

Software Requirements Specification

KIDEASEHUB

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1. Introduction

1.1. Purpose

This Software Requirement Specification (SRS) is intended to delineate software requirements for the customer's using KidEaseHub App for Autism Detection in Kids and to help them ease their symptoms. This document will provide guidance to the developers of the system to implement the required functionality as well as the test team to develop appropriate test cases and verification plans required to provide demonstration to the customers that the system is built according to specifications provided in this document.

1.2. Scope

This document specifies the requirements for the following capabilities:

1. The application, including user interface and support
2. Tasks assignment to kids and educational resources
3. Dedicated modules for support
4. Monitoring progress of the child

1.3. Definitions

| | |
|-----|------------------------------------|
| BDD | Block Definition Diagram |
| SRS | Software Requirement Specification |
| UML | Unified Modeling Language |
| V&V | Verification and Validation |

1.4. References

1. IEEE Std 830-1998 - IEEE Recommended Practice for Software Requirements Specifications - Revision of IEEE Std 830-1993

1.5. References

This document follows the recommended format specified in IEEE Std 830-1998 IEEE Recommended Practice for Software Specifications. For Section 3, the specific template A.5 for organizing information by feature is followed.

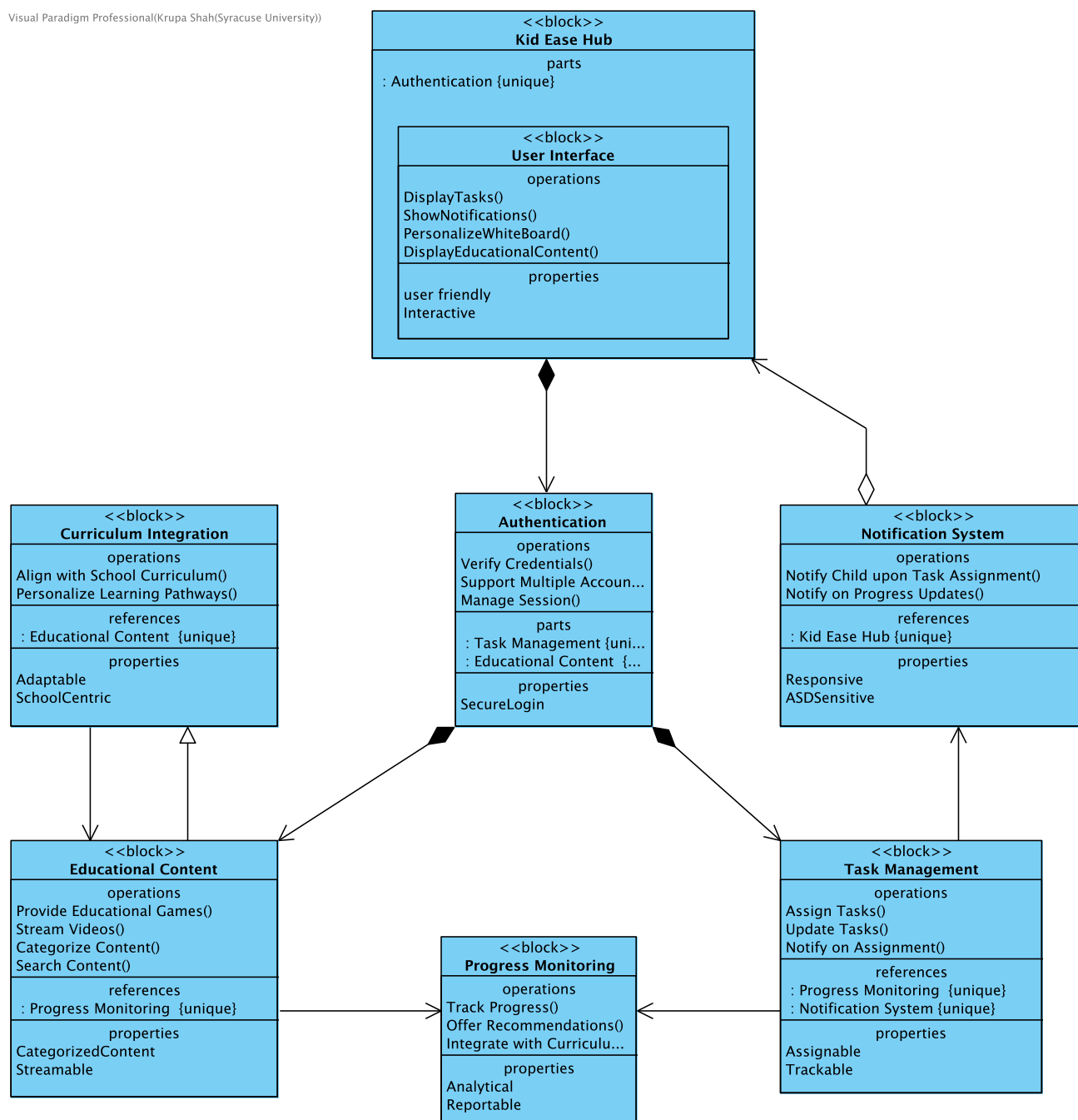
2. Overall Description

2.1. Product Perspective

The "KidEaseHub" Android application presents a robust solution designed to seamlessly facilitate tasks and educational activities, serving as a comprehensive platform for both parents and children. Parents can effortlessly integrate their children into the app, enabling them to assign tasks with ease, thereby fostering a structured and supportive environment conducive to their developmental needs. Figure 1 System Block Diagram shows the system overview, using a Unified Modeling Language (UML) Block Definition Diagram (BDD).

2.1.1. BDD Block Definition Diagram_KidEasehub

Visual Paradigm Professional(Krupa Shah(Syracuse University))



2.1.2. Authentication

Ensures secure access to the app, allowing parents to create accounts, log in, and manage permissions for themselves and their children.

2.1.3. User Interface

Provides a visually appealing and intuitive interface for parents and children to interact with the app's features and content.

2.1.4. Curriculum Integration

Integrates educational content and activities with established learning standards, ensuring alignment with educational goals and objectives.

2.1.5. Notification System

Sends alerts and reminders to parents and children regarding tasks, appointments, and important updates within the app.

2.1.6. Progress Monitoring

Allows parents to track their children's progress in completing tasks, mastering educational content, and achieving developmental milestones.

2.1.7. Task Management

Facilitates the assignment, tracking, and completion of tasks for children, helping parents to establish routines and responsibilities.

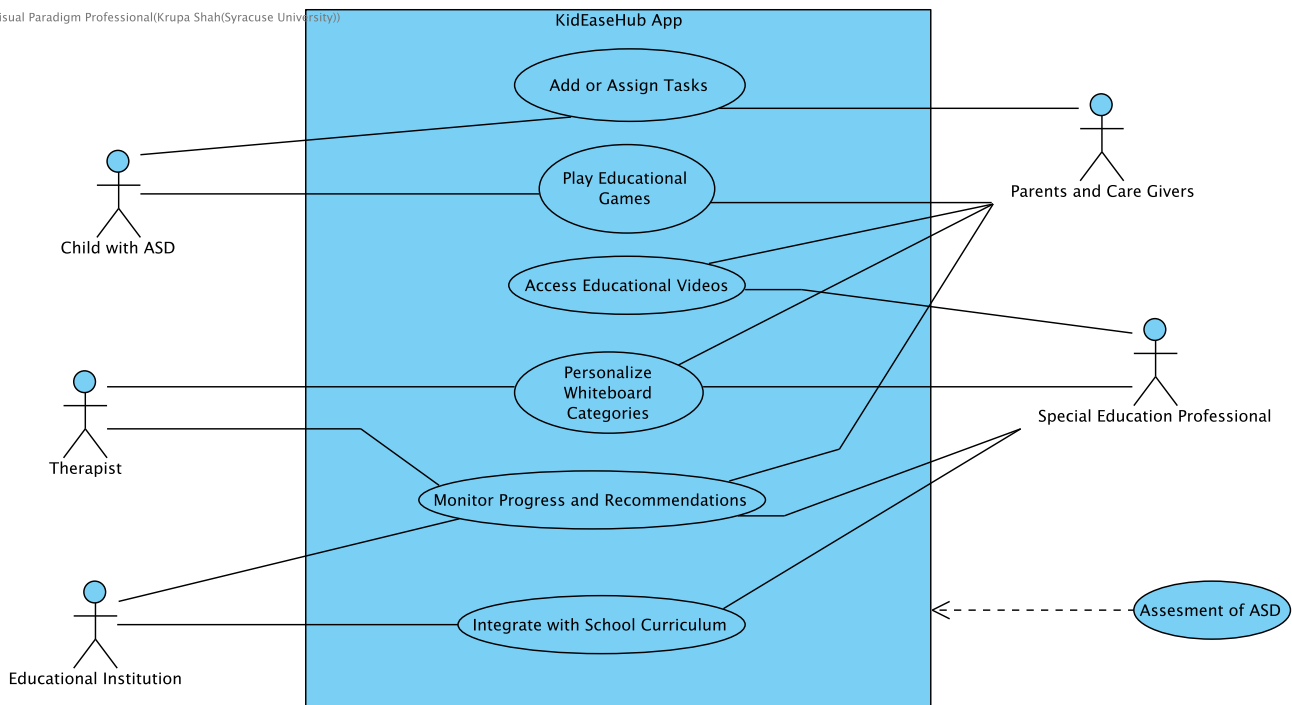
2.1.8. Educational Content

Provides access to a variety of engaging and age-appropriate educational materials, including videos, games, and interactive lessons.

2.2. Product Functions:

2.2.1. Use Case Diagram For Autism Detection

Visual Paradigm Professional(Krupa Shah(Syracuse University))



2.2.2. Assesment of ASD

ID: UC07

System assesses the likelihood of ASD using machine learning models.

2.2.3. Child with ASD

ID: AC01

A person diagnosed with Autism Spectrum Disorder (ASD) who will use the KidEaseHub application for learning and development.

2.2.4. Educational Institution

ID: AC06

A formal educational institution or school where children with ASD receive education and support.

2.2.5. Access Educational Videos

ID: UC02

This is to provide educational resources for children with ASD.

2.2.6. Add or Assign Tasks

ID: UC01

This use case is for parents and caregivers to create a structured environment for the child with ASD

2.2.7. Integrate with School Curriculum

ID: UC09

School/Educational Institution integrates KidEaseHub with their curriculum.

2.2.8. Monitor Progress and Recommendations

ID: UC08

Parent/Caregiver views progress and recommendations based on user data.

2.2.9. Personalize Whiteboard Categories

ID: UC04

Parent/Caregiver with the help of therapist and educational professionals personalizes categories on the whiteboard feature.

2.2.10. Play Educational Games

ID: UC03

To engage the child with ASD in learning activities.

2.2.11. Parents and Care Givers

ID: AC03

An individual responsible for the care and support of a child with Autism Spectrum Disorder (ASD).

2.2.12. Special Education Professional

ID: AC02

A trained professional specializing in special education and therapy for children with ASD.

2.2.13. Therapist

ID: AC04

A trained professional or therapist specializing in therapy for children with ASD.

2.2.14. Assesment of ASD

ID: UC07

System assesses the likelihood of ASD using machine learning models.

| | |
|------------------------------|--|
| Justification | Early detection and support for children with ASD |
| Level | N/A |
| Complexity | N/A |
| Use Case Status | N/A |
| Implementation Status | Scheduled |
| Preconditions | Sufficient user data must be collected for analysis. |
| Post-conditions | System provides a likelihood score indicating the probability of ASD. Recommendations for further evaluation or support may be provided based on the assessment. |
| Author | N/A |
| Assumptions | N/A |

Scenarios



Generating Analysis

1. The system will collect user data relevant to ASD assessment.
2. The system will utilize machine learning algorithms (KNN, Random Forest, SVM) for analysis.
3. And then generate a likelihood score based on the analysis.

2.2.15. Access Educational Videos









ID: UC02

This is to provide educational resources for children with ASD.

| | |
|------------------------------|--|
| Justification | Parent/Caregiver or Special Education Professional/Therapist accesses educational videos. |
| Primary Actors |  Parents and Care Givers |
| Supporting Actors |  Special Education Professional |
| Level | User |
| Complexity | Low |
| Use Case Status | Initial |
| Implementation Status | Scheduled |

| | |
|------------------------|---|
| Preconditions | User (Parent/Caregiver or Special Education Professional/Therapist) must be logged into the KidEaseHub app. |
| Post-conditions | User successfully watches the selected educational video. User may leave feedback or mark the video as watched for tracking purposes. |
| Author | N/A |
| Assumptions | N/A |

Requirements

| Name | ID | Kind |
|--|--------|-------------|
|  Login Requirement  | REQ001 | Interface |
|  Seamless Streaming  | REQ008 | Performance |
|  Search Option  | REQ009 | Interface |
|  Video Categorization  | REQ007 | Functional |

Scenarios

Parents Watch Educational Videos

1. Parent/Caregiver opens the KidEaseHub app.
2. They select the "Educational Videos" option from the main menu.
3. A list of available videos is displayed, organized by subject or topic.
4. Parent/Caregiver selects a video to watch, and it starts playing within the app.



Education Professional Watches

1. Special Education Professional/Therapist logs into the KidEaseHub app.
2. They access the "Educational Videos" section from the toolbar.
3. They search for a specific video using keywords or filters.
4. Once found, they click on the video to view it, and it begins playing.

2.2.16. Add or Assign Tasks

ID: UC01









This use case is for parents and caregivers to create a structured environment for the child with ASD

| | |
|------------------------------|---|
| Justification | Parent/Caregiver assigns tasks to the child with ASD |
| Primary Actors |  Parents and Care Givers |
| Supporting Actors |  Child with ASD |
| Level | User |
| Complexity | Low |
| Use Case Status | Initial |
| Implementation Status | Scheduled |
| Preconditions | Child with ASD must be added to the parent's account. |
| Post-conditions | Task is successfully assigned to the child. Child receives a notification or alert about the assigned task. |

Author N/A

Assumptions Parent/Caregiver must be logged into the KidEaseHub app.

Requirements

| Name | ID | Kind |
|--|--------|------------|
|  Login Requirement  | REQ001 | Interface |
|  Multiple Account Support  | REQ002 | Functional |
|  Notifications to the Child  | REQ004 | Functional |
|  User Friendly Interface  | REQ003 | Interface |

Scenarios

Parents Assign Task

1. Parent/Caregiver logs into the KidEaseHub app.
2. They select the "Assign Task" option from the menu.
3. A list of pre-defined tasks is displayed, categorized by type (educational, household).
4. Parent/Caregiver selects a task from the list or creates a new task.
5. They set the due date and any additional instructions.
6. The task is assigned to the child with ASD, and a notification is sent to them.



Child Accesses the Task

1. Parents navigate to the child's profile and select the "Tasks" tab.
2. A list of existing tasks assigned to the child is displayed.
3. Child completes the task.





2.2.17. Integrate with School Curriculum

ID: UC09

School/Educational Institution integrates KidEaseHub with their curriculum.

| | |
|------------------------------|---|
| Justification | To facilitate seamless integration of KidEaseHub into educational settings. |
| Primary Actors |  Educational Institution |
| Supporting Actors |  Special Education Professional |
| Level | N/A |
| Complexity | N/A |
| Use Case Status | N/A |
| Implementation Status | Scheduled |
| Preconditions | Collaboration between KidEaseHub developers and the school/educational institution must be established. |
| Post-conditions | KidEaseHub is successfully integrated into the school's curriculum. Teachers and students have access to KidEaseHub features aligned with educational objectives. |
| Author | N/A |
| Assumptions | N/A |

Requirements

| Name | ID | Kind |
|--|--------|------------|
|  Multiple Account Support  | REQ002 | Functional |
|  User Friendly Interface  | REQ003 | Interface |

Scenarios

Scenario

1. A school integrates KidEaseHub into its special education program to support students with ASD.
2. Teachers incorporate educational games and videos from the app into their lesson plans, aligning them with curriculum objectives.





Scenario2

1. An educational institution partners with KidEaseHub to customize the app for use in their therapy sessions and classrooms.
2. They collaborate with developers to add features that cater to the specific needs of their students with ASD, such as visual schedules and communication tools.



2.2.18. Monitor Progress and Recommendations

ID: UC08

Parent/Caregiver views progress and recommendations based on user data.

| | |
|------------------------------|--|
| Justification | To provide insights and recommendations for the child's development. |
| Primary Actors |  Parents and Care Givers |
| Supporting Actors |  Educational Institution,  Special Education Professional,  Therapist |
| Level | N/A |
| Complexity | N/A |
| Use Case Status | N/A |
| Implementation Status | Scheduled |
| Preconditions | Parent/Caregiver must be logged into the KidEaseHub app. |
| Post-conditions | Parent/Caregiver gains insights into the child's progress and areas for improvement. Recommendations for personalized interventions or activities are provided. |
| Author | N/A |
| Assumptions | N/A |

Requirements

| Name | ID | Kind |
|---|--------|-----------|
|  Login Requirement  | REQ001 | Interface |

Scenarios

Improvement in child's progress

1. A parent logs into the KidEaseHub app and reviews the progress reports for their child with ASD.
2. They see improvements in communication skills and behavioral management, along with personalized recommendations for social skills development activities.






Decline in Child's Progress

1. A special education professional accesses the KidEaseHub app to track the progress of their student with ASD.
2. They observe a decline in academic performance and receive recommendations for additional support resources such as tutoring or counseling.





2.2.19. Personalize Whiteboard Categories

ID: UC04

Parent/Caregiver with the help of therapist and educational professionals personalizes categories on the whiteboard feature.

| | |
|------------------------------|--|
| Justification | To customize the learning environment for the child with ASD. |
| Primary Actors |  Parents and Care Givers,  Special Education Professional,  Therapist |
| Level | N/A |
| Complexity | N/A |
| Use Case Status | N/A |
| Implementation Status | Scheduled |
| Preconditions |  Login Requirement is needed for this to perform |
| Post-conditions | Child can access and interact with the customized whiteboard and it also sends  Notifications to the Child |
| Author | N/A |
| Assumptions | N/A |

Requirements

| Name | ID | Kind |
|--|--------|------------|
|  Login Requirement  | REQ001 | Interface |
|  Notifications to the Child  | REQ004 | Functional |

Scenarios

Accessing from Parents Profile

1. Parent/Caregiver accesses the KidEaseHub app.
2. They navigate to the "Whiteboard" feature from the menu.
3. They see a list of existing categories and options to create a new category.
4. Parent/Caregiver selects a category to edit or creates a new one.
5. They add items or tasks to the category and customize its appearance.

Parents Access From Child's Profile



1. Parent/Caregiver logs into the KidEaseHub app.
2. They open the child's profile and navigate to the "Whiteboard" section.

3. Parent/Caregiver selects a category from the list and clicks on "Edit."
4. They add or remove items, reorder them, and save the changes to the whiteboard.







2.2.20. Play Educational Games

ID: UC03

To engage the child with ASD in learning activities.

| | |
|------------------------------|--|
| Justification | Child with ASD plays educational games |
| Primary Actors |  Child with ASD |
| Supporting Actors |  Parents and Care Givers |
| Level | N/A |
| Complexity | N/A |
| Use Case Status | N/A |
| Implementation Status | Scheduled |
| Preconditions | Child with ASD must be logged into the KidEaseHub app. |
| Post-conditions | Child successfully completes the educational game. Progress and performance metrics may be recorded for future analysis. |
| Author | N/A |
| Assumptions | N/A |

Requirements

| Name | ID | Kind |
|--|--------|------------|
|  Login Requirement  | REQ001 | Interface |
|  Notifications to the Child  | REQ004 | Functional |
|  User Friendly Interface  | REQ003 | Interface |

Scenarios

Child Plays the Game

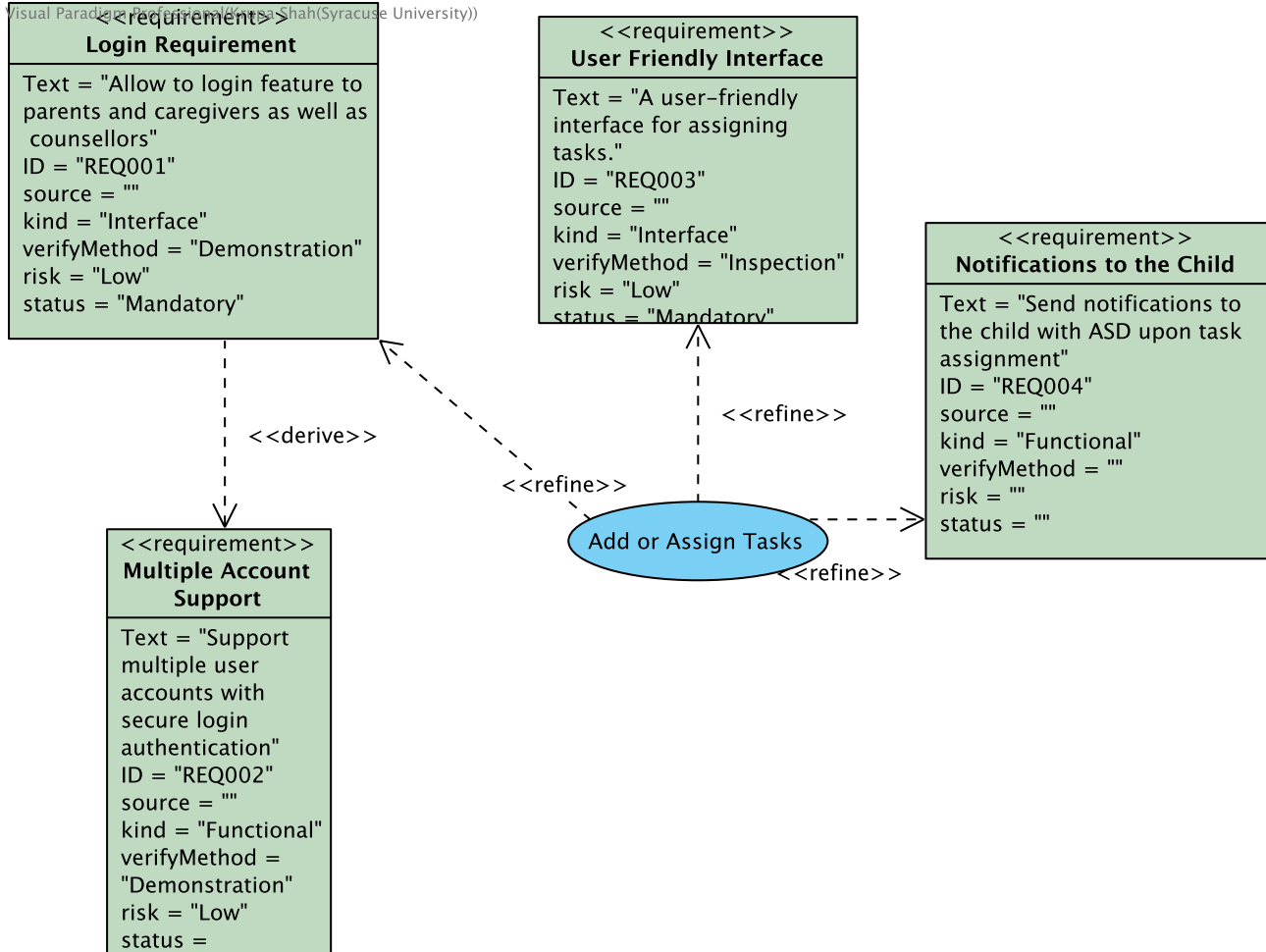
1. Child with ASD launches the KidEaseHub app on their device.
2. They select the "Educational Games" option from the home screen.
3. A list of available games is displayed, with brief descriptions of each.
4. Child selects a game to play, and the game interface loads.

Parent Assists the Child

1. Parent/Caregiver opens the KidEaseHub app on the child's device.
2. They navigate to the "Educational Games" section and select a game.
3. The game interface appears, and Parent/Caregiver assists the child in playing the game.

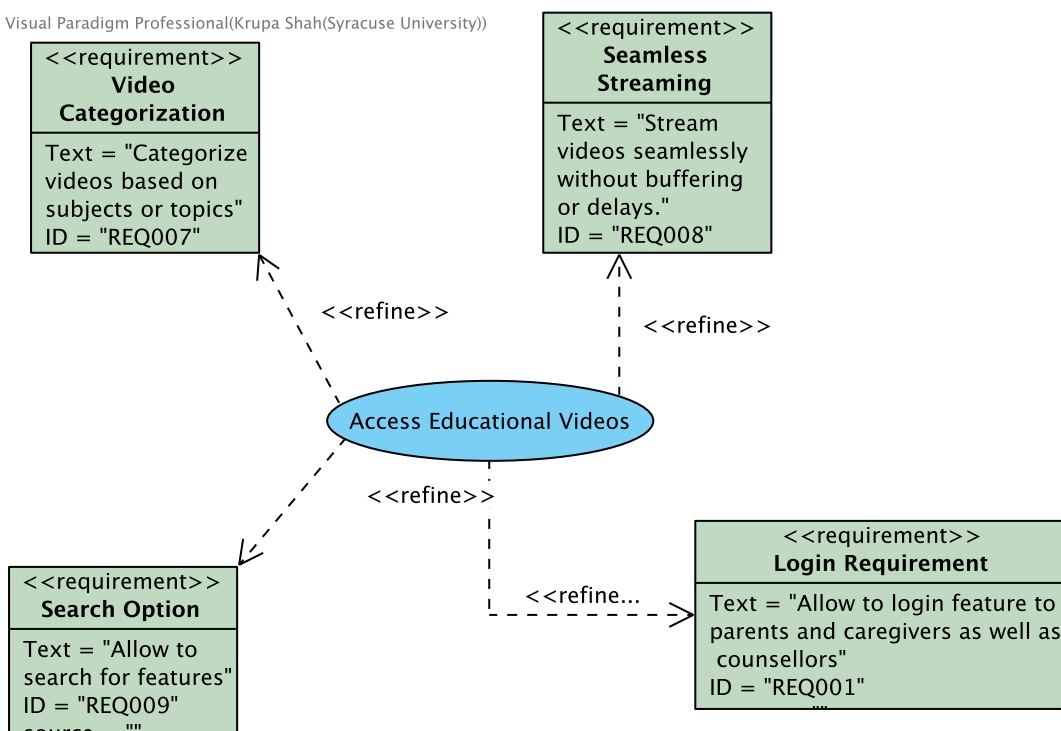
2.2.21. Assign Task Requirement Diagram

Visual Paradigm Professional(Krupa Shah(Syracuse University))



2.2.22. Access Educational Videos Requirement Diagram

Visual Paradigm Professional(Krupa Shah(Syracuse University))



2.3. User Characteristics

Refer to Use Case Diagram above and the descriptions of the Actors.

2.4. Constraints

These are defined specifically in Section 3.

3. Specific Requirements

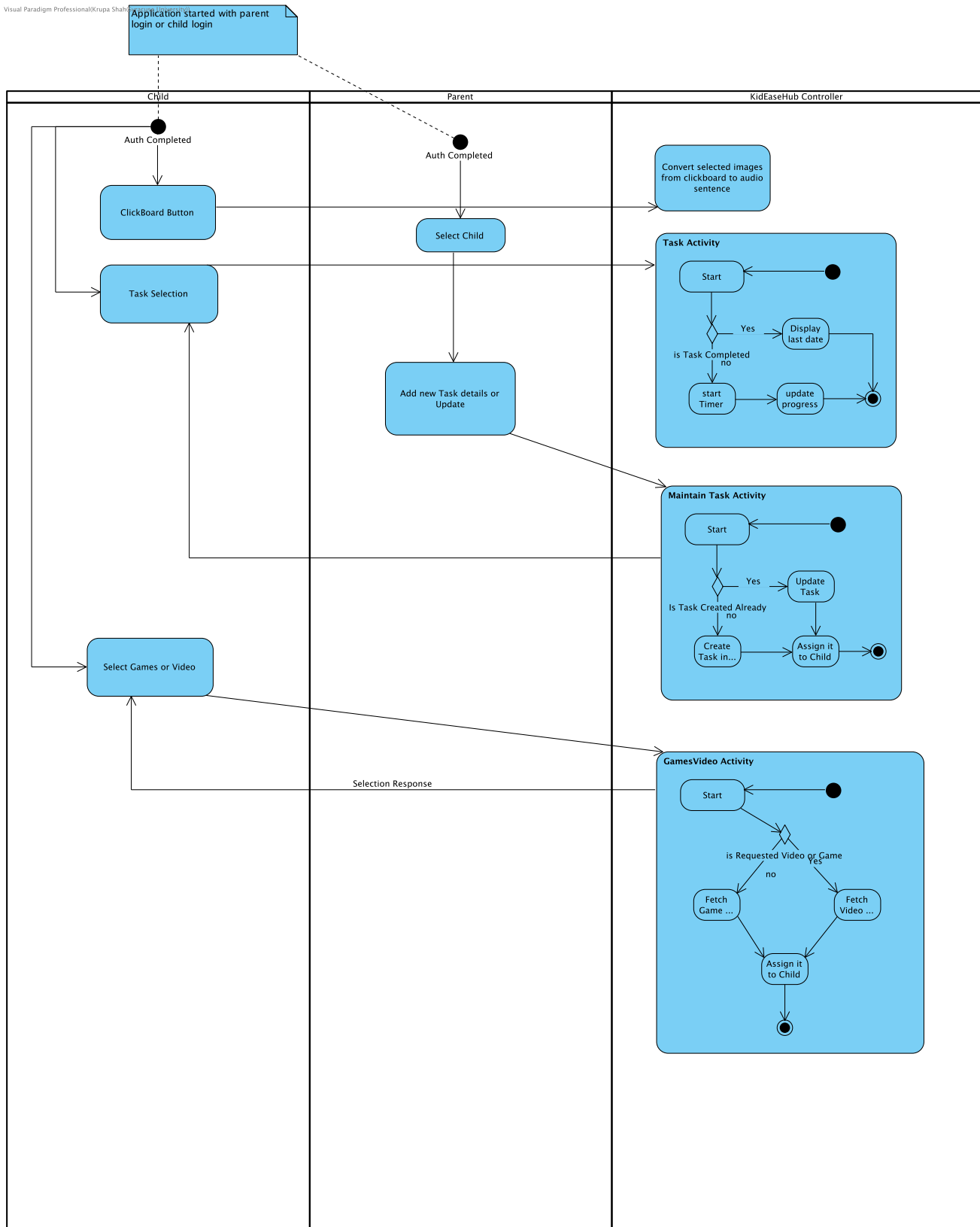
3.1. Overview

This app would allow parents to access the tasks and assign them to children as well as track the progress of children in their developmental stages. This section provides the detailed features of the system and associated requirements

3.2. Assign Task Activity Diagram

3.2.1. KidEaseHub Activity Diagram

Visual Paradigm Professional/Krupa Shah



3.2.2. ClickBoard Button

3.2.3. Add new Task details or Update

3.2.4. Convert selected images from clickboard to audio sentence

3.2.5. GamesVideo Activity

3.2.6. Assign it to Child

3.2.7. Fetch Game from DB

3.2.8. Fetch Video from DB

3.2.9. Maintain Task Activity

3.2.10. Create Task in DB

3.2.11. Update Task

3.2.12. Select Child

3.2.13. Select Games or Video

3.2.14. Task Activity

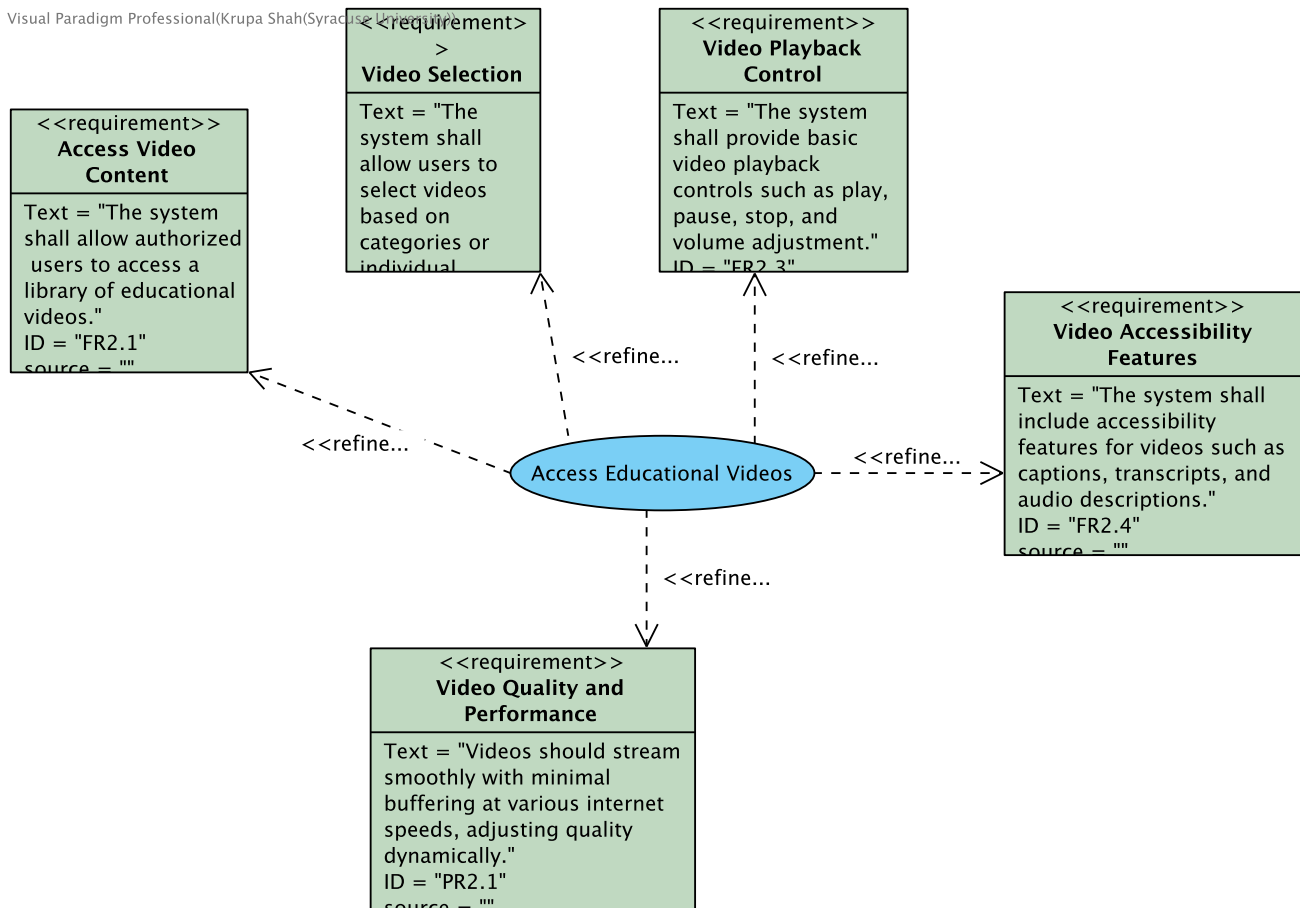
3.2.15. Task Selection

3.2.16. Display last date

3.2.17. Access Educational Videos System Requirement

Access Educational Videos System Requirement Diagram

Visual Paradigm Professional(Krupa Shah(Syracuse University))



Access Educational Videos

ID: UC02

This is to provide educational resources for children with ASD.

Access Video Content

ID: FR2.1

The system shall allow authorized users to access a library of educational videos.

Video Accessibility Features

ID: FR2.4

The system shall include accessibility features for videos such as captions, transcripts, and audio descriptions.

Video Playback Control

ID: FR2.3

The system shall provide basic video playback controls such as play, pause, stop, and volume adjustment.

Video Quality and Performance

ID: PR2.1

Videos should stream smoothly with minimal buffering at various internet speeds, adjusting quality dynamically.

Video Selection

ID: FR2.2

The system shall allow users to select videos based on categories or individual learning plans.

3.3. Performance Requirement

3.3.1. Video Quality and Performance

ID: PR2.1

Videos should stream smoothly with minimal buffering at various internet speeds, adjusting quality dynamically.

3.3.2. Integration with Educational Frameworks

ID: PR5.1

The system's progress tracking and recommendation features should integrate seamlessly with established educational frameworks and standards.

3.3.3. Accessibility and Compliance

ID: PR3.1

Educational games shall be accessible, adhering to WCAG 2.1 guidelines to ensure usability by individuals with diverse abilities and compliance with educational standards.

3.4. Design Constraints

3.4.1. Login Requirement

ID: REQ001

Allow to login feature to parents and caregivers as well as counsellors

3.4.2. Game Interaction

ID: FR3.4

The system shall support interactive elements within games to foster engagement, such as rewards, feedback, and prompts.

3.4.3. Visual Customization

ID: FR4.2

The system shall enable visual customization of categories including colors, icons, and sizes to aid visual learning.

3.4.4. Monitor Task Completion

ID: FR1.4

The system shall allow users to monitor the progress and completion status of assigned tasks.