**COMSATS University Islamabad,**

**Abbottabad Campus**

**SOFTWARE REQUIREMENTS SPECIFICATION   
(SRS DOCUMENT)**

**for**

**babyshARk**  
Version 1.0

***By***

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**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason for changes** | **Version** |
|  |  |  |  |
|  |  |  |  |

**Application Evaluation History**

|  |  |
| --- | --- |
| **Comments (by committee)**  **\*include the ones given at scope time both in doc and presentation** | **Action Taken** |
|  |  |
|  |  |

**Supervised by**

**<Supervisor’s Name>**

Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction**

Early childhood is a time when kids learn and develop their skills. Technology can help with this, and that's where "babyshARk" comes in. This app has fun features like "step by step writing," where kids can show off their art skills. It also has a "learning" module that helps kids learn to pronounce letters of the alphabet. With "Alphabet detection and 3D models," learning becomes interactive and exciting using AR technology. After learning, kids can test their skills in the "evaluation" module, which uses 3D models and quizzes to check what they know. Unlike other apps that leave kids unsupervised, "babyshARk" includes "screen-time management." This feature lets parents set time limits on how long their kids can use the app.

**Purpose**

The purpose of the babyshARk project is to create an innovative and engaging educational application for early childhood learning. Books often fail to keep kids interested, leading to a lack of interest but this application aims to enhance the learning experiences of kids by integrating augmented reality (AR) technology, making the process interactive, fun, and effective. While other apps might have AR drawing or alphabet learning, babyshARk is more interactive, simple, and easy to use and it aims to improve kids' interest in educational activities through easy-to-use, kid-friendly features.

**Scope**

* Development of an augmented reality (AR) based educational application for children aged 3 to 6.
* Availability for Android and iOS platforms, ensuring compatibility across different mobile devices.
* Alphabet Detection and 3D Model Presentation Module detects alphabets in the AR environment and triggers corresponding 3D models for each detected alphabet.
* Learning Module displays all alphabets to the kids and allows them to learn pronunciation by clicking on the alphabets, with voice lines played for each.
* The Evaluation Module presents interactive and engaging quizzes to kids to test their understanding of the alphabet and allows parents to view their child's results.
* Step-by-Step Writing Module guides kids in writing alphabets step by step in AR, providing real-time interaction and feedback.
* Screen Time Management Module allows parents to control and set time limits on their child’s usage of the app.
* UI Development involves setting up Android and iOS development environments and coding the app using Android SDK and iOS SDK in Unity.

The scope of the project does not extend beyond these functionalities and platforms.

**Overall description**

**Product perspective**

The babyshARk app is a new product created to make learning fun and interactive for kids using augmented reality (AR) technology. It is not part of an existing product line, nor is it an update of an old system or a replacement for another app. Instead, babyshARk is a fresh idea aimed at improving how kids learn by using AR to make their educational experiences more engaging and enjoyable.

**Operating environment**

**OE-1:** The babyshARk app shall operate correctly on Android and iOS platforms.

For Android: The app shall be compatible with Android version 8.0 and above.

For iOS: The app shall be compatible with iOS version 12.0 and above.

**OE-2:** The app shall be accessible to users worldwide, with no geographical restrictions.

**OE-3:** The app shall require internet connectivity for AR features, content updates, and synchronization of user data.

**OE-4:** The application shall utilize the device's camera for augmented reality (AR) functionality, requiring devices with a camera capable of supporting AR features.

**OE-5:** Users shall be able to download the application from the Google Play Store for Android devices and the Apple App Store for iOS devices.

**Design and implementation constraints**

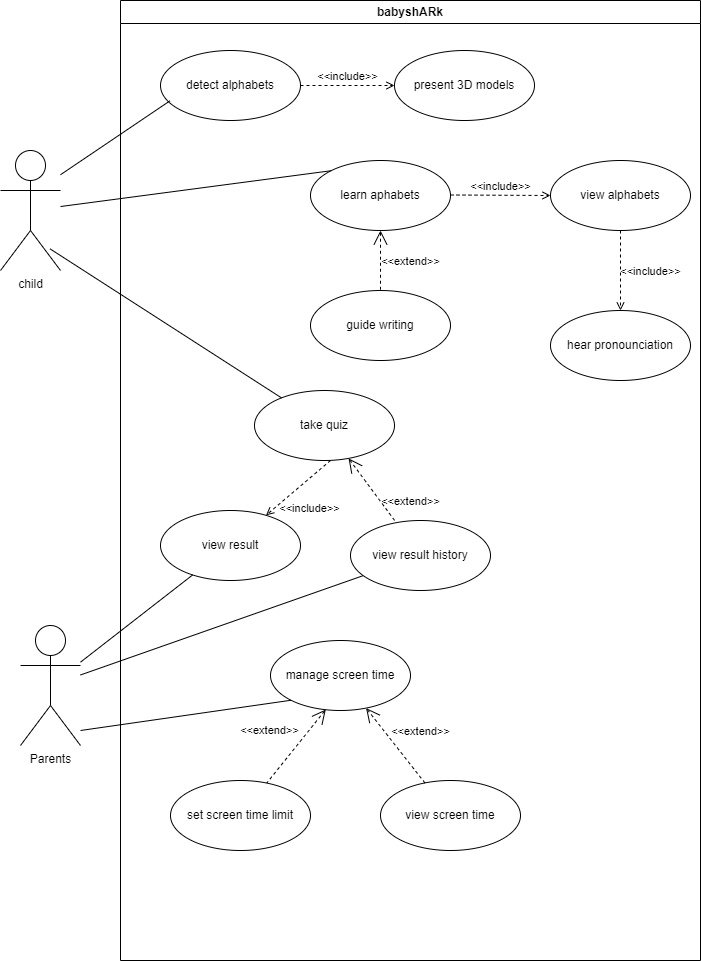
There are times when a certain programming language must be used, a code library that has already had time invested to develop it needs to be used, and so forth. Describe any factors that will restrict the options available to the developers and the rationale for each constraint. Constraints are described further in Chapter 14[[1]](#footnote-1), “Beyond functionality.”

Example:

*CO-1: The system shall use the current corporate standard Oracle database engine*

**Requirement identifying technique**

**Use case diagram.**

****

**Use case description.**

Use Case UC-1: Detect Alphabets

|  |  |
| --- | --- |
| **Use Case ID:** | UC-1 |
| **Use Case Name:** | Detect Alphabets |
| **Actors:** | Primary actor: Child |
| **Description:** | The child uses the AR environment to identify and interact with alphabets. The system processes the camera input to recognize the shapes of alphabets and provides feedback. |
| **Trigger:** | The child points the device camera at printed alphabets. |
| **Precondition** | The application is running, and camera is active. |
| **Postconditions:** | The system successfully detects and identifies the alphabet viewed through the camera. |
| **Normal Flow:** | 1. The child opens the app.  2. The child points the device camera at the alphabets  3. The system processes the camera input and detects the alphabet.  4. The system highlights or labels the detected alphabets on the screen.  5. The child receives visual feedback of the identified alphabets. |
| **Assumption** | The child has access to a device with a camera and the app is installed. |

**Use Case UC-2: Present 3D Models**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-2 |
| **Use Case Name:** | Present 3D Models |
| **Actors:** | Primary actor: Child |
| **Description:** | The child views corresponding 3D models triggered by detected alphabets. The system uses the detected alphabet to present an interactive 3D model related to that alphabet. |
| **Trigger:** | Detection of alphabets in AR environment. |
| **Precondition** | Detection of alphabets in the AR environment. |
| **Postconditions:** | Child successfully views corresponding 3D models. |
| **Normal Flow:** | 1. The system detects an alphabet in the AR environment.  2. The system retrieves the corresponding 3D model for the detected alphabet. 3. The system presents the 3D model on the screen. |

**Use Case UC-3: Learn Alphabets**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-3 |
| **Use Case Name:** | Learn Alphabets |
| **Actors:** | Primary actor: Child |
| **Description:** | The child learns the alphabet by interacting with the app. The app provides visual and auditory cues to help the child understand and memorize each alphabet. |
| **Trigger:** | The child selects the learning module from the app menu. |
| **Precondition** | The application is running and the learning module is accessed. |
| **Postconditions:** | All alphabets are displayed with options to view and hear pronunciation. |
| **Normal Flow:** | 1. The child opens the app and selects the learning mode.  2. The app displays alphabets on the screen.  3. The child interacts with an alphabet (e.g., clicking on it).  4. The app provides visual and auditory feedback.  5. The child repeats the interaction with other alphabets. |

**Use Case UC-4: View Alphabets**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-4 |
| **Use Case Name:** | View Alphabets |
| **Actors:** | Primary actor: Child |
| **Description:** | The child views the list of alphabets in the learning module. |
| **Trigger:** | The child accesses the learning module. |
| **Precondition** | The application is running, and the learning module is accessed. |
| **Postconditions:** | A list of all alphabets is displayed. |
| **Normal Flow:** | 1.The child accesses the learning module.  2.The application displays a list of all alphabets. |
| **Assumption** | The application data is correctly loaded. |

**Use Case UC-5: Hear Pronunciation**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-5 |
| **Use Case Name:** | Hear Pronunciation |
| **Actors:** | Primary actor: Child |
| **Description:** | The child learns the pronunciation of alphabets by clicking on them. The system plays a voice line for the selected alphabet. |
| **Trigger:** | The child clicks on an alphabet in the learning module. |
| **Precondition** | The app must have audio capabilities. |
| **Postconditions:** | The child hears the correct pronunciation of the alphabet. |
| **Normal Flow:** | 1. The child selects an alphabet in the learning module.  2. The system plays the pronunciation audio for the selected alphabet.  3. The child listens to the pronunciation. |
| **Assumption** | The app includes prerecorded pronunciations for each alphabet. |

**Use Case UC-6: Guide Writing**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-6 |
| **Use Case Name:** | Guide Writing |
| **Actors:** | Primary actor: Child |
| **Description:** | The child is guided step-by-step to write alphabets in the AR environment. |
| **Trigger:** | The child selects the writing module from the app menu. |
| **Precondition** | The application is running, and the writing module is accessed. |
| **Postconditions:** | The child successfully learns to write the selected alphabets. |
| **Normal Flow:** | 1. The child opens the app and selects the writing mode.  2. The app displays the first step of writing an alphabet.  3. The child follows the guided instructions to write the alphabet.  4. The app proceeds to the next step until the alphabet is completed.  5. The child repeats the process for other alphabets. |

**Use Case UC-7: Take Result**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-7 |
| **Use Case Name:** | Take Result |
| **Actors:** | Primary actor: Child |
| **Description:** | The child participates in interactive quizzes to test their knowledge of the alphabet. |
| **Trigger:** | The child selects the quiz module from the app menu. |
| **Precondition** | The application is running, and the quiz module is accessed. |
| **Postconditions:** | Child successfully completes quizzes.  The results of the quiz are recorded. |
| **Normal Flow:** | 1. The child opens the app and selects the quiz mode.  2. The app presents quiz questions related to the alphabet.  3. The child answers the quiz questions.  4. The app displays the final quiz score. |

**Use Case UC-8: View Result**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-8 |
| **Use Case Name:** | View Result |
| **Actors:** | Primary actor: Parents  Secondary actor: Child |
| **Description:** | The parent views the results of the quizzes taken by the child. |
| **Trigger:** | The parent selects the result view option from the app menu. |
| **Precondition** | The application is running, and the results module is accessed. |
| **Postconditions:** | The results of the child's quizzes are displayed. |
| **Normal Flow:** | 1. The parent selects the result view option from the app menu.  2. The application displays the results of the child's quizzes. |

**Use Case UC-9: View Result History**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-9 |
| **Use Case Name:** | View Result History |
| **Actors:** | Primary actor: Parents |
| **Description:** | The parent views the history of all quiz results. |
| **Trigger:** | The parent selects the result history option from the app menu. |
| **Precondition** | The application is running, and the results history module is accessed. |
| **Postconditions:** | The history of all quiz results is displayed. |
| **Normal Flow:** | 1. The parent selects the result history option from the app menu.  2. The application displays the history of all quiz results. |
| **Assumption** | The application has access to all stored quiz results. |

**Use Case UC-10: Manage Screen Time**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-10 |
| **Use Case Name:** | Manage Screen Time |
| **Actors:** | Primary actor: Parents |
| **Description:** | Parent manages screen time limits for the child. |
| **Trigger:** | Parent accesses the screen time management feature. |
| **Precondition** | The application is running, and the screen time management module is accessed. |
| **Postconditions:** | Parent successfully manages screen time limits. |
| **Normal Flow:** | 1. The parent selects the screen time management option from the app menu.  2. The application displays the current screen time settings and options to manage screen time. |

**Use Case UC-11: Set Screen Time Limits**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-11 |
| **Use Case Name:** | Set Screen Time Limits |
| **Actors:** | Primary actor: Parents |
| **Description:** | The parent sets specific time limits on how long the child can use the app. |
| **Trigger:** | Parent accesses the screen time setting feature. |
| **Precondition** | The application is running, and the screen time settings are accessed. |
| **Postconditions:** | Parent successfully sets screen time limits. |
| **Normal Flow:** | 1. The parent accesses the screen time settings.  2. The application displays options to set time limits.  3. The parent sets the desired screen time limit.  4. The application saves the new screen time limit. |

**Use Case UC-12: View Screen Time**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-12 |
| **Use Case Name:** | Set Screen Time |
| **Actors:** | Primary actor: Parents |
| **Description:** | The parent views the current screen time settings and usage. |
| **Trigger:** | The parent selects the option to view screen time from the app menu. |
| **Precondition** | The application is running, and the screen time viewing option is accessed. |
| **Postconditions:** | Current screen time settings and usage are displayed. |
| **Normal Flow:** | 1. The parent selects the option to view screen time from the app menu.  2. The application displays the current screen time settings and usage. |

**Functional Requirements**

**Functional Requirement for UC-1: Detect Alphabets**

|  |  |
| --- | --- |
| **Identifier** | FR-UC1-1 |
| **Title** | Detect Alphabets |
| **Requirement** | The system shall detect and identify alphabets when the child points the device camera at printed alphabets. |
| **Source** | Child |
| **Rationale** | To allow children to interact with and learn alphabets using AR technology. |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Functional Requirement for UC-2: Present 3D Models**

|  |  |
| --- | --- |
| **Identifier** | FR-UC2-1 |
| **Title** | Present 3D Models |
| **Requirement** | Upon detecting an alphabet, the system shall present the corresponding 3D model to the child. |
| **Source** | System |
| **Rationale** | To provide a visual representation of alphabets |
| **Business Rule (if required)** | - |
| **Dependencies** | FR-UC1-1 (Detect Alphabets) |
| **Priority** | High |

**Functional Requirement for UC-3: Learn Alphabets**

|  |  |
| --- | --- |
| **Identifier** | FR-UC3-1 |
| **Title** | Learn Alphabets |
| **Requirement** | The system shall display alphabets and allow children to interact with them to learn their shapes and sounds. |
| **Source** | Child |
| **Rationale** | To facilitate the learning of alphabets through interactive methods. |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Functional Requirement for UC-4: View Alphabets**

|  |  |
| --- | --- |
| **Identifier** | FR-UC4-1 |
| **Title** | View alphabets |
| **Requirement** | The system shall display a list of all alphabets in alphabetical order. |
| **Source** | Child |
| **Rationale** | To provide an easy navigation of alphabets |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Functional Requirement for UC-5: Hear Pronunciation**

|  |  |
| --- | --- |
| **Identifier** | FR-UC5-1 |
| **Title** | Hear Pronunciation |
| **Requirement** | When the child clicks on an alphabet, the system shall play the corresponding pronunciation audio. |
| **Source** | Child |
| **Rationale** | To help children learn the correct pronunciation of alphabets. |
| **Business Rule (if required)** | - |
| **Dependencies** | FR-UC3-1 (Learn Alphabets) |
| **Priority** | High |

**Functional Requirement for UC-6: Guide Writing**

|  |  |
| --- | --- |
| **Identifier** | FR-UC6-1 |
| **Title** | Guide Writing |
| **Requirement** | The system shall provide step-by-step instructions for drawing or writing alphabets. |
| **Source** | System |
| **Rationale** | To teach children how to draw or write alphabets accurately. |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | Medium |

**Functional Requirement for UC-7: Take Quiz**

|  |  |
| --- | --- |
| **Identifier** | FR-UC7-1 |
| **Title** | Take Quiz |
| **Requirement** | The system shall present interactive quizzes to the child and provide feedback on their answers. |
| **Source** | Child |
| **Rationale** | To test the child's knowledge of alphabets. |
| **Business Rule (if required)** | - |
| **Dependencies** | FR-UC3-1 (Learn Alphabets) |
| **Priority** | Medium |

**Functional Requirement for UC-8: View Result**

|  |  |
| --- | --- |
| **Identifier** | FR-UC8-1 |
| **Title** | View result |
| **Requirement** | The system shall allow the parent to access the results view option. |
| **Source** | Parent |
| **Rationale** | To enable parents to monitor their child's progress |
| **Business Rule (if required)** | - |
| **Dependencies** | FR-UC7-1 (Take Quiz) |
| **Priority** | Medium |

**Functional Requirement for UC-9: View Result History**

|  |  |
| --- | --- |
| **Identifier** | FR-UC9-1 |
| **Title** | View Result History |
| **Requirement** | The system shall allow the parent to access the result history option. |
| **Source** | Parent |
| **Rationale** | To provide a comprehensive view of the child's progress over time |
| **Business Rule (if required)** | - |
| **Dependencies** | FR-UC7-1 (Take Quiz) |
| **Priority** | Medium |

**Functional Requirement for UC-10: Manage Screen Time**

|  |  |
| --- | --- |
| **Identifier** | FR-UC10-1 |
| **Title** | Manage Screen Time |
| **Requirement** | The system shall allow parents to manage and monitor screen time limits for their children. |
| **Source** | Parent |
| **Rationale** | To help parents control and limit the amount of time children spend on the app |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Functional Requirement for UC-11: Set Screen Time Limits**

|  |  |
| --- | --- |
| **Identifier** | FR-UC11-1 |
| **Title** | Set Screen Time Limits |
| **Requirement** | The system shall allow parents to set specific screen time limits for their children. |
| **Source** | Parent |
| **Rationale** | To ensure children use the app within the allocated screen time limits. |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Functional Requirement for UC-12: View Screen Time**

|  |  |
| --- | --- |
| **Identifier** | FR-UC12-1 |
| **Title** | View Screen Time |
| **Requirement** | The system shall allow the parent to access the screen time viewing option. |
| **Source** | Parent |
| **Rationale** | To monitor the child's screen time usage |
| **Business Rule (if required)** | - |
| **Dependencies** | - |
| **Priority** | High |

**Non-Functional Requirements**

Usability Requirements

USE-1: The system shall provide a child-friendly interface with easy-to-understand icons and minimal text to facilitate navigation for kids.

USE-2: The system shall provide simple, one-touch controls for accessing main features like detecting alphabets, viewing 3D models, and taking quizzes.

**Performance Requirements**

PER-1: The system shall quickly detect and identify alphabets when the child points the device camera at them.

PER-2: The system shall promptly load and present 3D models after an alphabet is detected, audio pronunciation shall play immediately when the user clicks on an alphabet, quiz results shall be displayed promptly after the quiz is completed by the child.

**Reliability Requirements**

REL-1: The system shall be available 99.9% of the time during usage hours.

REL-2: The system shall ensure that no data, including quiz results and learning progress, is lost during interactions.

**Portability Requirements**

POR-1: The system shall be compatible with major mobile operating systems, specifically iOS and Android.

**References**

List any documents or other resources to which this SRS refers, if any. These might include user interface style guides, standards, system requirements specifications, interface specifications, or the SRS for a related product.

1. [↑](#footnote-ref-1)