A Sleep Tracking App for a Better Night's Rest

Abstract:

Dream Well is an innovative sleep tracking app designed to help individuals monitor, analyse, and optimize their sleep patterns for a better night's rest. Using cutting-edge technology and machine learning algorithms, Dream Well tracks sleep duration, quality, and stages, providing personalized insights and recommendations to improve sleep hygiene.

Key Features:

➢ Sleep Tracking: Monitor sleep duration, quality, and stages (light, deep, REM).
➢ Sleep Analysis: Identify sleep patterns, trends, and disruptions.
➢ Personalized Recommendations: Receive tailored suggestions for sleep schedule, environment, and habits.
➢ Smart Alarms: Wake up feeling refreshed during light sleep phases.
➢ Relaxation Techniques: Guided meditation, breathing exercises, and soothing sounds.
➢ Sleep Goals: Set and track progress toward sleep objectives.
➢ Integrations: Sync with wearable devices, calendars, and health apps.

Introduction:

Sleep is a vital aspect of human life, essential for physical and mental rejuvenation. However, millions worldwide struggle with sleep disorders, impacting their overall well-being, productivity, and quality of life. With the rise of wearable technology and mobile health applications, tracking and improving sleep quality has become more accessible.

Dream well a cutting-edge sleep tracking app, aims to bridge the gap between sleep science and everyday life. By leveraging advanced algorithms, personalized insights, and user-friendly design, Dream Well empowers individuals to take control of their sleep, enhancing their lives and fostering a healthier future.

A project that demonstrates the use of Android Jetpack Compose to build a UI for a sleep tracking app. The app allows users to track their sleep. With the "Sleep Tracker" app, you can assess the quality of sleep they have had in a day. It has been time and again proven that a good quality sleep is pretty essential for effective functioning of both mind and body.

Project description:

"Sleep Tracker" application enables you to start the timer when they are in the bed and about to fall asleep. The timer will keep running in the background until it is stopped, whenever the user wakes up. Based on the sleep experience, you can rate your sleep quality. Finally , the app will display an analysis of the kind of sleep , you had the previous night.

System requirement:

Opening System:

1. Operating System: Android 10+ or ios 13+

2. Processor: Quad-core 1.8 GHz or faster

3. Architecture: 64-bit
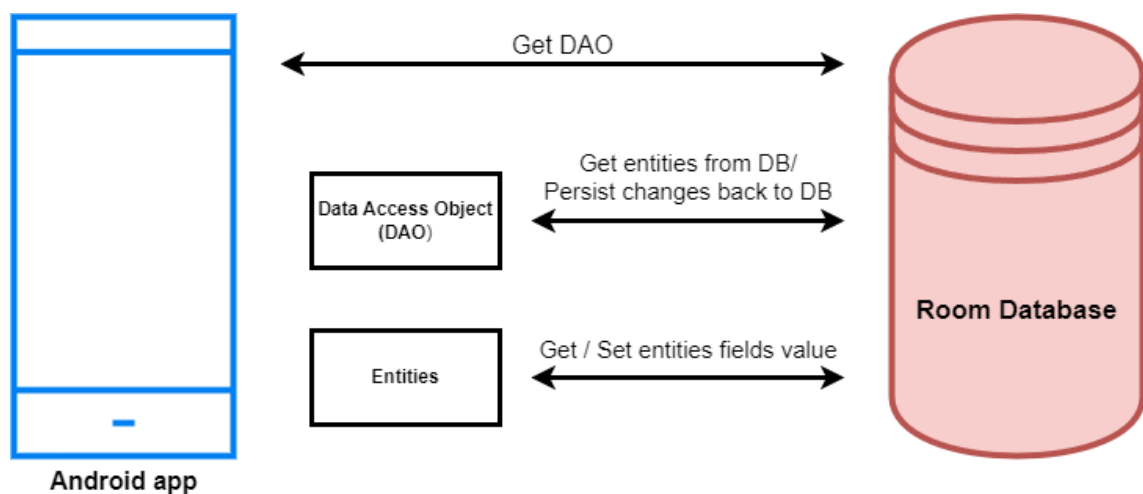
RAM:

     1. Minimum: 2 GB

     2. Recommended: 4 GB or more

ROM (Storage):

     1. Minimum: 4 GB

     2. Recommended: 16 GB or more

     3. Optimal: 32 GB or more

Tools used:

- Android Studio
- Firebase
- Kotlin
- Architecture

Architecture:

Tasks:

o Creating a new project.
o Adding required dependencies.
o Creating the database classes.
o Building application UI and connecting to database.
o Using AndroidManifest.xml
o Running the application.

program:

package com.example.projectone

```kotlin
import android.content.Context
import android.content.Intent
import android.os.Bundle
import androidx.activity.ComponentActivity
import androidx.activity.compose.setContent
import androidx.compose.foundation.Image
import androidx.compose.foundation.layout.*
import androidx.compose.material.*
import androidx.compose.runtime.*
import androidx.compose.ui.Alignment
import androidx.compose.ui.Modifier
import androidx.compose.ui.draw.alpha
import androidx.compose.ui.graphics.Color
import androidx.compose.ui.layout.ContentScale
import androidx.compose.ui.res.painterResource
import androidx.compose.ui.text.font.FontFamily
import androidx.compose.ui.text.font.FontWeight
import androidx.compose.ui.unit.dp
import androidx.compose.ui.unit.sp
import androidx.core.content.ContextCompat
import com.example.projectone.ui.theme.ProjectOneTheme


class LoginActivity : ComponentActivity() {
    private lateinit var databaseHelper: UserDatabaseHelper
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        databaseHelper = UserDatabaseHelper(this)
        setContent {
```

```kotlin
        ProjectOneTheme {
            // A surface container using the 'background' color from the theme
            Surface(
                modifier = Modifier.fillMaxSize(),
                color = MaterialTheme.colors.background
            ) {
                LoginScreen(this, databaseHelper)
            }
        }
    }
}

@Composable
fun LoginScreen(context: Context, databaseHelper: UserDatabaseHelper) {
    var username by remember { mutableStateOf("") }
    var password by remember { mutableStateOf("") }
    var error by remember { mutableStateOf("") }
    val imageModifier = Modifier
    Image(
        painterResource(id = R.drawable.sleeptracking),
        contentScale = ContentScale.FillHeight,
        contentDescription = "",
        modifier = imageModifier
            .alpha(0.3F),
    )
    Column(
        modifier = Modifier.fillMaxSize(),
        horizontalAlignment = Alignment.CenterHorizontally,
        verticalArrangement = Arrangement.Center
    ) {
```

```kotlin
Image(
    painter = painterResource(id = R.drawable.sleep),
    contentDescription = "",

    modifier = imageModifier
        .width(260.dp)
        .height(200.dp)
)
Text(
    fontSize = 36.sp,
    fontWeight = FontWeight.ExtraBold,
    fontFamily = FontFamily.Cursive,
    color = Color.White,
    text = "Login"
)
Spacer(modifier = Modifier.height(10.dp))

TextField(
    value = username,
    onValueChange = { username = it },
    label = { Text("Username") },
    modifier = Modifier.padding(10.dp)
        .width(280.dp)
)

TextField(
    value = password,
    onValueChange = { password = it },
    label = { Text("Password") },
```

```kotlin
        modifier = Modifier.padding(10.dp)
            .width(280.dp)
    )

    if (error.isNotEmpty()) {
        Text(
            text = error,
            color = MaterialTheme.colors.error,
            modifier = Modifier.padding(vertical = 16.dp)
        )
    }

    Button(
        onClick = {
            if (username.isNotEmpty() && password.isNotEmpty()) {
                val user = databaseHelper.getUserByUsername(username)
                if (user != null && user.password == password) {
                    error = "Successfully log in"
                    context.startActivity(
                        Intent(
                            context,
                            MainActivity::class.java
                        )
                    )

                    //onLoginSuccess()
                } else {
                    error = "Invalid username or password"
                }
            } else {
```

```kotlin
                error = "Please fill all fields"

            }

        },

        modifier = Modifier.padding(top = 16.dp)

) {

    Text(text = "Login")

}

Row {

    TextButton(onClick = {context.startActivity(

        Intent(

            context,

            MainActivity2::class.java

        )

    )}

    )

    { Text(color = Color.White,text = "Sign up") }

    TextButton(onClick = {

        /*startActivity(

        Intent(

            applicationContext,

            MainActivity2::class.java

        )

    )*/

    })


    {

        Spacer(modifier = Modifier.width(60.dp))

        Text(color = Color.White,text = "Forget password?")

    }

}
```
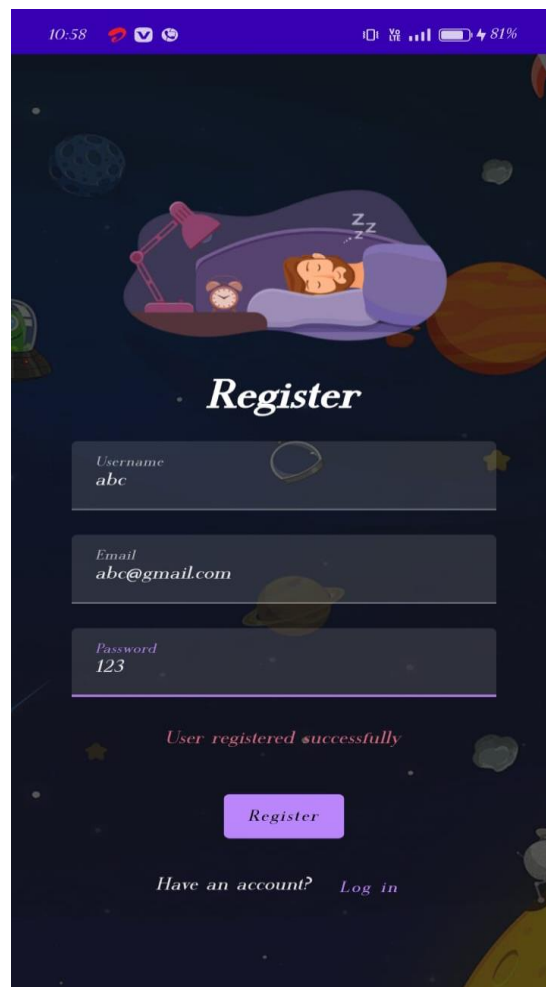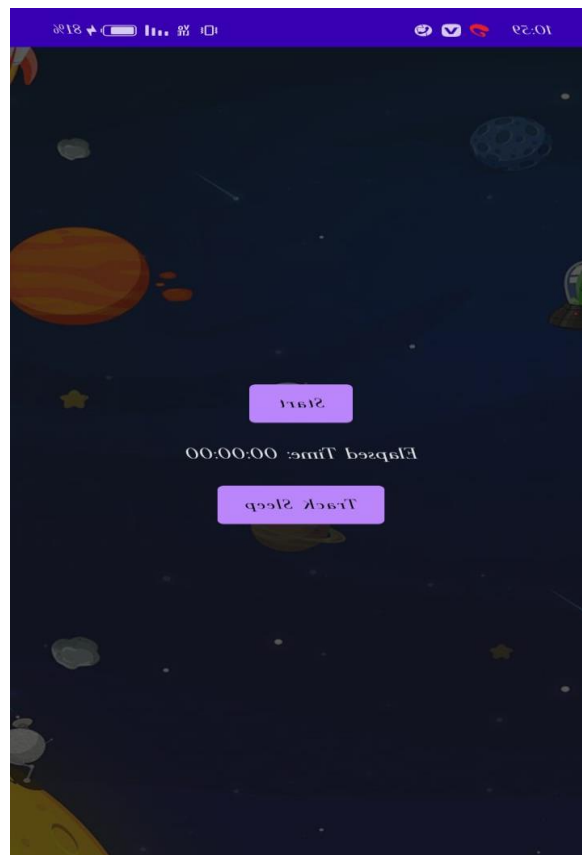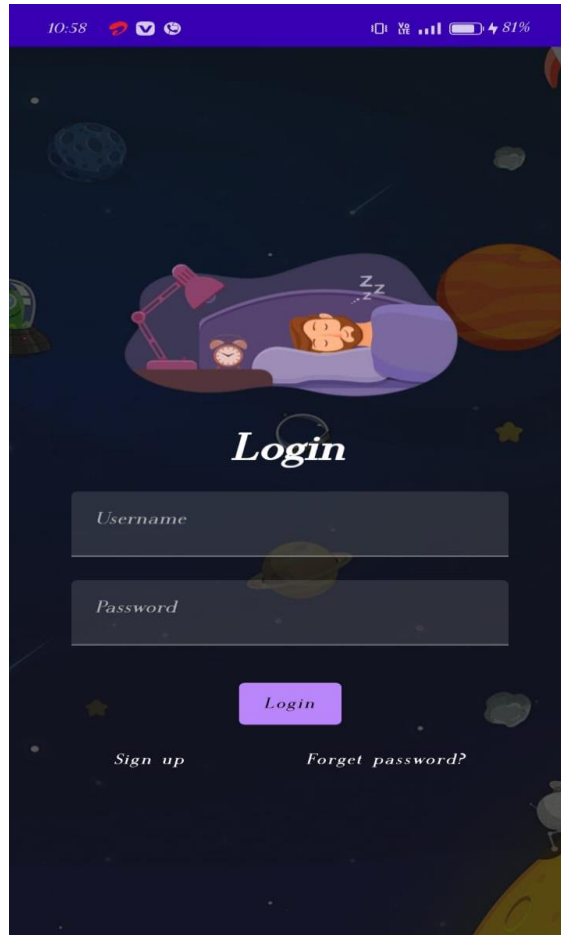
```
            }
    }
    private fun startMainPage(context: Context) {
        val intent = Intent(context, MainActivity2::class.java)
        ContextCompat.startActivity(context, intent, null)
    }
```
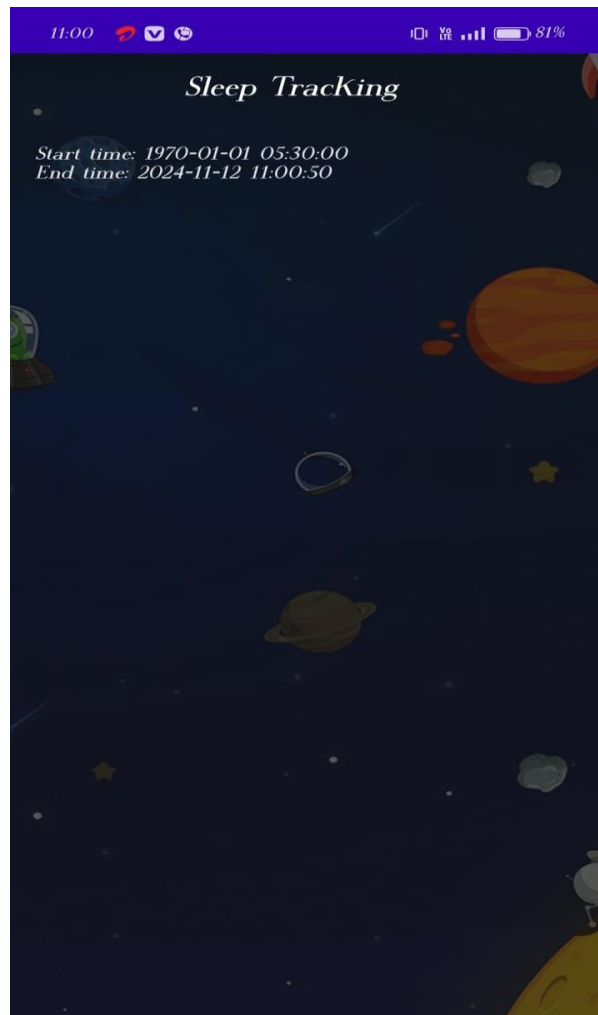
Output:

Login

Username

Password

Login

Sign up   Forget password?

Start

Elapsed Time: 00:00:00

Track Sleep

Conclusion:

Dream Well is an innovative sleep tracking app designed to empower individuals to take control of their sleep quality. By leveraging cutting-edge technology, machine learning algorithms, and expert insights, Dream Well provides personalized recommendations, comprehensive sleep analysis, and seamless wearable device integration.

A sleep tracking app aims to help users achieve better sleep by monitoring sleep patterns, identifying issues, and providing personalized recommendations. Using data from various factors—such as sleep duration, quality, and disturbances—these apps can highlight trends and suggest improvements like bedtime routines, optimal sleep schedules, and ways to reduce stress. By offering insights and tracking progress, a sleep tracking app can guide users toward healthier sleep habits, potentially leading to more restful nights and overall well-being.

Future scope:

- ✓ Integration with popular health apps (e.g., Apple Health, Google Fit)
- ✓ Short-Term (6-12 months)
- ✓ Expansion to new wearable devices and platforms (e.g., Samsung, Huawei)
- ✓ Enhanced AI-driven sleep stage detection and analysis
- ✓ Introduction of personalized sleep coaching and recommendations
- ✓ User engagement features (e.g., rewards, challenges, social sharing)

Mid-Term (1-2 years)

- ✓ Collaboration with sleep experts and researchers for advanced sleep analytics
- ✓ Development of predictive sleep modelling and risk assessment
- ✓ Integration with smart home devices for sleep-conducive environment optimization
- ✓ Expansion to new markets and languages
- ✓ Introduction of premium features and subscription models

Long-Term (2-5 years)

- ✓ Development of advanced sleep disorder detection and diagnosis
- ✓ Integration with healthcare systems for seamless data sharing
- ✓ Creation of a sleep-focused community platform
- ✓ Exploration of augmented reality (AR) and virtual reality (VR) sleep therapy
- ✓ Development of AI-powered sleep assistants for personalized guidance