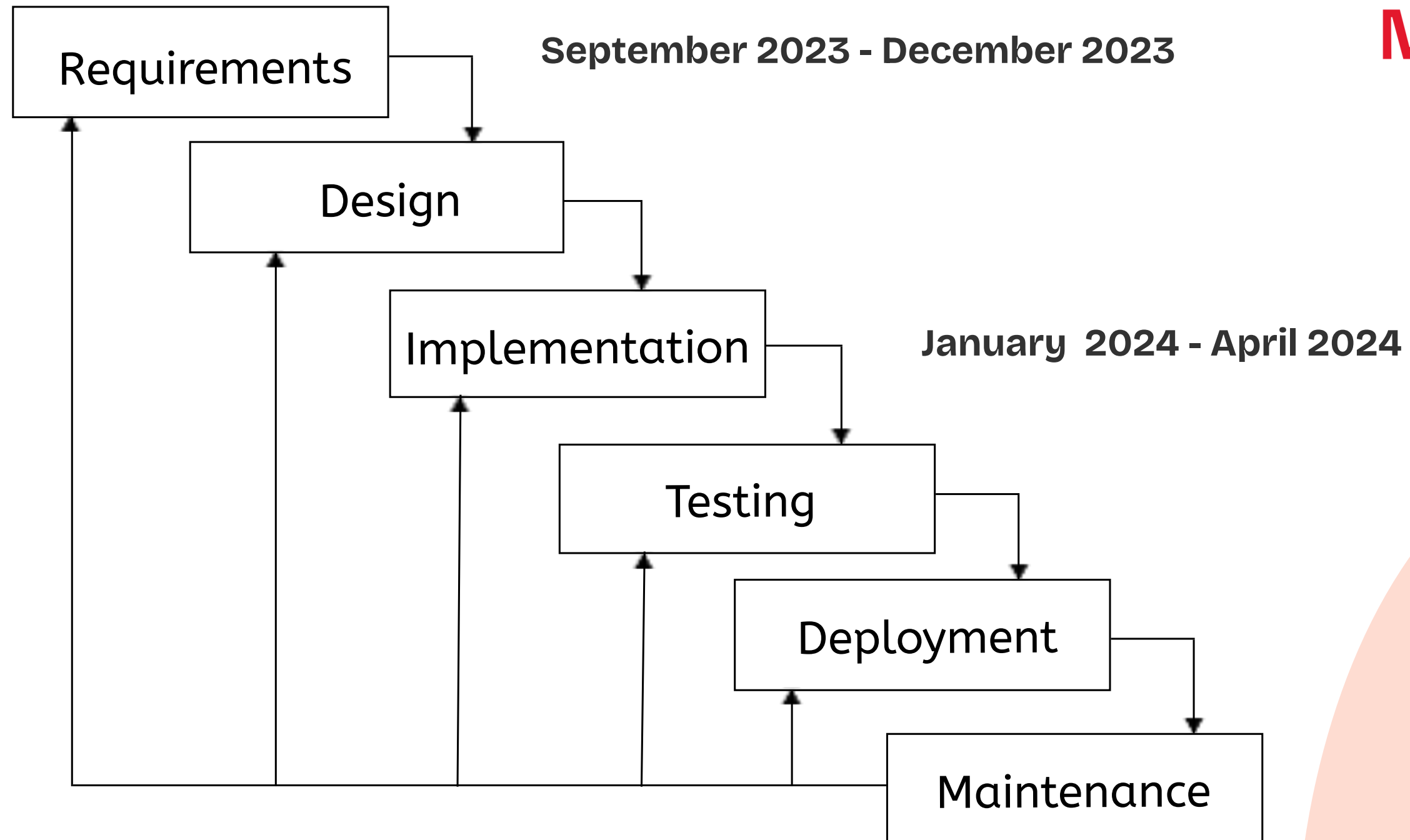
Solution Description

Web Side



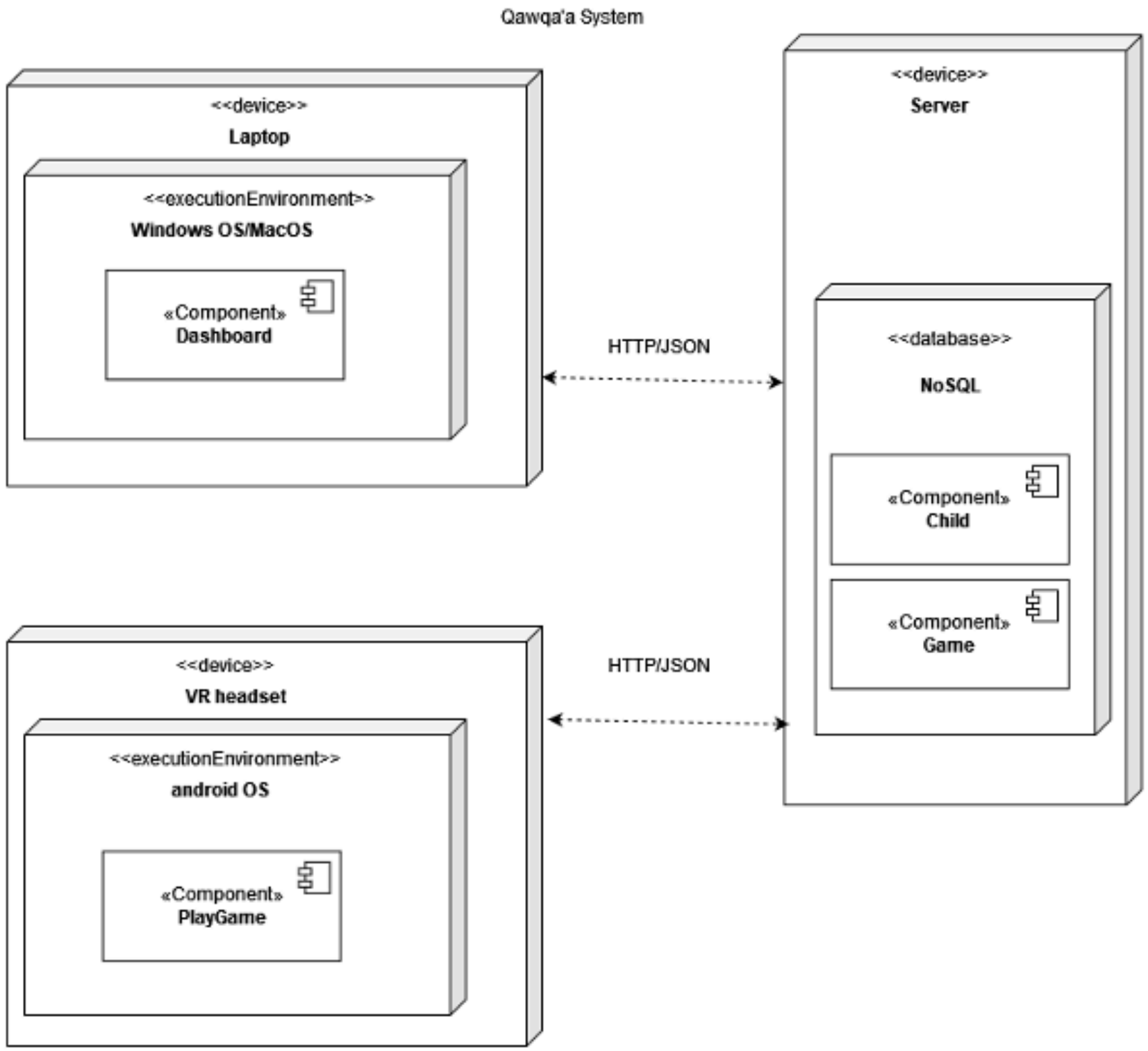
Methodology

MED⁹EL



Waterfall Methodology

Architecture



Qawqaa System Architecture

Technology and Implementation

🎯 Web Side



M



E



R



N

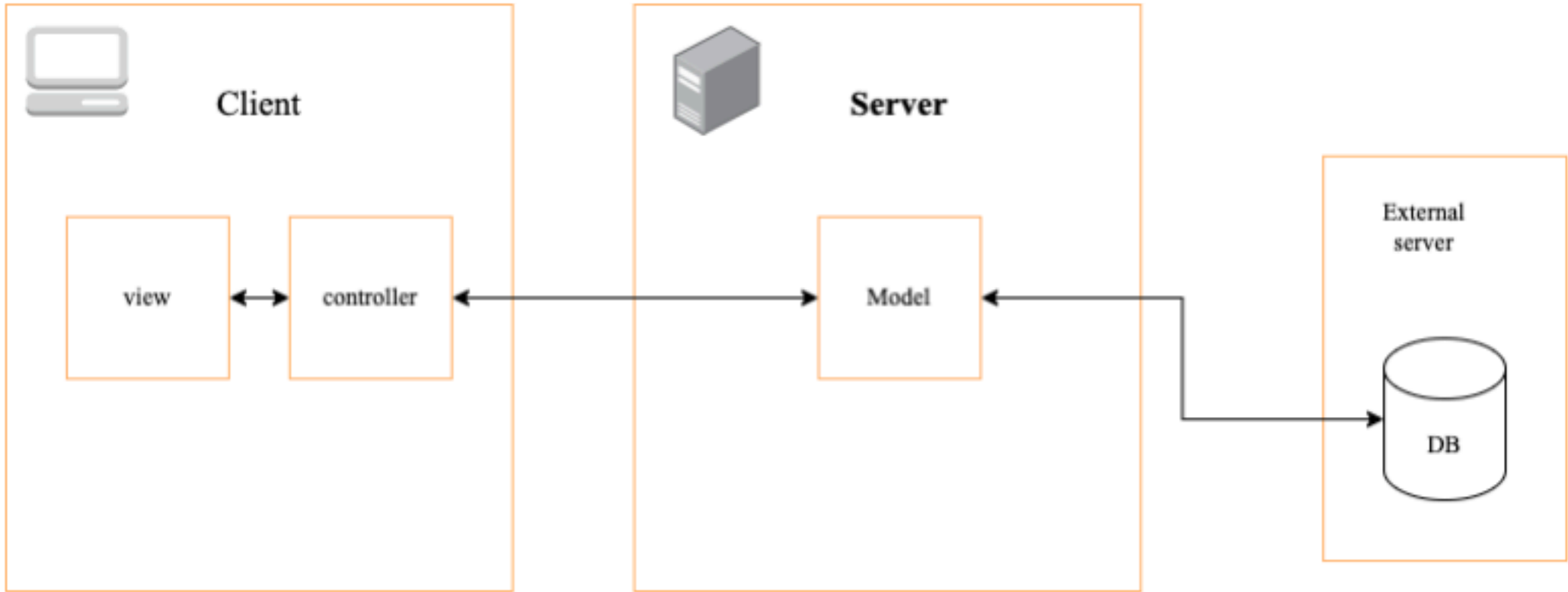


tailwindcss

🎯 VR Side



Unity



MVC (Model - View - Controller) model

Challenges

- 1- Difficulty in evaluating the effectiveness of our solution**
- 2- Difficulty in reaching the target users**
- 3- Lack of experience with the virtual reality technology**

Future Works

- 1- Emerging AI Voice recognition using Whisper from OpenAI**
- 2- Adding more skills for advanced level children**
- 3- Do meetings between Specialist and child in VR (Metaverse)**
- 4- Leaderboard and more gamification methods**



References

[1] Al-Abduljawad, Khayria & Zakzouk, Siraj. (2003). The prevalence of sensorineural hearing loss among Saudi children. International Congress Series. 1240. 199-204. 10.1016/S0531-5131(03)00913-0.

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Know more
about Qawqa'a