**Experiment 5**

**Aim:** To apply navigation, routing and gestures in Flutter App.

**Theory:** Flutter offers a comprehensive approach to handle deep links and screen transitions.

While the Navigator is suitable for smaller apps with basic deep linking, the Router is

recommended for larger apps requiring intricate deep linking. This ensures proper deep link

handling across Android, iOS, and web platforms.

Any mobile app’s workflow is determined by the user’s ability to navigate to various

pages; this process is known as routing. The MaterialPageRoute class of Flutter’s routing

system comes with the two methods that demonstrate how to switch between two routes and

they are:

1. **Navigator.push()** — To navigate to a new route.
2. **Navigator.pop()** — To return to the previous route.

The Navigator widget manages routes using a stack approach. Routes are stacked based on

user actions, and pressing back navigates to the most recent route.

**Working of the Navigator:**

These following steps show how all the components work together as one piece:

1. The RouteInformationParser converts a new route into a user-defined data type.
2. The RouterDelegate method updates the app state and calls notifyListeners.
3. The Router instructs the RouterDelegate to rebuild via its build() method.
4. The RouterDelegate.build() returns a new Navigator reflecting the updated app state.

**Steps to Start Navigation in App:**

There are three steps required to start navigation in the app and they are:

1. **Create Two Routes:** Define the initial and destination routes.
2. **Use Navigator.push():** Transition to the new route. To navigate or transition to a new

page, route, or screen, the Navigator.push() method is used. The push() method adds a

page or route to the stack, and then uses the Navigator to manage it. Once more, we

use the MaterialPageRoute class, which enables platform-specific animations for route

transitions.

1. **Use Navigator.pop():** Navigate back to the initial route. The Navigator controls the stack,and the pop() method enables to remove the current route from it.

The Router and Navigator are designed to work in tandem. By executing imperative

methods like push() and pop() on the Navigator, or declarative routing packages like go\_router,

Router API can be navigated. Each route on the Navigator is page-backed, which means it was

made from a Page using the pages option on the Navigator constructor, when you navigate

using the Router or a declarative routing package. On the other hand, any Route added to the

Navigator by calling Navigator.push or showDialog will add a pageless route. Page-backed

routes, as opposed to pageless ones, can always be deep-linked when utilising a routing

package.

All subsequent pageless routes are also deleted when a page-backed route is deleted

from the navigator. For instance, if a deep link navigates by eliminating a page-backed route

from the navigator, any pageless \_routes that follow up to the following page-backed route are

also eliminated.

For a consistent experience when utilising the browser’s back and forward buttons, apps

that use the Router class integrate with the History API. A History API entry is added to the

browser’s history stack each time you use the Router to traverse. When the back button is

pressed, the Router switches to reverse chronological navigation, which transports the user

back to the last

Gestures are used to interact with an application. It is generally used in touch-based

devices to physically interact with the application. It can be as simple as a single tap on the

screen to a more complex physical interaction like swiping in a specific direction to scrolling

down an application. It is heavily used in gaming and more or less every application requires it

to function as devices turn more touch-based than ever. In this article, we will discuss them in

detail.

Some widely used gestures are mentioned here :

● **Tap**:Touching the surface of the device with the fingertip for a small duration of time

period and finally releasing the fingertip.

● **Double Tap:** Tapping twice in a short time.

● **Drag:** Touching the surface of the device with the fingertip and then moving the fingertip

steadily and finally releasing the fingertip.

● **Flick:** Similar to dragging, but doing it in a speedier way.

● **Pinch:** Pinching the surface of the device using two fingers.

● **Zoom:**Opposite of pinching.

● **Panning:** Touching the device surface with the fingertip and moving it in the desired

direction without releasing the fingertip.

The GestureDetector widget in flutter is used to detect physical interaction with the application

on the UI. If a widget is supposed to experience a gesture, it is kept inside the GestureDetector

widget. The same widget catches the gesture and returns the appropriate action or response.

**Code in Home.dart:**

import 'package:flutter/material.dart';

import 'package:carousel\_slider/carousel\_slider.dart';

class HomePage extends StatelessWidget {

final List<Map<String, dynamic>> features = [

{

"title": "Goal Creation & Tracking",

"description": "Set SMART goals and log progress daily.",

"image":

"https://plus.unsplash.com/premium\_vector-1727955579504-b6e00adbf23c?q=80&w=1800&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",

"route": "/goal"

},

{

"title": "Accountability Partners",

"description": "Add friends, family, or mentors to track progress.",

"image":

"https://plus.unsplash.com/premium\_vector-1682269939460-1e7d742aaa7f?q=80&w=1800&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",

"route": "/partners"

},

{

"title": "Virtual Nudges",

"description": "Receive motivating messages from partners.",

"image":

"https://images.unsplash.com/vector-1738325063642-ca6a57d8743e?q=80&w=1800&auto=format&fit=crop&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxwaG90by1wYWdlfHx8fGVufDB8fHx8fA%3D%3D",

"route": "/forum"

},

{

"title": "Collaborative Goals",

"description": "Work on shared goals like fitness challenges.",

"image":

"https://plus.unsplash.com/premium\_vector-1727274000289-99ec6fa1f744?w=600&auto=format&fit=crop&q=60&ixlib=rb-4.0.3&ixid=M3wxMjA3fDB8MHxzZWFyY2h8N3x8Y29sbGFicmF0aXZlJTIwd29ya3xlbnwwfHwwfHx8MA%3D%3D",

"route": "/socials"

}

];

final List<String> recentAchievements = [

"🏆 Completed '30-Day Fitness Challenge'",

"✅ Logged 10,000 steps for 7 days in a row!",

"🥇 Top performer in Weekly Goal Streak"

];

final List<String> popularChallenges = [

"🔥 10-Day Meditation Challenge",

"🏋️‍♂️ 30-Day Fitness Bootcamp",

"📖 Read 5 Books in a Month"

];

final String motivationalQuote =

"Success is the sum of small efforts, repeated day in and day out. – Robert Collier";

@override

Widget build(BuildContext context) {

return Scaffold(

appBar: AppBar(

title: Row(

mainAxisAlignment: MainAxisAlignment.spaceBetween,

children: [

Text(

"Activibe",

style: TextStyle(fontSize: 24, fontWeight: FontWeight.bold),

),

IconButton(

icon: const Icon(Icons.account\_circle, size: 30),

onPressed: () {

Navigator.pushNamed(context, "/user"); // Navigate to User Profile Page

},

),

],

),

backgroundColor: Colors.white,

elevation: 4,

shape: RoundedRectangleBorder(

borderRadius: BorderRadius.vertical(bottom: Radius.circular(15)),

),

),

backgroundColor: Colors.white,

body: SingleChildScrollView(

child: Padding(

padding: const EdgeInsets.all(10.0),

child: Column(

crossAxisAlignment: CrossAxisAlignment.start,

children: [

// Carousel Section

CarouselSlider.builder(

itemCount: features.length,

itemBuilder: (context, index, realIndex) {

return GestureDetector(

onTap: () {

if (features[index]["route"] != null) {

Navigator.pushNamed(context, features[index]["route"]);

}

},

child: Card(

shape: RoundedRectangleBorder(

borderRadius: BorderRadius.circular(15),

),

elevation: 5,

child: Container(

decoration: BoxDecoration(

borderRadius: BorderRadius.circular(15),

image: DecorationImage(

image: NetworkImage(features[index]["image"]),

fit: BoxFit.cover,

colorFilter: ColorFilter.mode(

Colors.white.withOpacity(0.4),

BlendMode.darken,

),

),

),

child: Padding(

padding: EdgeInsets.all(20),

child: Column(

mainAxisAlignment: MainAxisAlignment.center,

children: [

Text(

features[index]["title"],

style: TextStyle(

fontSize: 22,

fontWeight: FontWeight.bold,

color: Colors.black87,

),

textAlign: TextAlign.center,

),

SizedBox(height: 10),

Text(

features[index]["description"],

style: TextStyle(

fontSize: 16,

color: Colors.black87,

),

textAlign: TextAlign.center,

),

],

),

),

),

),

);

},

options: CarouselOptions(

height: 350,

autoPlay: true,

enlargeCenterPage: true,

enableInfiniteScroll: true,

),

),

SizedBox(height: 20),

// Recent Achievements (Grid View)

Text("🏆 Recent Achievements", style: TextStyle(fontSize: 20, fontWeight: FontWeight.bold)),

SizedBox(height: 10),

GridView.builder(

shrinkWrap: true,

physics: NeverScrollableScrollPhysics(),

gridDelegate: SliverGridDelegateWithFixedCrossAxisCount(

crossAxisCount: 2,

crossAxisSpacing: 10,

mainAxisSpacing: 10,

childAspectRatio: 2.5,

),

itemCount: recentAchievements.length,

itemBuilder: (context, index) {

return Container(

padding: EdgeInsets.all(10),

decoration: BoxDecoration(

color: Colors.blue.shade100,

borderRadius: BorderRadius.circular(10),

),

child: Text("✅ ${recentAchievements[index]}", textAlign: TextAlign.center),

);

},

),

SizedBox(height: 20),

// Popular Challenges (Grid View)

Text("🔥 Popular Challenges", style: TextStyle(fontSize: 20, fontWeight: FontWeight.bold)),

SizedBox(height: 10),

GridView.builder(

shrinkWrap: true,

physics: NeverScrollableScrollPhysics(),

gridDelegate: SliverGridDelegateWithFixedCrossAxisCount(

crossAxisCount: 2,

crossAxisSpacing: 10,

mainAxisSpacing: 10,

childAspectRatio: 2.5,

),

itemCount: popularChallenges.length,

itemBuilder: (context, index) {

return Container(

padding: EdgeInsets.all(10),

decoration: BoxDecoration(

color: Colors.orange.shade100,

borderRadius: BorderRadius.circular(10),

),

child: Text("📌 ${popularChallenges[index]}", textAlign: TextAlign.center),

);

},

),

SizedBox(height: 30),

],

),

),

),

);

}

}

