CS233

TEAM NO: 15

PROJECT NO: 1

VISUALLY AIDED READING

“AReader”

EMPIRICAL RESEARCH

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EMPIRICAL RESEARCH:-

Empirical research is the collection and analysis of end user data for determining the usability of an interactive system. It is an observation-based investigation. Empirical research is based on the three themes:

- Answering and raising questions about the existing design or interaction method (testable research questions)
- Observation and Measurement of Variables
- User studies

FORMULATING A RESEARCH PROBLEM:-

Research questions basically help us in testing the usability of the system. They are also useful in comparing the performance of a system with respect to an existing system.

Here, the existing system used for testing is a similar apps available in the play store /apple store.

SYSTEM:-

App:- Visually Aided Reading app.

Description :- An app which gives augmented 3D representation of the word selected.

1. RESEARCH QUESTIONS:-

Question 1 :- If error rates are kept under 10% , given a total no. of scans and a specific word, how much time the app takes to recognize the word ?
Independent Variables :- No. of Scans, no. of words
Dependent Variable :- Time Taken.

FACTOR	LEVELS
No. of Scans	1,2,3,4,5
No. of Words	1,2,3

Questions 2 :- Given a no. of scan and no. of words, by what rate the app displayed the wrong 3D augmented representation in a single attempt?
Independent Variables :- No. of Scans, No. of words
Dependent Variables :- Error Rate = (No. of Incorrect Word representation)/ (Total No. of Words)

FACTOR	LEVELS
No. of Scans	1,2,3,4,5
No. of Words	1,2,3,4,5

VALIDITY OF RESEARCH QUESTIONS :-

The research questions formulated are internally valid
Question 1: The above stated independent variables can compute a reasonably accurate value for the measure of time taken.
Question 2:. The stated independent variables can compute a reasonably accurate value for the measure of error rate.

Also, the validity is increased by posing multiple narrow questions that covered the range of outcomes influencing the broader questions.

2 . EXPERIMENT DESIGN

Experiment design in the context of empirical research refers to the organization of variables, procedures, participants, etc in an experiment.

Experiment Objectives:

The experiment is designed in order to pre-decide on the number and category of participants to be involved, the apparatus to be used and the procedure to be followed for collecting data and categorization of variables.

PARTICIPANTS :-

We have conducted our study on 10 people . The participants are selected from different categories such as of gender , age , android experience.

These categories may have the following values:
1. Age: age of all participants is >= 3 years
2. Gender: Male or Female(M/F)
3. Android Mobile Experience (AME) : Novice / Intermediate / Advanced.
4. Education Qualification : No Formal Education (N) / Primary + Secondary Schooling (S) / Bachelor's degree or higher (B)

S.No	Age	Gender	Experience	Education Qualification
1	19	M	Advanced	B
2	25	M	Intermediate	B
3	18	F	Intermediate	S
4	31	M	Novice	N
5	16	F	Intermediate	S

6	29	M	Intermediate	B
7	23	M	Advanced	B
8	20	F	Advanced	B
9	30	F	Novice	N
10	35	M	Novice	N

Procedure For Collecting The Data:

• The participants were first explained the general objective of the Experiment.
• Then the app was launched and the control handed over to the participants.
• The participants were shown “How to focus camera on text” interactive tutorial
• The participants were allowed to explore the app for a while for familiarization
• The collection of data was initiated after this.
• Each participant was allowed to scan the text.
• Each participant was allowed to select a word displayed on screen and view the 3D Augment Representation of the word.
• In total 10 observations were collected for the first question.
• In total 10 observations were collected for the second question.

CONTROL VARIABLES:-

Factors that might influence a dependent variable, but are not under investigation need to be accommodated in some manner. These are known as control variables. For our system, the following are the control variables used:

1. Running the app in background.
2. Internet speed
3. time taken to switch between modules (i.e, time to search, noun detection, augment representation, etc).

DEPENDENT AND INDEPENDENT VARIABLES :-

Dependent Variables	**Factors**	**Levels**
Time Taken	No. Of Scans	1,2,3,4,5
	No. of Words	1,2,3
Error Rate	No. of Scans	1,2,3,4,5
	No. of Words	1,2,3,4,5

DATA TABLE :-

1. For Time Taken :

No. of Participants :- 10
No. of Scans :- 1,2,3,4,5
No. of Words :- 3 ({ 1 : Banana } , { 2 : Apple } , { 3 : Kiwi })

Participant	Word No.	No. Of Scans	Time Taken (secs)
1	1	3	3
2	2	4	3
3	3	1	4
4	2	2	5
5	3	4	4
6	1	5	3
7	2	3	5
8	2	2	3
9	1	5	2
10	3	1	3

2. For Error Rate :

No. of Participants :- 10
No. of Scans :- 1,2,3,4,5
No. of Words :- 5 ({ 1 : Banana } , { 2 : Apple } , { 3 : Kiwi } , { 4 : Table } , { 5 : Chicken })
* Unable to scan is considered as incorrect 3D representation of the word

Participant	No. Of Scans	No. Of Words	Error Rate
1	2	2	0%
2	3	5	40%
3	4	4	25%
4	1	3	33.33%
5	5	5	0%
6	3	4	25%
7	4	4	0%
8	5	3	33.33%
9	2	2	50%
10	1	5	80%

RESULT :

For time taken :-

Total Number : 10
Sum : 35
Mean : 3.5
Standard Deviation : 0.92

For Error Rate:-

Total Number : 10
Sum : 2.8666
Mean : 0.2866
Standard Deviation : 0.24