CS233

TEAM NO: 15

PROJECT NO: 1

VISUALLY AIDED READING

“AReader”

Software Design Document

Submitted By -

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1.0 INTRODUCTION

1.1 Purpose

The aim of the project is to develop an app which visually aids users to read texts (printed). The app helps users to understand words from the texts by augmenting a 3D representation corresponding to the word.This Document involves Data Flow Diagrams.This document is primarily intended to as a reference for developing the first version of the system for the development team.

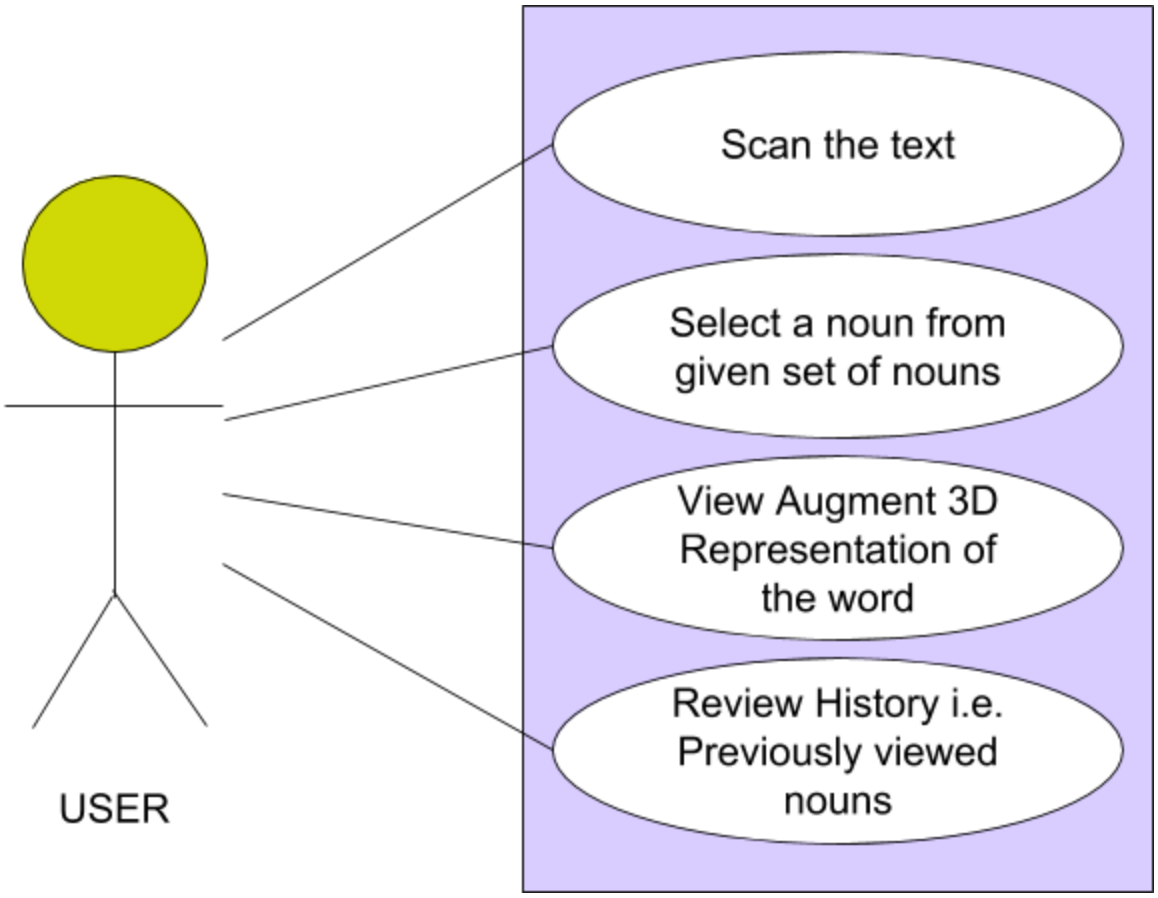
1.1. Scope

Project:- Visually Aided Reading

"AReader" is an app which lets user get the augmented 3D representation of the word he/she desires to know. This app can function as visual aid for users to read texts. Users can experience a mixed reality, i.e. an integration of digital world into the user's perception of the real world.

2.0 USE CASES

USE CASE DIAGRAM



2.1 U1 : Scanning the Text

Actor : An Android-phone user

Scenario 1 : Mainline Sequence

1. User : Scans the image through camera of the mobile phone.
2. System : Analyses the image pointed by the user.
3. User : Focus the camera point on the textual region of the image.
4. System : Locates the boundary coordinates of the textual region.

Scenario 2 : Alternate Sequence, At Step 4 of mainline sequence

4. System : Displays an error when no text is detected.
5. User : Resets the camera.

2.2 U2 : Selecting the word

Actor : An Android phone user

Precondition : System has sorted out the nouns from the words, extracted from the image.

Scenario 1 : Mainline Sequence

1. System : Presents the noun words on the screen of the phone as overlay buttons.
2. User : Taps on the desired word button.

Scenario 2 : Alternate Sequence, Step 1 of mainline sequence

1. System : Displays a message when no noun is found in the extracted words.

2.3 U3 : View Augment 3D Representation

Actor : An android phone user

Scenario 1 : Mainline Sequence

1. System : Downloads the augment 3D Representation of the word selected by the user from the internet server and displays it over the word.
2. User : Views and learn from the augment 3D representation of the word.

Scenario 2 : Alternate Sequence, only a change in Step 1.

1. System : If the selected word is previously searched before, augment 3D representation of the word is loaded from the local store database and displayed on the screen over the word.

2.4 U4 : Review History

Actor : An android phone user

Scenario 1 : Mainline Sequence

1. User : Clicks on the “History” Button.
2. System : Shows a list of all the previously viewed words.
3. User : Search the word list to have an another look at the desired word and selects it.
4. System : Displays an Augment 3D representation of the selected word.
5. User : Views and learn from the augment 3D representation of the word.

Scenario 2 : Alternate Sequence, from Step 3 in Mainline Sequence.

3. User : Clicks on the “Clear” Option.
4. System : Clears the history i.e. clears the application’s local storage from the phone. Displays the list is empty.

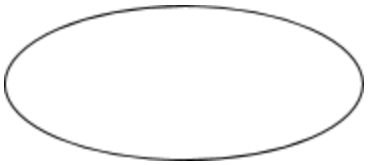
3.0 DESIGN

3.1 Overview

Design phase deals with transforming the requirements,as described in the SRS document, into a form that is implemented using a programming language. The various designs of this system are shown as following:

Data Flow Diagram:

Data Flow diagram is a graphical representation of flow of data throughout the information system. Data flow diagrams illustrate how data is processed by a system in terms of inputs and outputs.

NAME	NOTATION	ROLE
Process		transforms incoming dataflow to output dataflow
Database		Data repositories in system
Dataflow		Pipeline for information flow
External Entity		Objects outside system, with which system communicates

3.2 Level Zero DFD

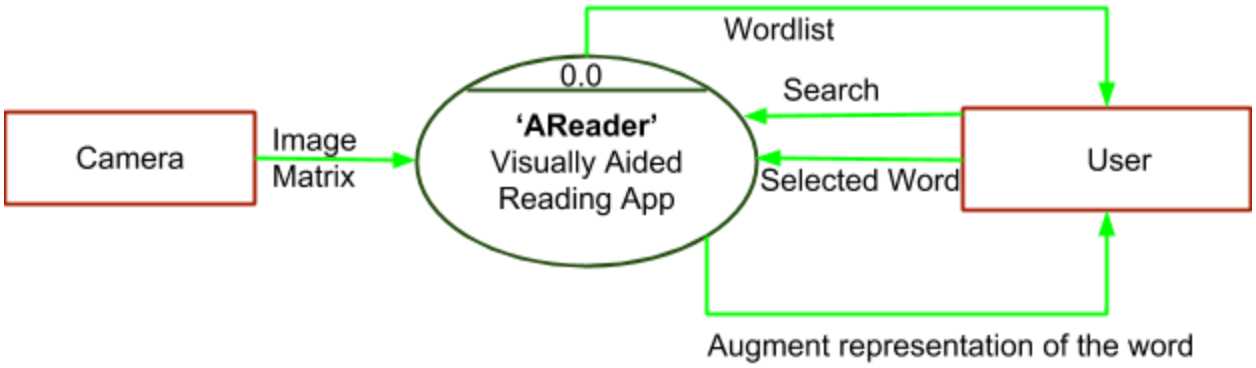
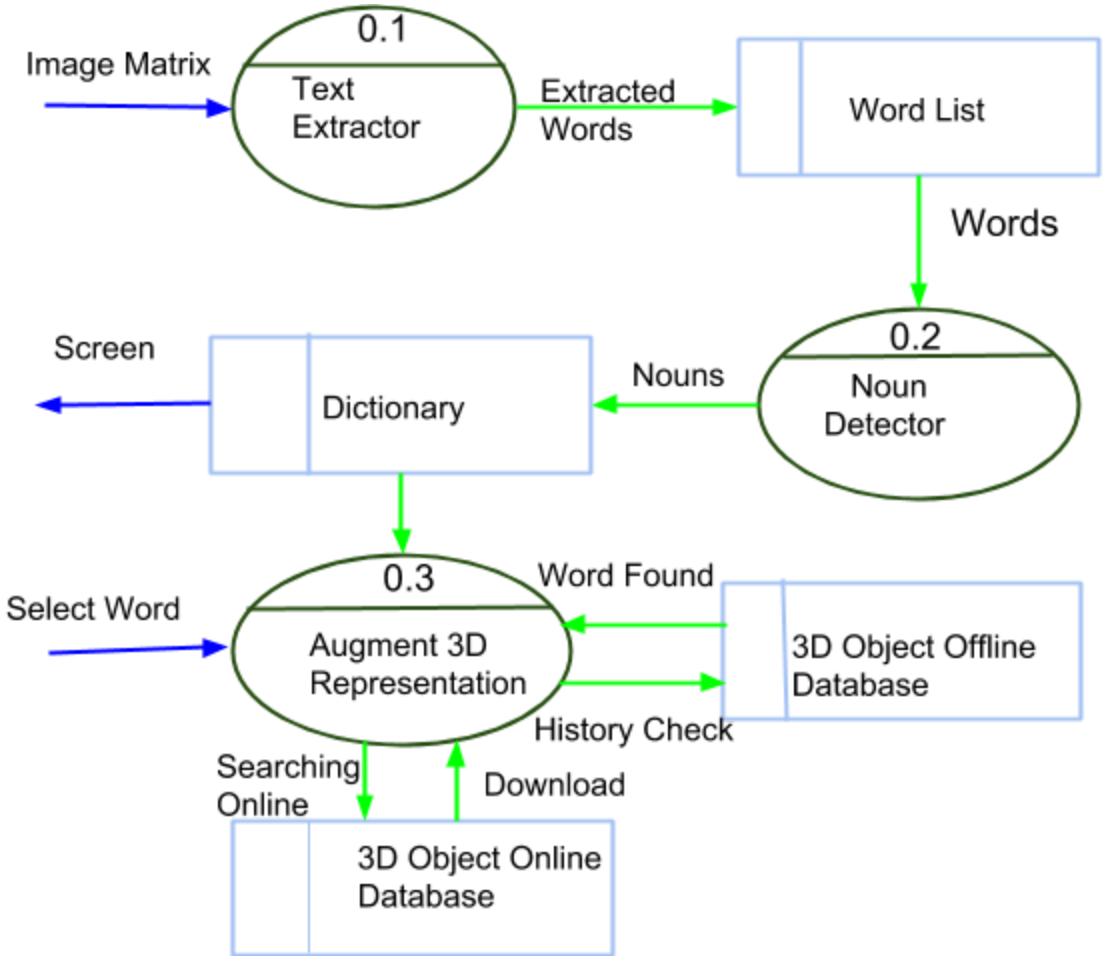


FIGURE 3.1 CONTEXT DIAGRAM

BLUE ARROW ( ) : For data flow to other level of DFD

GREEN ARROW ( ) : For data flow within the same level of DFD

3.3 Level One DFD



3.4 Data Dictionary

- Image Matrix :- [integer 2d-matrix] Image detected data from a Camera.
- Extracted Words :- [string] Paragraphs are Extracted from the image matrix.
- Words :- [string] Words are extracted from the paragraph.
- Nouns :- [string] Nouns are detected from the given words.
- History Check :- [string] Check for the given word in the offline database.

- Word Found :- [boolean] 1 if word is found else 0.

- WordList :- [string array] List containing words extracted from the scanned image.

- Selected Word :- [string] Word selected by the user from the word list.

- Paragraph :- [2d matrix] It contains coordinates of textual area in The image.

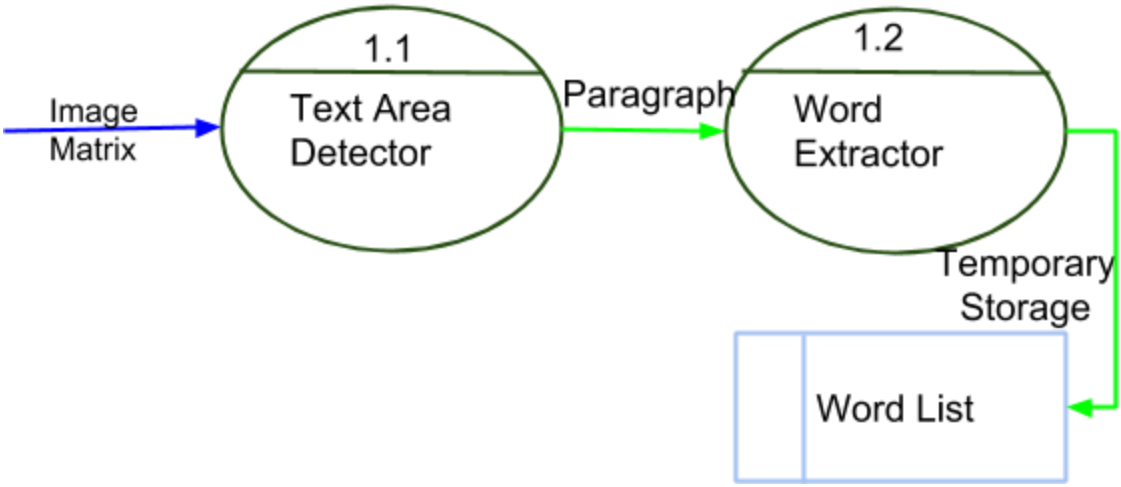
- Augment Representation of the word :- [fiducial marker + real world coordinate system + ARML +ECMAscript] It shows 3D Augment Representation of the word on the screen.

** ARML = Augmented reality markup language

- Clear Data :- [boolean] Clears all the previous search data along 3D representations.
- Search :- [string] Searches for the word in the offline database.
- Screen :- [Integer 2D matrix] words displayed on the screen.
- Search Online :- [string] search for the word in the online database.

3.5 Level Two DFD

1) Text Extractor



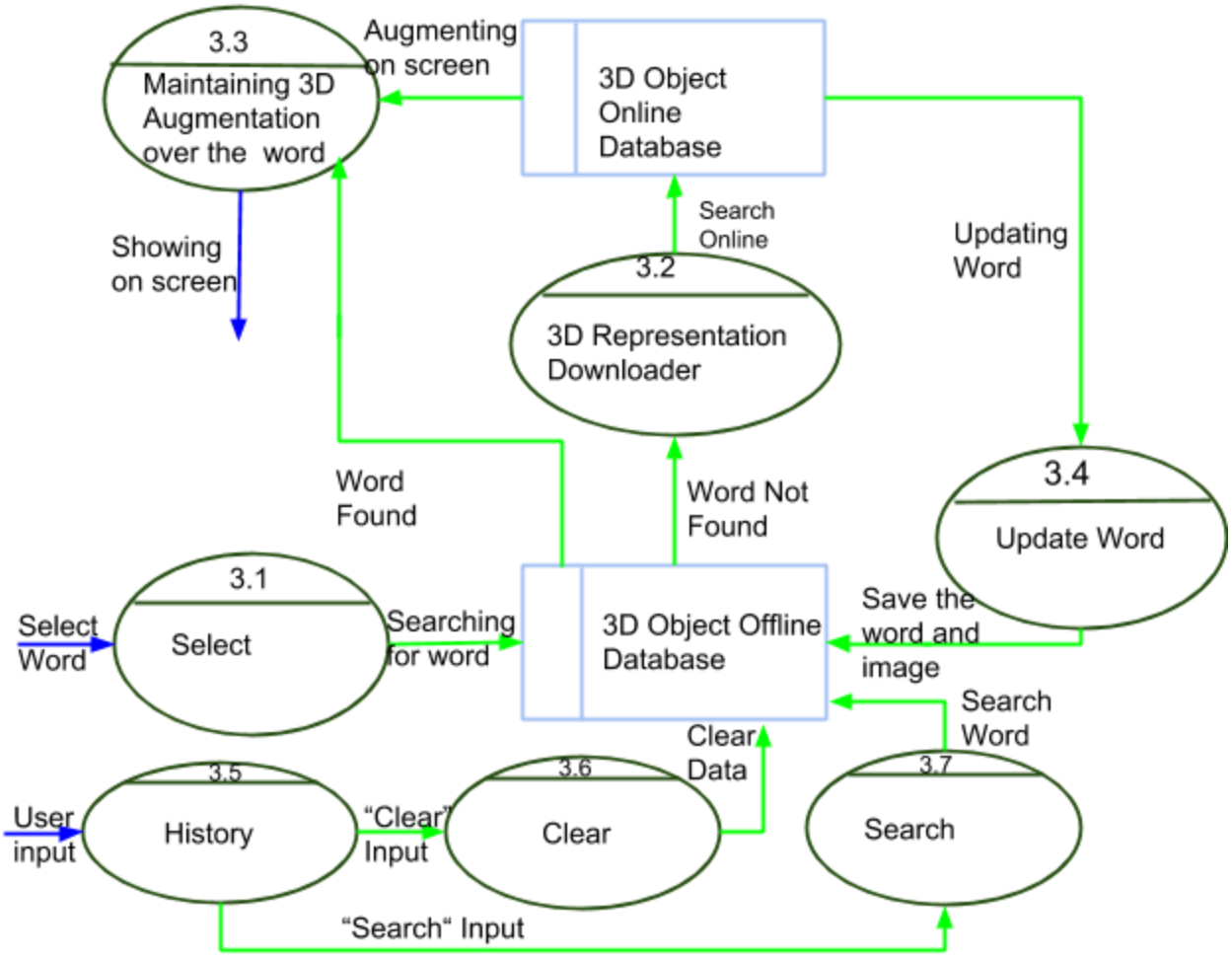
Function Definitions

- 1.1 Text Area Detector :- Detects Text from the image matrix.
- 1.2 Word Extractor :- Extracts Words from the Text scanned.

2) Noun Detection

Words extracted from the text are sorted into a set of words which comes under “Noun” figure of speech using Dictionary.

3) Augmenting 3D Representation of word



Function Definitions

- 3.1 Select :- Searches for the given word in the 3D offline database.

- 3.2 3D Representation Downloader :- Downloadhelper for downloading 3D representation from Online Database.

- 3.3 Maintaining 3D Representation Augmented Over the word :- This function is for showing and maintaining 3D representation augmented over the word.

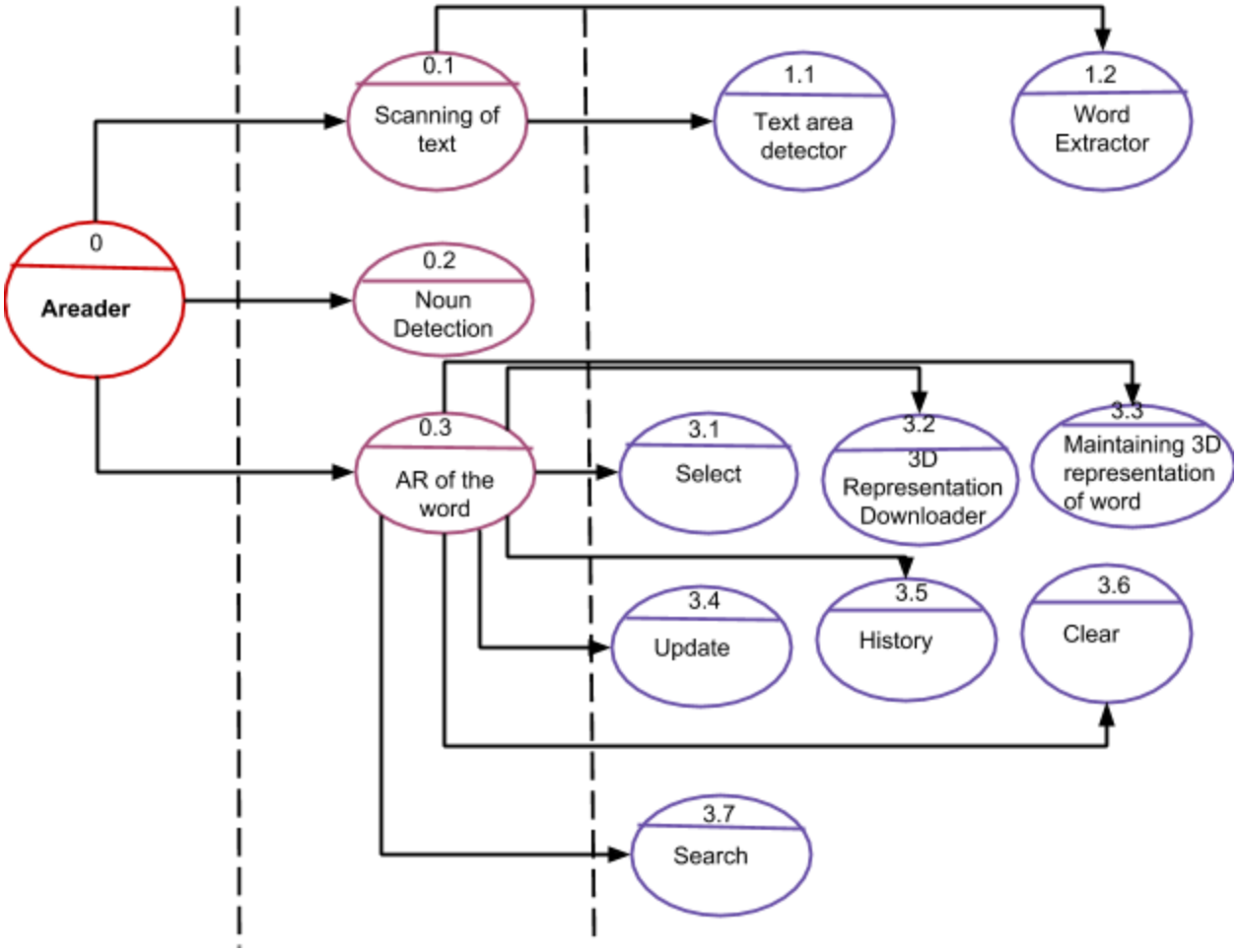
- 3.4 Update Word :- This function updates the 3D representation and the word not present in the history.

- 3.5 History :- History button to view all the previous searches .

- 3.6 Clear :- Clear all the previous history searches.

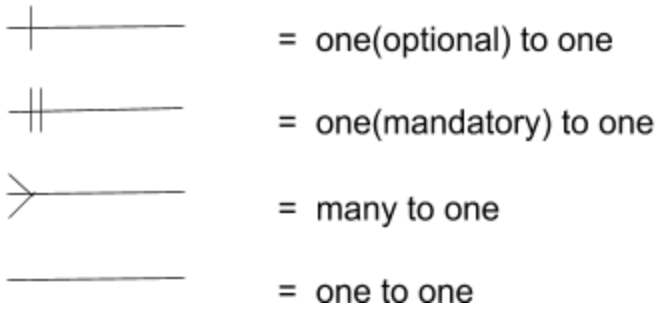
- 3.7 Search :- Search for the word desired in the History.

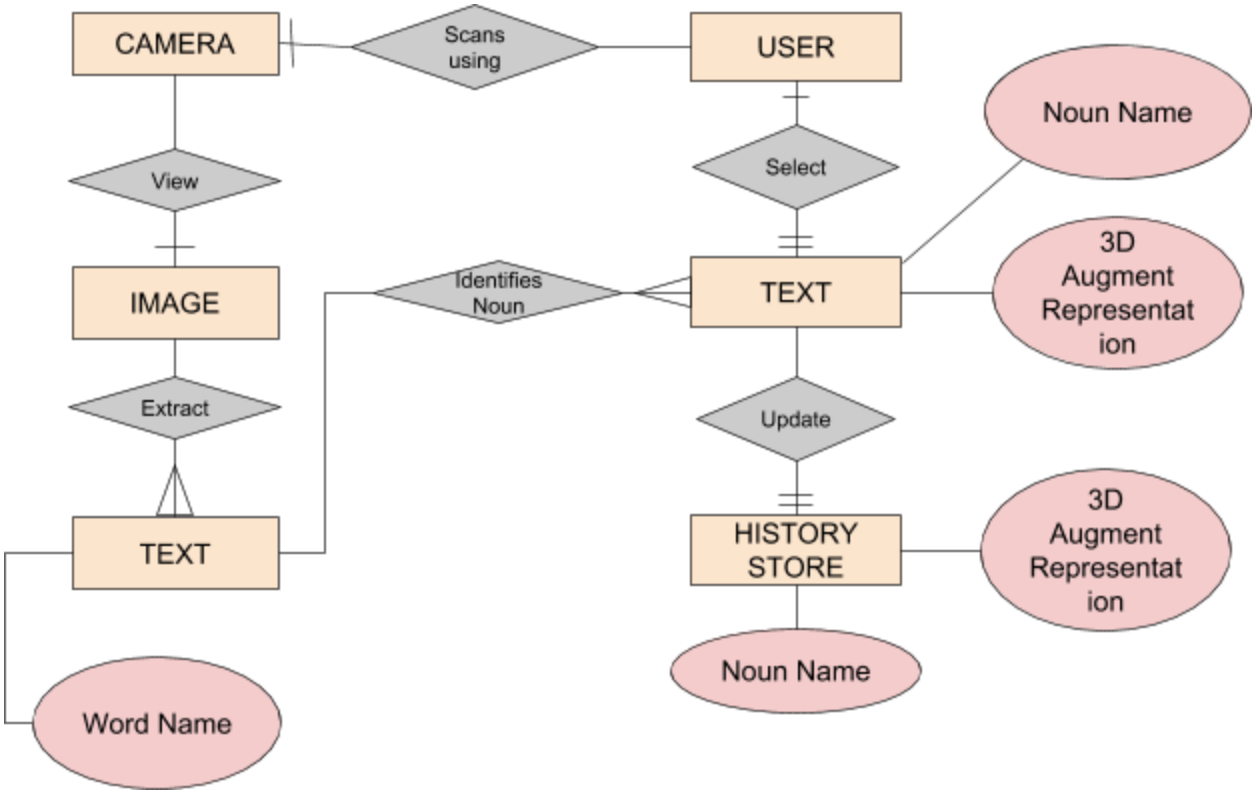
2.6 Process Decomposition



4.0 ENTITY RELATIONSHIP DIAGRAM

Symbols :




CAMERA
Scans using
USER
View
Select
Noun Name
IMAGE
Identifies Noun
TEXT
3D Augment Representation
Extract
Update
TEXT
HISTORY STORE
3D Augment Representation
Noun Name
Word Name