SMART INDIA HACKATHON 2020

Software Edition

ORGANISATION

Yamaha Motor Solution India Pvt. Ltd.

PROBLEM STATEMENT

Mobile game for Alzheimer's Disease detection

TEAM NAME

Runtime – Terrors

INSTITUTION : **MKSSS's Cummins College of Engineering for Women , Pune**

#SmartIndiaHackathon

What is our Solution ?

- Basis
- Visually Paired Game
- Visually Impaired Game
- Distinctive features
- User Flow

SOLUTION

1. Basis

Mobile Game *for* **Alzheimer's Disease Detection**

based on

MoCA & SAGE

S . A . G . E .

(Self-Administered Gerocognitive Exam)

- **Verified**
- **Reliable**
- **Accurate**

Alzheimer's Detection Game

Alzheimer's Detection Game

A Runtime Terrors Initiative

Overall Scoring System

- **10 Cognitive Aspects (95%)**
- **Family and Lifestyle Aspects (3 %)**
- **Behavioral Aspects (2%)**

** AD also depends on **age** , **educational levels** , **linguistic** and **cultural factors**

SOLUTION

2 .Main Game

Alzheimer's Detection Game

10 Stages / 30 Points

Each stage checks a cognition with scoring based on MoCA

Attribute Checked	Game Description	Scoring (points) ** strictly based on MoCA
1. Executive Functioning	make an alternate trail of alphabets preceding a number (1-A ,2-B..)	complete 4 Trails = 1
2. Naming	arrange jumbled alphabets to name 4 different objects	1 x 4 Name = 4
3. Abstraction	segregate objects into a basket, according to their category	1 x 3 Baskets = 3
4. Calculation	analyze left side and right side and choose the larger value	1 x 3 large no. = 3
5. Orientation	name the year, month, exact date, day of the week, state & city	0.5 x 6 Info. = 3
6. Immediate Recall	answer questions based on a short story shown before	1 x 2 Que. = 2
7. Attention	remember the object shown & answer yes/no if it matches the one before	0.5 x 6 Objects = 3
8. Visuo-perception	find 6 hidden objects/words in a picture	0.5 x 6 Words = 3
9. Fluency	speak as many words as possible from a given alphabet	> 17 words : 2 7 – 13 words : 1 else 0
10. Delayed Recall	Answer few more questions based on a short story shown in stage 6	0.5 x 6 Que. = 3
		Total = 30 Points

- Behavioral Questionnaire - checks mental well-being

SOLUTION

3. Visually Impaired Game

Separate game for

Visually Impaired Users

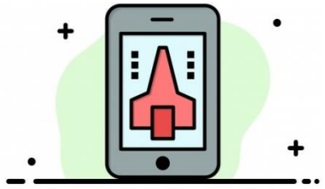
8 Stages / 22 Points

Each stage checks a cognition with scoring based on MoCA

Attribute Checked	Game Description	Scoring (points) ** strictly based on MoCA
1. Memory	answer questions based on a short story that was recited before	1 x 2 Ques. = 2
2. Attention	alphabets will be recited, tap on the screen a particular alphabet is heard	1 x 3 “A” = 3
3. Calculation	analyze the question and swipe according to the instructions recited	1 x 3 Ques. = 3
4. Sentence Repetition	a sentence is recited , repeat it as it is word by word	1 x 2 Ques. = 2
5. Verbal Fluency	speak as many words as possible from a given alphabet	1 x > 1 Words = 1
6. Abstraction	analyze the question and swipe according to the instructions recited	1 x 2 Ques. = 2
7. Delayed Recall	answer questions based on a short story that was recited in stage 1	0.5 x 6 Ques. = 3
8. Orientation	name the year, month, exact date, day of the week, country & city	1 x 6 Ques. = 6
		Total = 22 Points

SOLUTION

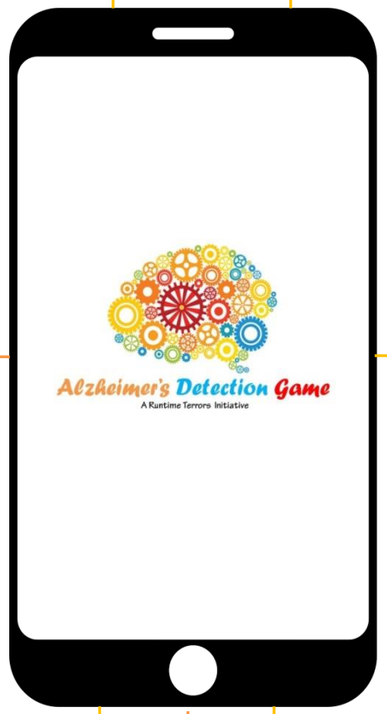
4. Features



User Experience

Past Results can be Re-accessed

All Results - QR Code Generation



Nearby Doctors

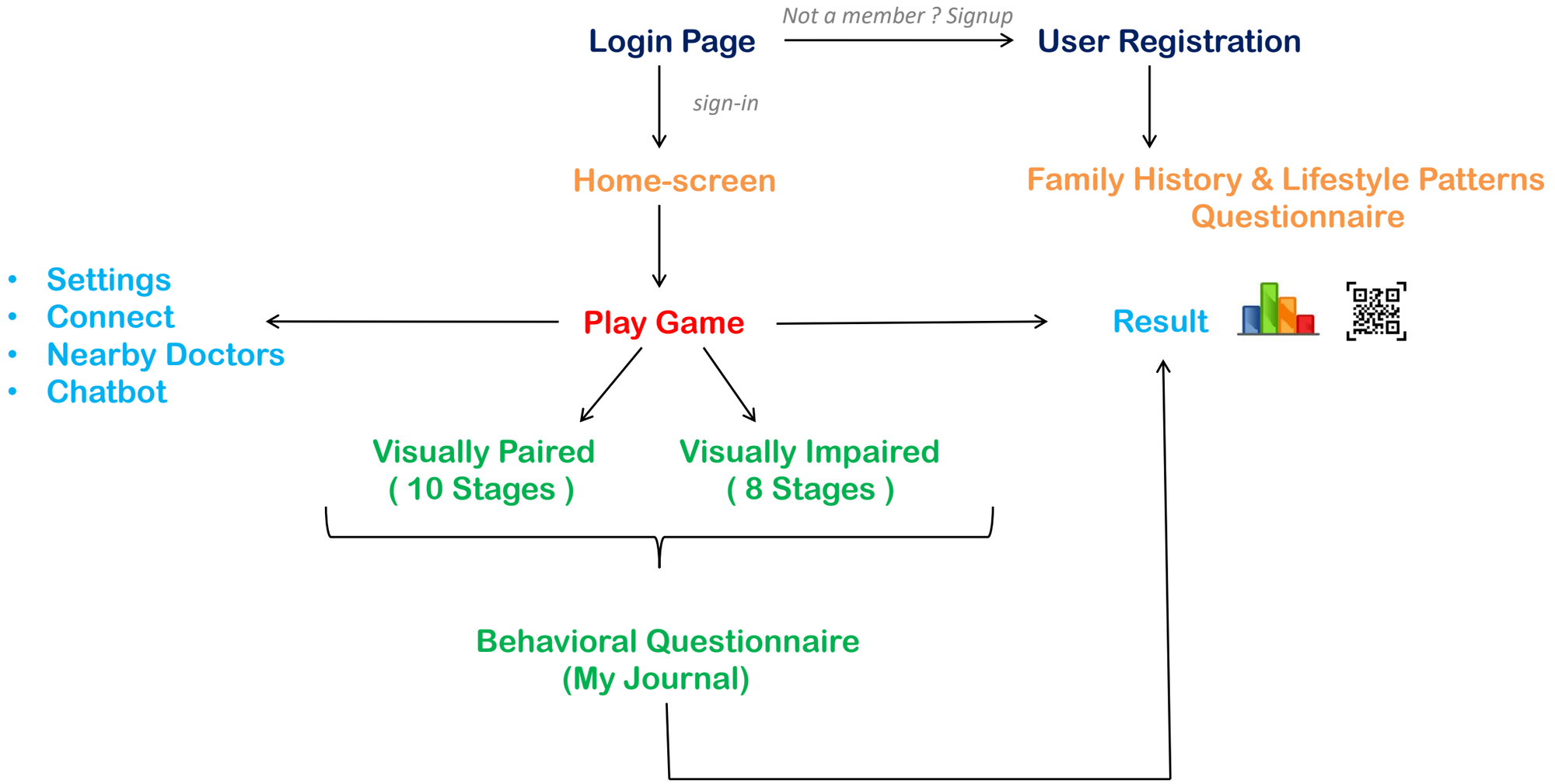
Connect to Communities

Multi- language Support

QnA Chat-bot

SOLUTION

5. Flow



**Note : The user has to follow the sequence of the game , he/she cannot replay any stage due to MoCA guidelines.

What are the TECHNOLOGIES involved ?

TECHNOLOGY STACK

Android Studio

DEVELOPMENT PLATFORM

FRONTEND

- User Interface

XML

- Editing / Graphics

Adobe Photoshop

- Disk Cache

Glide / Picasso

Google APIs - Secured Infrastructure

- Speech to text API
- Location API
- Text to Speech API

BACKEND

- User Authentication

Firebase

Java

OPTIMIZATION

Pro-guard

SECURITY

(Data Encryption)

isolates your app data and code execution from other apps

SANDBOX

DELIVERY

App Serving – Dynamic Delivery

Google Play

At-Install | On Demand | Conditional | Instant

TARGET GROUPS

TARGET GROUPS

Target Groups

Patients
(Target Audience)

Family Members / Caregiver

DIRECT

Search Engine Optimization

Social Media Promotion

share with others feature inside the app

Doctors / Hospitals
(Referral Group / Catalyst)

Neurologists

Government / Pvt. Hospitals

Doctors can use app to detect AD

promotion in clinics / hospitals through displays , calendars ,gifts etc.

NGOs
(Referral Group / Catalyst)

groups working for AD / Dementia patients

through presentation / seminars / awareness schemes

Pharmaceutical Companies / Medical Shops
(Referral Group / Catalyst)

promotion through displays , calendars ,gifts etc.

INDIRECT

IMPACT

IMPACT

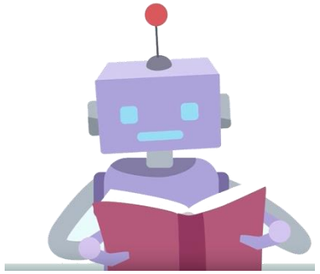
We want to BRIDGE the GAP between healthcare and technology and create a nationwide impact and touch lives globally.

- Accuracy of MoCA Test – at Home – in the hands of people
- Game preferable for ALL AGE-GROUPS – useful for all
- Our share with others feature in the chat-bot - will increase the Reachability
- We lay emphasis to the physical as well as mental wellbeing of our user

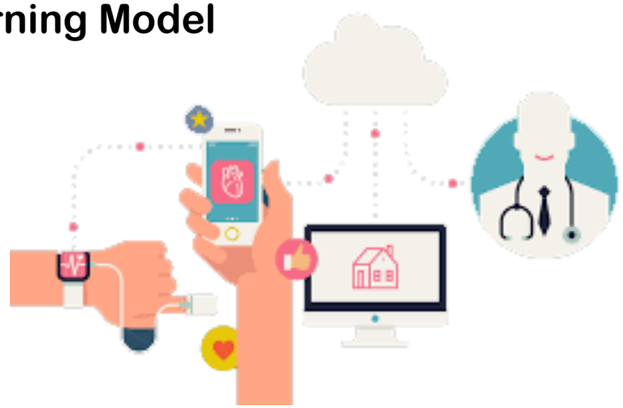
FUTURE SCOPE

FUTURE SCOPE

- As users increase – **DATASET Generation**
- train a **Machine Learning Model** using **Classification Algorithm**
- to keep polishing the accuracy of our **prediction**



- Using available DATASETS - train a **Machine Learning Model**
- user can share his **MRI brain scans** with us
- **automated** disease AD detection model



- Interfacing the user's everyday health related data
- such as **sleep patterns, heartbeat rate , sedentary time** & **navigation** with a **smart watch**

Thank You