InfiniRacer

41097 Studio 3A - Group 1

Problem Description

Problem: ADHD is a disorder that affects a significant portion of the world's children and the COVID-19 outbreak worsened conditions for these individuals.

Requirement: An ADHD treatment that is easily accessible to work around the global COVID-19 pandemic.
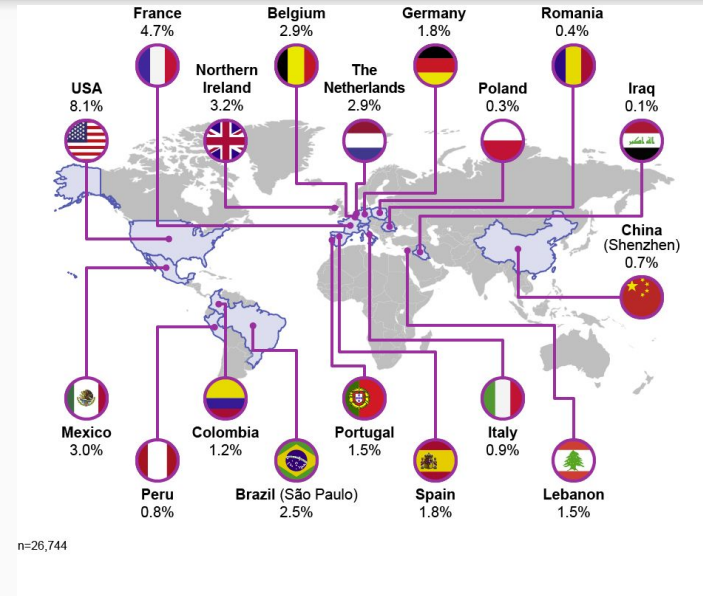

Figure 1: Global prevalence of childhood ADHD based on retrospective recall in adults aged 18–44 years. Figure developed using data from Fayyad J et al. Atten Defic Hyperact Disord 2017; 9: 47-65 [1]

Background Research

- "A mean worldwide prevalence of attention-deficit hyperactivity disorder (ADHD), or hyperkinetic disorder (HKD), of ~2.2% overall (range, 0.1–8.1%) has been estimated in children and adolescents (aged <18 years)"[1]
- "Mitigating the hazardous effects of COVID-19 on mental health is an international public health priority"[2]
- "Children's ADHD behaviours during the COVID-19 outbreak were rated by their parents. A one-sample t-test revealed that the average of children's ADHD behaviours were significantly worsened in comparison to their normal state"[3]
- "The U.S. Food and Drug Administration (FDA) permitted marketing of the first game-based digital therapeutic device to improve attention function in children with attention deficit hyperactivity disorder (ADHD)"[4]

Users' Needs

- Improve attention/focus
- Be able to analyse multiple actions on the screen without distractions
- Interesting and interactive design
- Enjoy a game in playful and exciting manner
- Be able to use in a variety of circumstances
- Challenging gameplay
- Gameplay variety

Figure 2: A child playing the FDA approved ADHD therapeutic device EndeavorRX

Comparisons or Differences - Taseen

- Highlight the differences as comparing to the previous or existing software/solutions/services
- The comparisons can easily highlight the novel and innovative solutions in your project

(Note for Taseen from Ryan: take a look at EndevaouRX to compare us too)

Project Scope - Taseen

- Address the whole scope and objective clearly
- Please use non technical terms. It means every audience (Like: your parents or grand parents can also easily understand your bright idea will change the whole world)
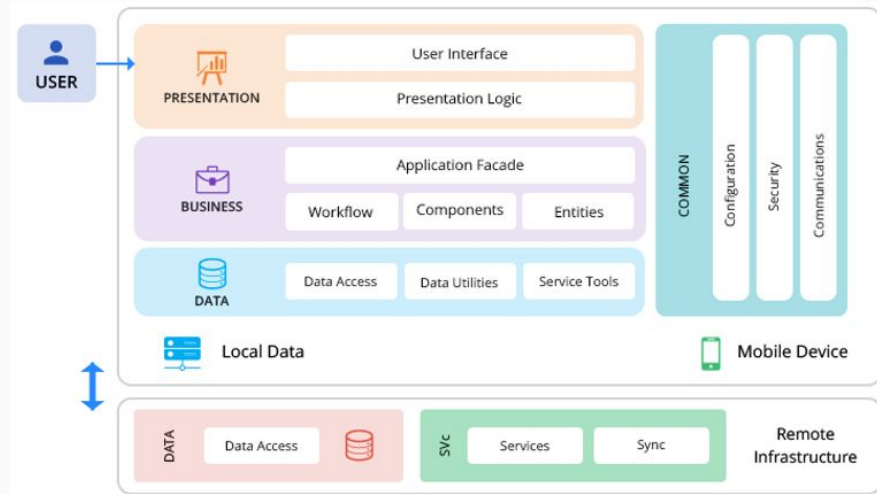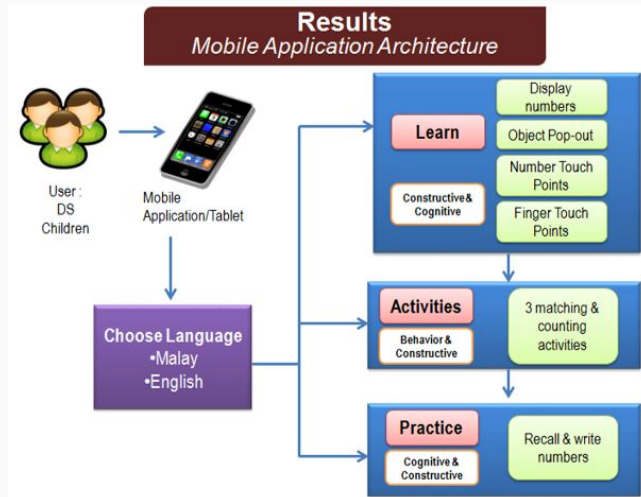
Overview of Software

- A short video (kind of trailer) can be inserted here to highlight the whole software/solution

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- The team have to upload one video to MS Teams before the presentation. The classmates can watch the video in advance.
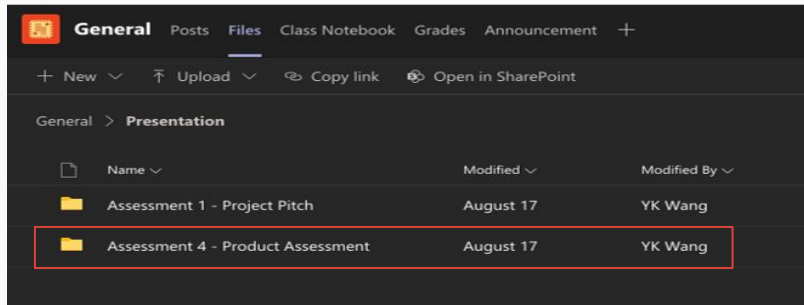
Overview of Solid Achievements

- Introduce the software look like by an architecture (preferred) or list

Introduce the key/new function(s)

- Introduce the most valuable function(s) with <u>who, what, when, why and how</u> of the function(s) [ref. your design thinking]

- You are free to decide the number of function you want to clearly introduce in the presentation

- A short clip can be integrated for better presentation/demostration

AI - Nathan

- AI Objectives
  - Drive in the correct direction
  - Do not crash
  - Hold first place
  - Impede player progress (collisions)

- Training Challenges
  - Procedural Track
  - Realistic Behaviour

- Unity ML-Agents
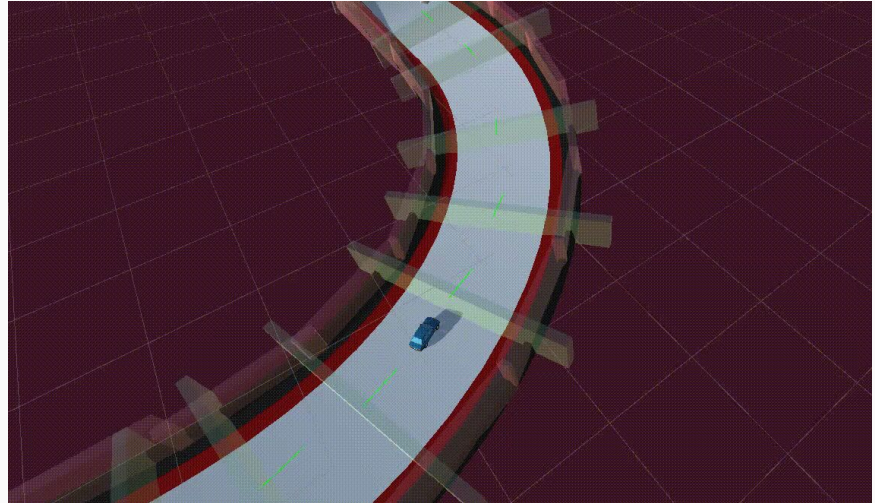
- Proximal Policy Optimisation (PPO) Algorithm

- Training Methods
  - Reinforcement Training
  - Immitiation Training

AI - Nathan

Reward System
- Rewards
  - Correct Checkpoints
  - Straight Steering
  - High Speed
  - Collisions
  - Holding first place

- Penalties
  - Incorrect Checkpoints
  - Wall Barriers
  - End Barriers

UI - Ayush

Key functions and approach to User Interface design

Track Generator - Arian

Please use a very short clip/gif of the function you are explaining.

Power Ups - Vladimir

Please use a very short clip/gif of the function you are explaining.

Next Step - Tuan
(business model / leading research / improvement)

- How to get profit or investment?

- A bigger market in the future?

- Need more research inputs

- More functions

Teamwork/Management Review - Riley

- Review the sprints in your team by
- List the **good thing(s)** -> you should keep

    not so good -> how do you make it right

    bad thing(s) -> how to change it

Project Timeline / Achievement Review - Riley

- List the actual timeline / achievements here
-
- Analyse the difference: OS, language, platform, communications, experience, learning, etc.
-
- How to remove the hazard and have proper plan in coming project?

Questions
&
Answers

References

[1] ADHD Epidemiology | ADHD Institute 2021, ADHD Institute. viewed 27 August 2021, <https://adhd-institute.com/burden-of-adhd/epidemiology/>.

[2] Xiong, J., Lipsitz, O. and Nasri, F. 2021, Impact of COVID-19 pandemic on mental health in the general population: A systematic review, NCBI. viewed 27 August 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7413844/>.

[3] Zhang, J., Yu, H., Shuai, L. and Wang, Z. 2021, Acute stress, behavioural symptoms and mood states among school-age children with Attention-Deficit/Hyperactive Disorder during the COVID-19 outbreak, ResearchGate. viewed 27 August 2021, <https://www.researchgate.net/publication/340549556_Acute_stress_behavioural_symptoms_and_mood_states_among_school-age_children_with_Attention-DeficitHyperactive_Disorder_during_the_COVID-19_outbreak>.

[4]FDA Permits Marketing of First Game-Based Digital Therapeutic to Improve Attention Function in Children with ADHD 2021, U.S. Food and Drug Administration. viewed 27 August 2021, <https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-first-game-based-digital-therapeutic-improve-attention-function-children-adhd>.

Kollins, S., DeLoss, D. and Cañadas, E. 2021, A novel digital intervention for actively reducing severity of paediatric ADHD (STARS-ADHD): a randomised controlled trial, The Lancet. viewed 27 August 2021, <https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30017-0/fulltext>.

The key/Main Tech

- Introduce the state-of-the-art tech which will be used or brought in your project

- Why and how the tech can bring better product or solution?

- Example:
  AR goggle => AR is a new way to provide intensive interaction in real environment