



Faculty of Information Technology
Department of Software Engineering
The University of Lahore



Final Year Project Proposal

For probably the first time in your undergraduate/graduate program, you are required to defend a proposal of a larger project. In teams, you will be working on the common project, but individual team members will be required to take on responsibilities for specific work for which each will be held accountable. Interaction, collaboration and assistance are allowed and expected, but each person will receive an individual mark for his/her work performed in the project.

	Day	Month	Year						
DATE									

Write down the brief project topic and should not be confusing.

PROJECT TITLE: EduCare: AI Tutor and Health Assistant for Autism Support

STUDENT INFORMATION

Write down the detail of all group members in BLOCK LETTERS ONLY.

Sr.	Student ID	Name	Email	Mobile
1.	70126012	SAIRA ARSHAD	70126012@student.uol.edu.pk	0302 6911144
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PROBLEM STATEMENT

The problem statement should be concise, as you now understand it. It is highly advisable that it should not exceed more than 5 lines.

Parents of children with autism often struggle to find comprehensive resources for learning, guidance, and progress monitoring. Traditional education methods may not engage these children effectively, and parents face challenges in getting timely guidance on their child's health. Existing tools lack personalized support, making it difficult for parents to track their child's development and access tailored educational content. This project aims to develop an AI-powered app that

provides parents with a chatbot for answering autism-related queries, an AI tutor for interactive learning and activities, and a progress tracking feature for better insights into their child's growth.

EXECUTIVE SUMMARY

*This section summarizes the overall document and should include the important highlights from the document. It should be concise, professional and must stand alone. It is **NOT** an introduction, it is a summary. It is **NOT** an index or table of contents, it is a summary.*

The target audience for this section is a person who can appreciate the technology but is not well-versed in the details or in the project itself and who wants to read one page to understand an overview of the project.

The one-page limit is a hard limit; you might well use less than a page.

In order to stand alone, the Executive Summary should not make any reference to other parts of the document.

This project aims to develop an AI-powered mobile application designed to support children with Autism Spectrum Disorder (ASD) and assist their parents in managing their care. The app provides a multi-functional platform that includes an **initial assessment** feature to evaluate each child's developmental level and needs. Based on responses to questions about the child's age group and ASD level (e.g., mild, moderate, or severe), the app tailors its content—such as activities and games—to better suit the child's abilities and needs.

The app also includes a **chatbot** for parents to address common questions related to autism. The chatbot enables parents to easily find trusted information and seek guidance on managing their child's needs. This feature offers timely support and reduces the burden on parents who often face challenges in finding reliable information.

A core feature of the app is an **AI Tutor**, offering children interactive learning modules, educational games, and activities tailored to their developmental needs. This will not only aid in improving cognitive skills but also help in boosting engagement and learning outcomes in a structured yet enjoyable manner.

Additionally, the app includes a **progress tracking system**, allowing parents and caregivers to monitor their child's development over time. This feature offers real-time insights into the child's growth, helping parents make informed decisions based on their progress in learning, behavior, and overall well-being.

By integrating these features—initial assessment, chatbot, AI tutor, and progress tracking—into one application, this project aims to provide an accessible, user-friendly tool for families of children with autism, enhancing learning and development while offering parents the support they need.

INTRODUCTION

Relevance or importance of problem

Background information to educate the reader

Previous related work by others—literature review with credible sources

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that affects communication, behavior, and learning abilities. Children with autism often face challenges in learning and social interaction, making it essential for parents and caregivers to have access to tools that offer structured learning, guidance, and progress monitoring. However, many existing resources are either too fragmented or not tailored to the specific needs of autistic children, leaving parents without comprehensive support.

Relevance or Importance of the Problem:

Caring for a child with autism requires a personalized approach that includes educational, behavioral, and therapeutic interventions. Parents often lack the necessary tools to monitor their child's progress and provide meaningful learning experiences. Additionally, the absence of easily accessible resources for parental guidance exacerbates their challenges. An all-in-one solution that addresses these gaps can significantly improve the quality of life for both children with autism and their caregivers.

Background Information:

The rise in digital health tools and AI-driven applications has opened new avenues for supporting children with special needs. Various studies have explored the role of technology in autism intervention, highlighting its potential to enhance learning outcomes, improve communication, and assist in behavior management. However, existing applications often focus on a single aspect—either learning or communication—without integrating the full spectrum of needs that children with autism and their parents require.

Previous Related Work:

Several apps and platforms have been developed to aid children with autism. For instance, apps like "**Proloquo2Go**" focus on communication support, while "**Autism Learning Games**" provides educational activities. However, these apps lack a comprehensive approach that includes not only interactive learning but also parent-guided tools such as progress tracking and healthcare advice. Numerous studies and applications have explored the potential of AI in addressing autism. For instance, **Cognoa**, an AI-based diagnostic tool, has been FDA-cleared to assist in the early diagnosis of autism.

Additionally, studies such as those by Fletcher-Watson et al. (2015) emphasize the effectiveness of using technology to improve learning and behavior in autistic children, but they also note the need for more integrated systems.

This project aims to fill that gap by combining three critical features—AI-driven tutoring, chatbot support for parents, and progress tracking—into a single, user-friendly application, thus providing a holistic solution for autism care and education.

COMPETITORS/COMPETITIVE ANALYSIS

This section will list down all the possible competitors of your product. That is, you need to list down all those products that are closely related to your product in terms of features, target audience, etc.

Cognoa

- **Target Audience:** Parents and clinicians working with children suspected of autism or developmental delays.
- **Key Features:** AI-powered diagnostic tool for early autism detection. Offers personalized activities and developmental insights.
- **Pricing:** Paid (may be insurance-covered).

Proloquo2Go

- **Target Audience:** Nonverbal children, including those with autism.
- **Key Features:** Augmentative and alternative communication (AAC) tool for nonverbal individuals. Customizable interface to suit the user's communication preferences. Progress tracking for caregivers to monitor communication skills.
- **Pricing:** Paid, typically a one-time purchase.

Autism iHelp

- **Target Audience:** Children with autism, educators, and caregivers.
- **Key Features:** Early intervention educational app suite designed to teach vocabulary, emotions, and other basic concepts. Focuses on visual learning through flashcards and interactive tasks, which cater to the specific learning needs of children with autism. Provides progress tracking for parents and educators to monitor the child's learning milestones.
- **Pricing:** Free with in-app purchases (each app or module needs to be purchased separately depending on the category).

AutiSpark

- **Target Audience:** Children on the autism spectrum.
- **Key Features:** Interactive learning activities designed for children with autism. Focus on visual learning with tasks like sorting, matching, and memory games. Progress reports for parents.
- **Pricing:** Paid (either one-time or subscription).

Inner Voice

- **Target Audience:** Children with autism, particularly those who are non-verbal or minimally verbal.
- **Key Features:** A communication aid that allows users to express themselves through pictures and symbols, generating spoken words.
- **Pricing:** Paid app with options for customization, which may add additional costs.

Otsimo

- **Target Audience:** Children with autism, educators, and caregivers.
- **Key Features:** Educational games focused on language development and social skills, with progress tracking.
- **Pricing:** Freemium model with additional features available through subscription.

OBJECTIVES

Objectives are the final results to be achieved after the completion of your project.

- **Add an Initial Assessment Feature:**

Implement an assessment at the start of the app to evaluate the child's ASD level (e.g., mild, moderate, severe) and age group. This assessment will help personalize the app experience, suggesting activities, games, and educational modules that best match the child's abilities and developmental needs.

- **Develop an AI-Powered Chatbot:**

Create a chatbot that provides parents with reliable answers to general autism-related questions, including behavioral concerns and guidance to enhance parental understanding and decision-making.

- **Implement an AI Tutor for Learning and Activities:**

Design an AI-driven tutor that offers children with autism personalized learning modules, interactive games, and activities aimed at improving cognitive skills, engagement, and social development.

- **Enable Progress Tracking and Monitoring:**

Develop a progress tracking feature that allows parents and caregivers to monitor their child's development, learning achievements, and activity progress, providing data-driven insights for informed decision-making. The progress tracker will generate report, allowing parents and educators to assess improvements in learning, attention, and interaction over time.

- **Enhance User Experience and Accessibility:**

Ensure the app is easy to navigate, user-friendly, and accessible for both children with autism and their parents, with intuitive interfaces and clear guidance.

- **Integrate a Comprehensive Support System:**

Combine learning, parental guidance, and progress monitoring into one cohesive platform, offering a well-rounded tool that addresses both the educational and care needs of children with autism and their families.

These objectives aim to deliver a comprehensive autism support app that enhances learning, simplifies parental guidance, and tracks child development in a meaningful and accessible way.

MOTIVATION

Why is your problem interesting and important?

By leveraging AI, this project aims to provide personalized learning experiences for children and accessible, trustworthy information for parents. The **motivation** behind this project is to simplify the management of autism care while making learning more engaging and tracking progress

more efficient. Many existing applications for autism care and learning support are prohibitively expensive, making them inaccessible to many families, particularly in developing countries. According to the **World Health Organization (WHO)**, approximately **1 in 100 children worldwide** is diagnosed with Autism Spectrum Disorder (ASD). According to the Centers for Disease Control, autism affects an estimated **1 in 36 children** in the United States today. In Pakistan, it is estimated that around **350,000 to 400,000 children** are affected by autism, with many families facing challenges in accessing affordable and effective resources for their care.

Additionally, families often invest in expensive books and traditional learning materials that do not fully engage children with autism. These materials, despite their high cost, fail to provide the interactive and personalized learning experience that many children with ASD require for effective engagement and development.

This project aims to bridge this gap by providing an accessible, cost-effective, and user-friendly mobile application. By integrating technology with personalized care and learning support, this app can empower parents, create positive developmental outcomes for children with ASD, and make autism care more inclusive on both national and global levels.

REQUIREMENTS

Present the requirements as understood at this time through contacts with the stakeholder.

Functional Requirements

User Management:

- The system must allow separate user accounts for children and parents.
- The system must enable users to register and log in with an email/username and password.
- The system must provide profile management features for children and parents to update their information.

Learning Content and Activities:

- The system must offer AI-based interactive learning modules with educational content and interactive exercises.
- The system must provide AI-based games and activities to support learning and engage children with assessments.
- The system must conduct an initial assessment to categorize the child's ASD level and age group, which will determine the types of learning modules, games, and activities suggested.

Chatbot Integration:

- The system must provide a chatbot that provides parents with reliable answers to general autism-related questions, including behavioral concerns and guidance.

Progress Reports:

- The system must track and save the results of each activity performed by the child.
- The system must generate monthly or weekly progress reports based on activities and performance.
- The system must include a "View Progress Report" button on the parent dashboards for accessing performance and learning summaries.

Notifications and Reminders:

- The system must send reminders to children and parents for completing specific learning activities.

Settings and Customization:

- The system must enable users to customize app settings, including language selection, font size and volume adjustment.

Technical Support and Feedback:

- The system must offer a feedback option for users to submit their suggestions and feedback.

Non-Functional Requirements

- **Performance:** The system shall respond to user requests within few seconds for a smooth user experience.
- **Security:** The system shall ensure secure user authentication and data encryption to protect sensitive information.
- **Usability:** The system shall provide an intuitive user interface that is easy for children and parents to navigate.
- **Maintainability:** The system shall be designed to allow easy updates and maintenance

without significant downtime.

FEATURES OF PROJECT

Detailed functionality of each feature

1. User Management

User Registration and Login:

- Allows to create the separate accounts for children and parents.
- The system enables to secure login with username and password, or email.
- The system allows social login options (e.g., Google, Apple) for convenience and easier access.

Profile Management:

- The system enables parents to view and edit their profiles, including personal details, learning preferences, and settings.
- Parents can view child profiles and manage app usage settings for each child account.

2. Learning Content and Activities

Interactive Learning Modules:

- The system allows for the inclusion of educational content and interactive exercises that facilitate learning.
- The system enables lessons to be interactive, utilizing games and activities that effectively engage the child.
- The system allows Assessment-Driven Customization based on the child's assessment, the system customizes learning modules, adjusting difficulty and content according to the child's age, ASD level, and progress over time.

AI-based Games and Activities:

- The games allow the integration of learning with fun and activities aimed at developing cognitive, motor, and social skills while assessing progress.
- Each game/activity is designed to enable the teaching or reinforcement of a specific concept, with progress indicators to motivate the child.

3. Chatbot Integration

Chatbot for Parents:

- The chatbot can provides parents with reliable answers to general questions about Autism including behavioural concerns and guidance.

4. Progress Tracking and Reports

Activity Tracking:

- The system allows to monitor and records each activity a child performs, including educational modules, games, and exercises.
- The system enables the generation of comprehensive progress reports, keeping parents informed about their child's learning journey.

Progress Reports:

- The system can generate weekly and monthly reports summarizing the child's activity, including strengths and areas for improvement.
- Parents can quickly download reports in formats like PDF or Excel for immediate access, offline review, and easy sharing with teachers or therapists.
- Serves as a record, enabling parents to check their child's learning progress over time.

Progress Dashboard:

- Displays a "View Progress Report" button on parents' dashboard for easy access to performance summaries.

5. Notifications and Reminders

Learning Activity Reminders:

- The system allows to send daily or weekly reminders for children to complete specific activities, tailored to their learning schedule.

6. Settings and Customization

Language Selection:

- Parents can choose their preferred language, ensuring content is accessible for them.
- Parents can set language preferences separately for each child if multiple children are using the app.

Theme and Display Options:

- Allows parents to change the font size for improved readability, catering to individual preferences.

Audio and Visual Cues:

- Enables or disables sound effects and voice guidance within the app, customizable per child's preferences.
- Parents can control the volume of audio features, tailoring the experience to suit their environment.

7. Security and Privacy

Data Protection:

- Implements encryption and data protection measures to ensure user data privacy.
- Provides options for parents to manage children's data, ensuring compliance with data protection policies.

Access Control:

- Parents have exclusive access to sensitive data, such as progress reports and settings customization.
- Separate access levels ensure children can focus on learning content while parents manage administrative functions.

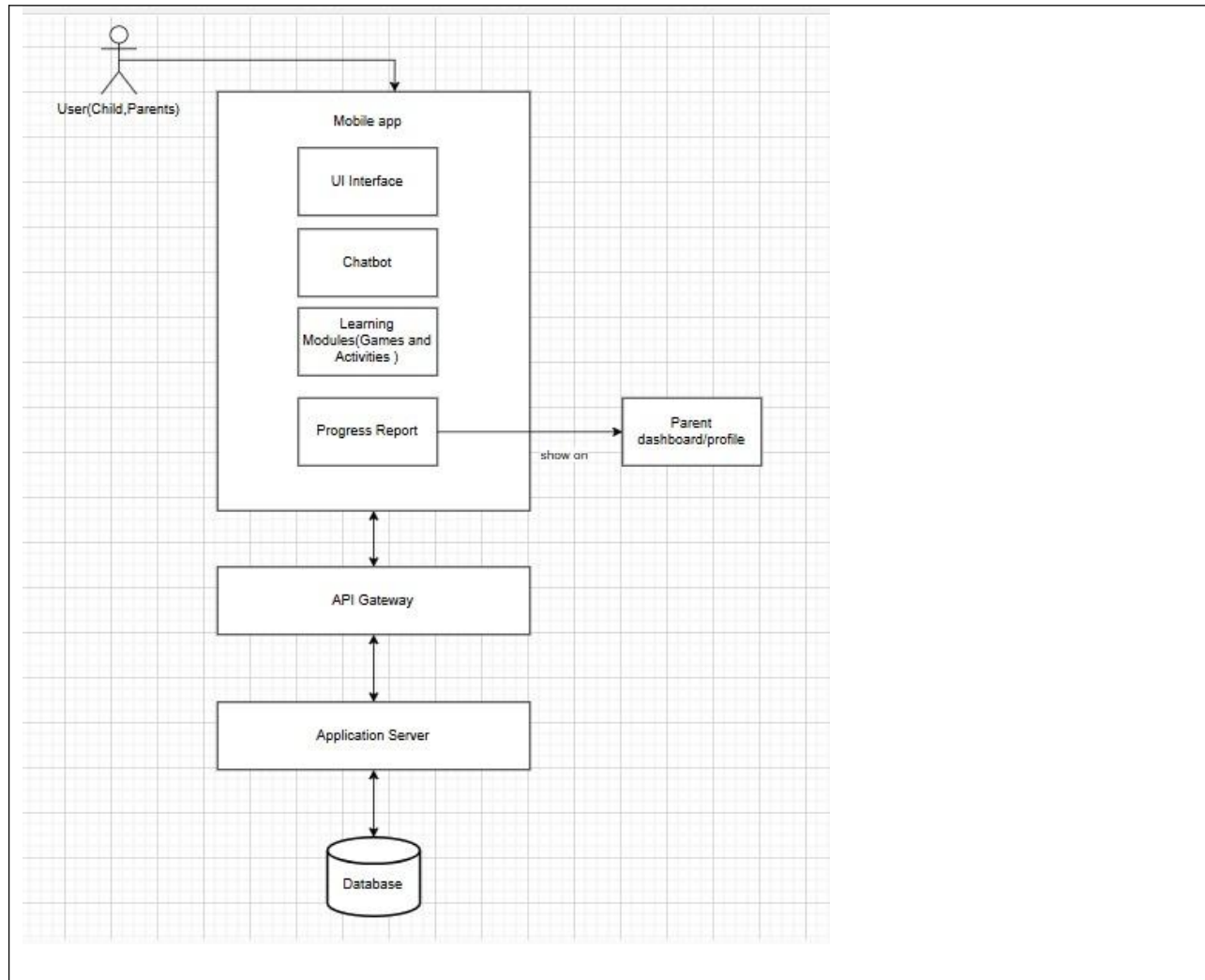
8. Technical Support and Feedback

Feedback System:

- Provides a feedback form for parents to submit suggestions, report issues, or rate the app's features.
- Feedback is used to improve app content and address user needs.

ARCHITECTURAL DESIGN

*Describe hardware, software, or network components as relevant and as understood at this time. Draw a high-level architecture diagram to illustrate the proposed system **components** and the relationships between them.*



IMPLEMENTATION TOOLS AND TECHNIQUES

Describe your methodology for implementation along with implementation tools.

Techniques:

Natural Language Processing (NLP)

Tools:

Googlecolab, Pycharm, VScode

UI/UX:

Figma

Programming Languages:

Flutter, Python

Backend and APIs:

Node.js (or Django with Python), Express.js

Artificial Intelligence and Machine Learning:

TensorFlow Lite , Core ML, Dialogflow , Rasa

Testing Tools:

Selenium, Appium, Manual testing

Database:

Firebase , MySql, MongoDB, SQLite

PROJECT PLAN

This section describes how the project will be managed, including a detailed plan with milestones. Specific items to include in this section are as follows:

- *Division of responsibilities and duties among team members.*
- *Timeline with milestones: **Gantt chart in Microsoft project 2021.** The following are required elements of your Gantt chart:*
 - *Project duration is from the date your project is enrolled to the completion date:*
 - *Each milestone is to be labeled with a title.*
 - *Schedule all tasks not just “Design” or “Testing.” Break this schedule down to specific assignments.*
 - *Each task is to be labeled with a title and person or persons assigned to the task.*
 - *Subdivide larger items so that no task is longer than about one week*
 - *Link tasks which are dependent on the completion of a previous task.*

Gantt Chart:

<https://sg.docworkspace.com/d/sIA6h7NuTAqeDirkG>

VERSION CONTROL

A table that will provide information of each time proposal was updated.

Version Number	Date (DD-MM-YYYY)	Description of updates	Updated by
1.0	21/10/2024	Initial proposal draft with project objectives	Saira Arshad
1.1	21/10/2024	Added functional requirements	Maheen Qamar
1.2	22/10/2024	Revised motivations and competitive analysis	Saira Arshad
1.3	22/10/2024	Updated project plan with milestones and tasks	Haseeb Tariq
1.4	22/10/2024	Added version control table for documentation	Maheen Qamar
1.5	23/10/2024	Finalized non-functional requirements	Saira Arshad
1.6	23/10/2024	Added tools, techniques for mobile app development.	Saira Arshad, Haseeb Tariq
1.7	23/10/2024	Defined detailed task schedule for each development phase	Haseeb Tariq
2.0	24/10/2024	Added Progress tracking functionality	Saira Arshad
2.1	24/10/2024	Revised chatbot integration requirements	Maheen Qamar
2.2	25/10/2024	Included detailed description of AI-based activities	Saira Arshad, Haseeb Tariq
2.1	26/10/2024	Refined progress tracking and reporting functionality	Maheen Qamar, Haseeb Tariq
2.2	26/10/2024	Added Gantt chart details in project plan	Saira Arshad
2.3	27/10/2024	Clarified functional requirement metrics	Saira Arshad
2.4	28/10/2024	Finalized version control table and updated version history	Maheen Qamar

REFERENCES

Give references to the resources you have consulted in finalizing your project topic.

Gantt Chart:

<https://create.microsoft.com/en-us/template/gantt-project-planner-8eab671c-2214-4ce4-b5ee-17b3ad09c5a1>

Diagrams:

<https://app.diagrams.net/>

Datasets:

<https://huggingface.co/datasets>

<https://www.kaggle.com/datasets>

<https://openai.com/>

<https://github.com/>

UI/UX:

<https://www.figma.com/>

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Approved	<input type="checkbox"/> Yes <input type="checkbox"/> No
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Checked & Approved/Not Approved By:

Name: _____

Signature: _____

Day Month Year

DATE

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