

Phan Ngọc Hạnh Nhi

Lê Thị Minh Tươi

Vũ Quang Huy

Trần Trung Hậu

Child Growth Tracking - SRS

1. System Overview & Scope

1.1. System Overview

- The Child Growth Tracking System is a web/mobile application that supports parents and caregivers in monitoring the physical development of children over time.
- The system allows users to:
 1. Store and manage key growth indicators of each child (weight, height/length, head circumference, BMI).
 2. Display growth charts in a visual way and compare a child's measurements against standardized growth references (e.g., WHO, CDC).
 3. Help parents share a child's growth data with doctors or other caregivers (e.g., grandparents, babysitters) in the form of reports.
- The main user groups of the system include:
 1. Parent/Guardian: creates an account, manages one or multiple child profiles, enters periodic measurements, and views growth charts.
 2. Caregiver (authorized by the parent): is granted permission by the parent to update measurements and view growth information.
 3. Doctor/Pediatrician: views reports or growth charts provided by parents to support medical examination and consultation.
 4. System Administrator (Admin): manages user accounts, configures growth standards, and monitors system operations.
- The system focuses on three main objectives:
 1. Securely store and manage the growth history of each child over time.
 2. Analyze and visualize growth data using charts and percentiles so that parents can easily understand the child's growth status.
 3. Support coordinated care between parents, caregivers, and doctors through reminders, reports, and data sharing.

1.2. Scope

- Within the scope of this project, the Child Growth Tracking System will support the following functional groups:
 - User management and access control: register, log in, manage user accounts, and distinguish roles (Parent/Caregiver/Doctor/Admin).
 - Child profile management: create, update, and store one or multiple child profiles under the same parent account.
 - Measurement recording: enter and store growth measurements such as weight, height/length, head circumference, etc. at different points in time; support BMI calculation and age at the time of measurement.

- Growth chart analysis and visualization: display growth charts over time and show the child's position on standardized growth curves (percentiles).
- Periodic tracking reminders: configure measurement reminder schedules and send notifications when it is time to record new measurements.
- Report generation and sharing: export growth data as reports (PDF/CSV/chart images) for storage or for sharing with doctors.
- Out of scope for this version:
 - The system does not perform medical diagnosis or make treatment decisions.
 - The system does not yet integrate directly with hospital systems or smart measuring devices; all data is entered manually by users.

2. Functional Requirements (FR)

FR1 – User Registration & Authentication

The system shall allow users to create a new account using an email and password, and to log in using their registered credentials. Passwords shall be stored securely. After successful login, users shall be able to access features according to their assigned role.

FR2 – User Roles & Authorization

The system shall support basic user roles: Parent/Guardian, Caregiver, Doctor, and Admin. Each role shall only have access to appropriate functions (e.g., a Caregiver cannot delete accounts, a Doctor can only view shared reports, an Admin manages users but does not modify child measurements).

FR3 – Manage Child Profiles

The system shall allow parents to create, view, update, and (if necessary) deactivate child profiles. Each child profile shall include at least: full name, gender, date of birth, preterm/full-term status, and an optional profile photo. A single parent account may manage multiple child profiles.

FR4 – Record Growth Measurements

The system shall allow authorized users (Parent or delegated Caregiver) to enter growth measurements for a child at different points in time, including at least: measurement date, weight, height/length, and head circumference (if available). After saving, the system shall calculate BMI (if sufficient data is provided) and the child's age at the time of measurement (chronological age or corrected age for preterm children).

FR5 – View & Analyze Growth Charts

The system shall display growth charts for each child based on recorded measurements, for example: Age vs. Weight, Age vs. Height, Age vs. BMI. The system shall show the child's position on standardized growth curves (percentiles) so that parents can see whether the child is below, within, or above the normal range.

FR6 – Reminders & Notifications

The system shall allow parents to configure measurement reminder schedules (e.g., every 1 month, every 3 months) for each child. When a scheduled time is reached, the system shall send a notification (in-app, email, or another selected channel) to remind users to enter new measurements.

FR7 – Export & Share Growth Reports

The system shall allow parents to export a child's growth report for a specified time

range (from date – to date). Reports may be generated in formats such as PDF, CSV, or chart images. The system shall allow users to download the report or share it with doctors/caregivers (e.g., via email or a secure link).

FR8 – System Administration & Configuration

The system shall provide an interface for Admin users to manage user accounts (lock/unlock, reset passwords), monitor system activity, and configure growth standards (e.g., selecting WHO or CDC references for different age groups).

3. Non-functional Requirements (NFR)

NFR1 – Usability

The user interface shall be simple, clear, and user-friendly for non-technical users. A new user (e.g., a parent not familiar with technology) should be able to perform basic tasks such as creating a child profile and entering measurements in a few steps, without needing complex training.

NFR2 – Performance

The system shall respond within an acceptable time for end users. The main pages and growth charts for a single child should be displayed within 3 seconds under normal network conditions.

NFR3 – Security & Privacy

User account data and child health data shall be protected. The system shall:

- Encrypt user passwords.
- Allow access to data only after successful authentication and proper authorization.
- Prevent users without permission from viewing data of other children.

NFR4 – Reliability & Availability

The system shall maintain stable operation most of the time, with a high target availability (e.g., 24/7 excluding scheduled maintenance). Growth data shall be stored safely and shall not be lost due to minor incidents. There shall be a mechanism for periodic data backup.

NFR5 – Compatibility & Portability

The system shall work properly on major web browsers (Chrome, Firefox, Edge, Safari) and support responsive layouts on desktop, tablet, and mobile devices. The system architecture should allow deployment in different environments (on-premises or cloud) without major functional changes.