

UV Sense

Week 1 Individual Project Report

Personalized UV Monitoring & Protection

Cross-Platform Development - ASE456

Project Scope

By the Numbers

Features

- 5 Core Features

Requirements

- 5 Core User Stories

The Problem

UV Exposure Challenges

- Generic weather apps provide rough UV indices, not precise readings
- Micro-environments (shade, clouds, location) aren't considered
- Personal factors (skin type, sensitivity) are ignored
- Lack of tracking cumulative daily/weekly exposure
- No actionable advice - just numbers without context

Why This Matters

Health Impact

Too Little UV:

- Vitamin D deficiency
- Depression and low bone density
- Seasonal mood disorders

Too Much UV:

- Skin cancer risk
- Premature aging and wrinkles
- Sunburns and skin damage

Personalized data helps prevent both over- and under-exposure

Feature 1: UV Sensor Integration

Real-Time Precision

Problem: Users lack accurate, real-time UV data tailored to their specific environment

Solution:

- ESP32 microcontroller + UV sensor (VEML6075)
- Bluetooth/Wi-Fi connectivity to Flutter app
- Real-time readings accounting for shade, clouds, and micro-environments

Feature 2: UV Tracking App

Exposure History & Trends

Problem: People don't track cumulative UV exposure over time

Solution:

- Flutter app with local database (SQLite/Hive)
- Daily/weekly exposure logging
- Trend visualization with charts
- Safe vs unsafe exposure range indicators

Feature 3: User Sensitivity Quiz

Personalized Recommendations

Problem: UV tolerance varies by skin type, but most apps give generic advice

Solution:

- Quiz based on Fitzpatrick skin type research
- Assessment of user's UV sensitivity profile
- Personalized recommendations tailored to individual needs

Feature 4: Recommendation Engine

Actionable Guidance

Problem: Users need actionable advice, not just numbers

Solution:

- Recommendation matrix (skin type × UV index ranges)
- Specific guidance: safe exposure time, sunscreen needs, shade advice
- Vitamin D optimization recommendations
- Real-time decision support

Feature 5: UI/UX Flow & Visualization

Intuitive User Experience

Problem: Poorly designed apps discourage daily usage

Solution:

- Clean, intuitive interface design
- Clear data visualizations and charts
- Smooth user flow: connect → dashboard → quiz → recommendations → history
- Consistent theme and user-friendly interactions

Technical Implementation

Development Stack

Hardware

- ESP32 microcontroller board
- VEML6075 UV sensor module
- Bluetooth/Wi-Fi communication

Software

- Flutter cross-platform app
- State management (Provider/Bloc)
- Local storage (SQLite/Hive)
- Visualization (fl_chart, charts_flutter)

Solution Architecture

App Flow Design

Sensor Connect → Live Dashboard → Sensitivity Quiz →
Personalized Recommendations → Historical Data & Trends

Key Components:

- Real-time sensor data collection
- User profile and sensitivity assessment
- Dynamic recommendation generation
- Historical tracking and visualization
- Cross-platform mobile interface

User Stories & Requirements

Core User Needs

1. **Real-time data:** Connect to UV sensor for location-specific readings
2. **Exposure tracking:** Monitor daily/weekly UV exposure patterns
3. **Personal assessment:** Complete sensitivity quiz for tailored advice
4. **Actionable guidance:** Receive specific recommendations based on current conditions
5. **Intuitive interface:** Easy-to-use app with clear visualizations

Next Steps

Week 2 Development Plan

- [] Set up Flutter development environment
- [] Create basic app structure and navigation
- [] Design UI mockups and wireframes
- [] Research ESP32 and sensor integration
- [] Begin implementing core features

Goal: Working prototype with mock data by end of Week 2