AIM:

Task Description:
Develop two distinct applications using Flutter:
1. News App: Utilize multiple widgets and layouts to create a user-friendly interface for a news application. The app should allow users to browse news articles with features such as categories, headlines, and article previews. The design and functionality should aim to resemble the example output provided.
2. OTT App: Create an Over-The-Top (OTT) media streaming application. The app should include widgets and layouts to display movies, shows, and recommendations with an intuitive design that enhances user experience.

THEORY:

1. StatefulWidget

- **Definition:**
  A StatefulWidget is a widget that maintains state that might change during its lifetime. It consists of two classes:
  - The StatefulWidget class itself, which is immutable.
  - A State class where the mutable state is maintained.
- **Use Case:**
  Use StatefulWidget when the UI depends on dynamic data that can change, such as user interactions or real-time updates.
- **Example:**

```
class MyStatefulWidget extends StatefulWidget {
  @override
  _MyStatefulWidgetState createState() => _MyStatefulWidgetState();
}

class _MyStatefulWidgetState extends State<MyStatefulWidget> {
  int counter = 0;

  void incrementCounter() {
    setState(() {
      counter++;
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: Text('StatefulWidget Example')),
      body: Center(child: Text('Counter: $counter')),
      floatingActionButton: FloatingActionButton(
        onPressed: incrementCounter,
        child: Icon(Icons.add),
      ),
    );
  }
}
```

2. Factory Constructor

- **Definition:**
  A factory constructor in Dart allows you to control instance creation. It returns an instance of the class or an existing instance (singleton).
- **Use Case:**
  Useful for implementing patterns like singletons, caching, or object pooling.
- **Example:**

```
class Singleton {
  static final Singleton _instance = Singleton._internal();

  factory Singleton() {
    return _instance;
  }

  Singleton._internal();
}

void main() {
  var s1 = Singleton();
  var s2 = Singleton();
  print(s1 == s2); // true
}
```

3. HTTP GET Request

- **Definition:**
  Flutter uses the http package to perform network requests like GET, POST, PUT, DELETE, etc.
- **Use Case:**
  Use GET requests to fetch data from a REST API.
- **Example:**

```
import 'package:http/http.dart' as http;
import 'dart:convert';

Future<void> fetchData() async {
  final response = await http.get(Uri.parse('https://api.example.com/data'));

  if (response.statusCode == 200) {
    var data = jsonDecode(response.body);
    print(data);
  } else {
    print('Failed to load data');
  }
}
```

4. SingleChildScrollView

- **Definition:**
  A SingleChildScrollView allows a single widget to be scrollable when its content overflows the available screen space.
- **Use Case:**
  Use this widget for a scrollable layout with a single child.
- **Example:**

```
@override
Widget build(BuildContext context) {
  return Scaffold(
    body: SingleChildScrollView(
      child: Column(
        children: List.generate(50, (index) => Text('Item $index')),
      ),
    ),
  );
}
```

5. Route and Routing

- **Definition:**
  Routing in Flutter involves navigation between different screens (widgets). Flutter provides Navigator and MaterialPageRoute for navigation.
- **Use Case:**
  Use routing for app navigation and managing the back stack.
- **Example:**

```
Navigator.push(
  context,
  MaterialPageRoute(builder: (context) => SecondScreen()),
);
```

6. YouTube Controller (Video Playback)

- **Definition:**
  The youtube_player_flutter package provides a widget and controller to embed YouTube videos in your Flutter app.
- **Use Case:**
  Embed and control YouTube videos.
- **Example:**

```
import 'package:youtube_player_flutter/youtube_player_flutter.dart';
```

```
class YouTubeExample extends StatefulWidget {
  @override
  _YouTubeExampleState createState() => _YouTubeExampleState();
}

class _YouTubeExampleState extends State<YouTubeExample> {
  late YoutubePlayerController _controller;

  @override
  void initState() {
    super.initState();
    _controller = YoutubePlayerController(
      initialVideoId: 'dQw4w9WgXcQ',
      flags: YoutubePlayerFlags(autoPlay: true),
    );
  }

  @override
  Widget build(BuildContext context) {
    return YoutubePlayer(
      controller: _controller,
      showVideoProgressIndicator: true,
    );
  }
}
```

7. ListView

- **Definition:**
  A ListView is a scrollable list of widgets. It is highly customizable and efficient for rendering large datasets.
- **Use Case:**
  Use ListView to display a scrollable list of items.
- **Example:**

```
@override
Widget build(BuildContext context) {
  return Scaffold(
    body: ListView(
      children: List.generate(
        10,
        (index) => ListTile(
          title: Text('Item $index'),
        ),
      ),
    ),
  );
}
```

8. Other Similar Widgets

- **GridView:**
  Used for displaying a scrollable grid of widgets.

```
GridView.count(
  crossAxisCount: 2,
  children: List.generate(10, (index) => Text('Item $index')),
);
```

- **FutureBuilder:**
  A widget that builds itself based on the latest snapshot of interaction with a Future.

```
FutureBuilder(
  future: fetchData(),
  builder: (context, snapshot) {
    if (snapshot.connectionState == ConnectionState.done) {
      return Text('Data: ${snapshot.data}');
    } else {
      return CircularProgressIndicator();
    }
  },
);
```

- **StreamBuilder:**
  Similar to FutureBuilder, but for Stream.

```
StreamBuilder(
  stream: myStream,
  builder: (context, snapshot) {
    return Text('Data: ${snapshot.data}');
  },
);
```

- **CustomScrollView:**
  Combines multiple scrolling views (e.g., ListView, GridView) into a single scrollable layout.

```
CustomScrollView(
  slivers: [
    SliverList(
      delegate: SliverChildBuilderDelegate(
        (context, index) => ListTile(title: Text('Item $index')),
      ),
    ),
  ],
);
```

9. Additional Classes/Concepts

- **InheritedWidget:** For sharing state efficiently across widgets.
- **PageView:** For implementing swipable pages.
- **Drawer:** For creating side navigation menus.
- **Provider:** A state management solution in Flutter.

CODE:

News app :

Main.dart

```
import 'dart:ui';
import 'package:flutter/material.dart';
import 'package:http/http.dart' as http;
import 'dart:convert';
import './news.dart';

void main() => runApp(const MyApp());

class MyApp extends StatelessWidget {
  const MyApp({super.key});

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'News List App',
      theme: ThemeData(
        primarySwatch: Colors.indigo,
        scaffoldBackgroundColor: const Color(0xFFF3F4F6), // Light background
        appBarTheme: const AppBarTheme(
          color: Color(0xFF1E40AF), // Darker Indigo
        ),
        textTheme: const TextTheme(
          bodyMedium: TextStyle(color: Colors.black87, fontSize: 16),
          headlineMedium: TextStyle(
              color: Colors.black87, fontSize: 24, fontWeight: FontWeight.bold),
        ),
      ),
      home: const NewsListPage(),
    );
  }
}

class NewsListPage extends StatefulWidget {
  const NewsListPage({super.key});

  @override
  _NewsListPageState createState() => _NewsListPageState();
}

class _NewsListPageState extends State<NewsListPage> {
  late Future<List<News>> _newsFuture;
  TextEditingController _searchController = TextEditingController();

  @override
  void initState() {
    super.initState();
    _newsFuture = fetchNewsList();
  }

  Future<List<News>> fetchNewsList({String query = "tesla"}) async {
    final uri = Uri.parse(
                                        "https://newsapi.org/v2/everything?q=$query&from=2024-12-
05&sortBy=publishedAt&apiKey=2764460cb029438fb103a3270d3f67fb");
    final response = await http.get(uri);

    if (response.statusCode == 200) {
      final jsonData = json.decode(response.body);
      final newsList =
          jsonData['articles'] as List; // Assuming articles is a list
      return newsList.map((newsJson) => News.fromJson(newsJson)).toList();
    } else {
      throw Exception('Failed to load news');
    }
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: const Text('News Articles'),
        actions: [
          Padding(
            padding: const EdgeInsets.all(8.0),
            child: IconButton(
              icon: const Icon(Icons.search, color: Colors.white),
              onPressed: () {
                setState(() {
```

```
              _newsFuture = fetchNewsList(query: _searchController.text);
            });
          },
        ),
      ),
    ],
  ),
  body: Column(
    children: [
      Padding(
        padding: const EdgeInsets.all(8.0),
        child: TextField(
          controller: _searchController,
          decoration: const InputDecoration(
            hintText: "Search for news...",
            border: OutlineInputBorder(),
            prefixIcon: Icon(Icons.search),
          ),
        ),
      ),
      Expanded(
        child: FutureBuilder<List<News>>(
          future: _newsFuture,
          builder: (context, snapshot) {
            if (snapshot.connectionState == ConnectionState.waiting) {
              return const Center(child: CircularProgressIndicator());
            } else if (snapshot.hasError) {
              return Center(child: Text('Error: ${snapshot.error}'));
            } else if (snapshot.hasData) {
              final newsList = snapshot.data!;
              return SingleChildScrollView(
                scrollDirection: Axis.horizontal,
                child: Row(
                  children: newsList.map((news) {
                    return Padding(
                      padding: const EdgeInsets.all(8.0),
                      child: Container(
                        width: 300, // Fixed width for each news item
                        decoration: BoxDecoration(
                          color: Colors.indigo[300], // Light Indigo
                          borderRadius: BorderRadius.circular(12),
                          boxShadow: [
                            BoxShadow(
                              color: Colors.indigo[200]!.withOpacity(0.5),
                              spreadRadius: 1,
                              blurRadius: 5,
                              offset: const Offset(0, 3),
                            ),
                          ],
                        ),
                        child: InkWell(
                          onTap: () {
                            Navigator.push(
                              context,
                              MaterialPageRoute(
                                builder: (context) =>
                                    NewsDetailsPage(news: news),
                              ),
                            );
                          },
                          child: Column(
                            mainAxisAlignment: MainAxisAlignment.start,
                            children: [
                              Padding(
                                padding: const EdgeInsets.all(8.0),
                                child: Text(
                                  news.title,
                                  style: const TextStyle(
                                    color: Colors.white,
                                    fontSize: 18,
                                    fontWeight: FontWeight.bold,
                                  ),
                                  maxLines: 2,
                                  overflow: TextOverflow.ellipsis,
                                ),
                              ),
                              news.imageUrl.isNotEmpty
                                  ? ClipRRect(
                                      borderRadius:
                                          BorderRadius.circular(10.0),
                                      child: Image.network(
                                        news.imageUrl,
                                        width: 200,
                                        height: 300,
                                        fit: BoxFit.cover,
                                      ),
                                    )
                                  : const Icon(Icons.image,
                                                            size: 200, color: Colors.white),
                                                        Padding(
                                                          padding: const EdgeInsets.all(8.0),
                                                          child: Text(
                                                            news.description,
                                                            style: const TextStyle(
                                                              color: Colors.white,
                                                              fontSize: 14,
                                                            ),
                                                            maxLines: 10,
                                                            overflow: TextOverflow.ellipsis,
                                                          ),
                                                        ),
                                                      ],
                                                    ),
                                                  ),
                                                ),
                                              );
                                            }).toList(),
                                          ),
                                        );
                                      } else {
                                        return const Center(child: Text('No news available'));
                                      }
                                    },
                                  ),
                                ),
                              ],
                            ),
                          );
                      }
}

class NewsDetailsPage extends StatelessWidget {
  final News news;

  const NewsDetailsPage({super.key, required this.news});

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text(
          news.title,
                          maxLines: 1, // Truncating title in AppBar if too long
                          overflow: TextOverflow.ellipsis,
                          style: const TextStyle(color: Colors.white),
                        ),
                        backgroundColor: const Color(0xFF1E3A8A), // Dark Blue
                      ),
                      body: SingleChildScrollView(
                        padding: const EdgeInsets.all(16.0),
                        child: Column(
                          crossAxisAlignment: CrossAxisAlignment.start,
                          children: [
                            if (news.imageUrl.isNotEmpty)
                              ClipRRect(
                                borderRadius: BorderRadius.circular(8.0),
                                child: Image.network(
                                  news.imageUrl,
                                  width: double.infinity,
                                  height: 200,
                                  fit: BoxFit.cover,
                                ),
                              )
                            else
                              const Icon(Icons.image, size: 200, color: Colors.grey),

                            const SizedBox(height: 16.0),

                            // Title
                            Text(
                              news.title,
                              style: const TextStyle(
                                fontSize: 24,
                                fontWeight: FontWeight.bold,
                                color: Colors.black87,
                              ),
                            ),

                            const SizedBox(height: 8.0),

                            // Description
                            Text(
                              news.description,
                              style: const TextStyle(
                                fontSize: 16,
                                color: Colors.black54,
                              ),
                            ),

                            const SizedBox(height: 16.0),

                            // Full Content
                            Text(
                              news.content,
                              style: const TextStyle(
                                fontSize: 14,
                                color: Colors.black87,
                              ),
                            ),
                          ],
                        ),
                      ),
                    );
                  }
                }
```

News.dart

```
class News {
  final String title;
  final String description;
  final String content;
  final String imageUrl;
  final String sourceUrl;

  // Constructor
  News({
    required this.title,
    required this.description,
    required this.content,
    required this.imageUrl,
    required this.sourceUrl,
  });

  // Factory constructor to create a News object from JSON with null checks
  factory News.fromJson(Map<String, dynamic> json) {
    return News(
      title: json['title'] ?? 'No title available',
      description: json['description'] ?? "No description available",
      content: json['content'] ?? 'No content available',
    imageUrl: json['urlToImage'] ?? '', // Empty string if no image URL
    sourceUrl: json['url'] ?? '', // Empty string if no source URL
   );
  }

  // Method to convert a News object to JSON
  Map<String, dynamic> toJson() => {
      'title': title,
      'description': description,
      'content': content,
      'image_url': imageUrl,
      'source_url': sourceUrl,
     };
}
```

Ott app :

Main.dart:

```
import 'package:flutter/material.dart';
import 'movie_details.dart';

void main() {
  runApp(MyApp());
}

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'OTT App',
      theme: ThemeData(primarySwatch: Colors.blue),
      home: MovieListScreen(),
    );
  }
}

final List<Map<String, dynamic>> movies = [
  {
    'id': 1,
    'title': 'Inception',
    'description':
        'A thief with the ability to enter dreams takes on a final job.',
    'rating': 8.8,
    'image':
        'https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQovCe0H45fWwAtV31ajOdXRPTxSsMQgPIQ3lcZX_mAW0jXV3kH',
    'video': 'https://www.youtube.com/watch?v=YoHD9XEInc0',
  },
  {
    'id': 2,
    'title': 'The Matrix',
    'description': 'A computer hacker learns about the true nature of reality.',
    'rating': 8.7,
    'image':
        'https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcR5DoFtShSmClflZ0RzBj9JBMweU5IUVBCeEbbLeV2XPlCnTKNi',
    'video': 'https://www.youtube.com/watch?v=vKQi3bBA1y8',
  },
  {
    'id': 3,
    'title': 'Interstellar',
    'description': 'A journey beyond the stars to save humanity.',
    'rating': 8.6,
    'image':
        'https://upload.wikimedia.org/wikipedia/en/b/bc/Interstellar_film_poster.jpg',
    'video': 'https://www.youtube.com/watch?v=zSWdZVtXT7E',
  },
];

class MovieListScreen extends StatefulWidget {
  @override
  _MovieListScreenState createState() => _MovieListScreenState();
}

class _MovieListScreenState extends State<MovieListScreen> {
  List<Map<String, dynamic>> filteredMovies = movies;

  void filterMovies(String query) {
    setState(() {
      filteredMovies = movies
          .where((movie) =>
              movie['title'].toLowerCase().contains(query.toLowerCase()))
          .toList();
    });
```

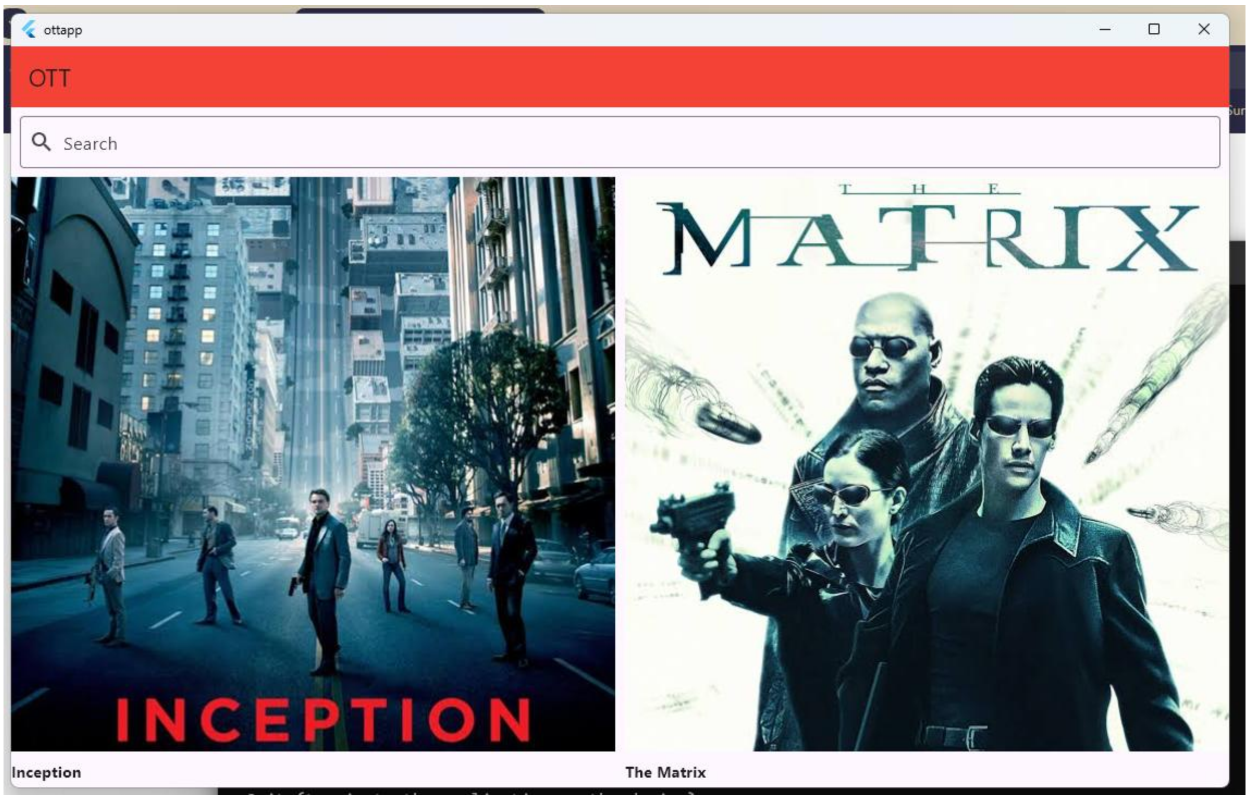
```
}

@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text('Netflix Clone'),
      backgroundColor: Colors.red,
    ),
    body: Column(
      children: [
        Padding(
          padding: const EdgeInsets.all(8.0),
          child: TextField(
            decoration: InputDecoration(
              labelText: 'Search',
              prefixIcon: Icon(Icons.search),
              border: OutlineInputBorder(),
            ),
            onChanged: filterMovies,
          ),
        ),
        Expanded(
          child: GridView.builder(
            gridDelegate: SliverGridDelegateWithFixedCrossAxisCount(
              crossAxisCount: 2,
              crossAxisSpacing: 8,
              mainAxisSpacing: 8,
            ),
            itemCount: filteredMovies.length,
            itemBuilder: (context, index) {
              final movie = filteredMovies[index];
              return GestureDetector(
                onTap: () {
                  Navigator.push(
                    context,
                    MaterialPageRoute(
                      builder: (context) => MovieDetailsScreen(movie: movie),
                    ),
                  );
                },
                child: Column(
                  crossAxisAlignment: CrossAxisAlignment.start,
                  children: [
                    Expanded(
                      child: Image.network(
                        movie['image'],
                        fit: BoxFit.cover,
                        width: double.infinity,
                      ),
                    ),
                    Padding(
                      padding: const EdgeInsets.only(top: 8.0),
                      child: Text(
                        movie['title'],
                        style: TextStyle(fontWeight: FontWeight.bold),
                        overflow: TextOverflow.ellipsis,
                      ),
                    ),
                  ],
                ),
              );
            },
          ),
        ),
      ],
    ),
  );
  }
}
```

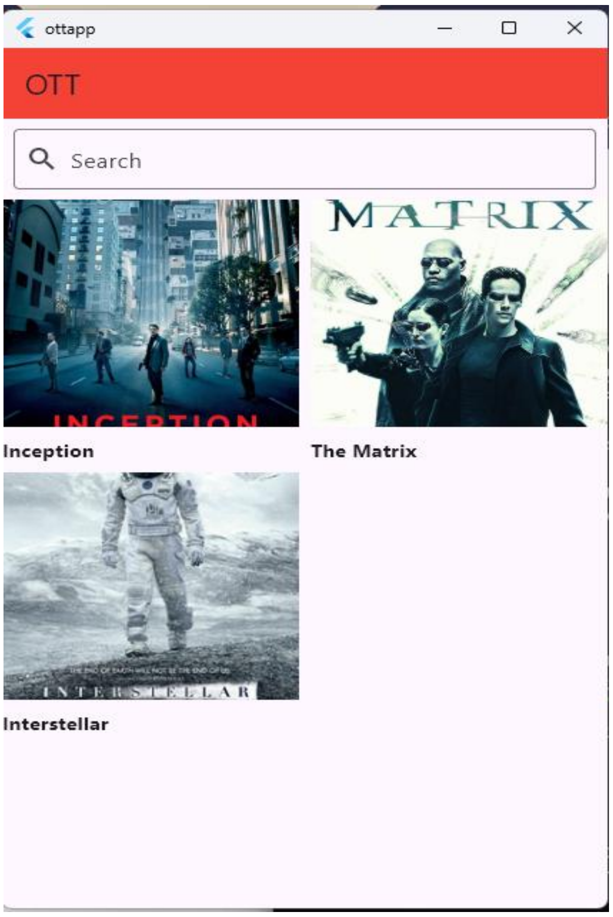
movie_details.dart

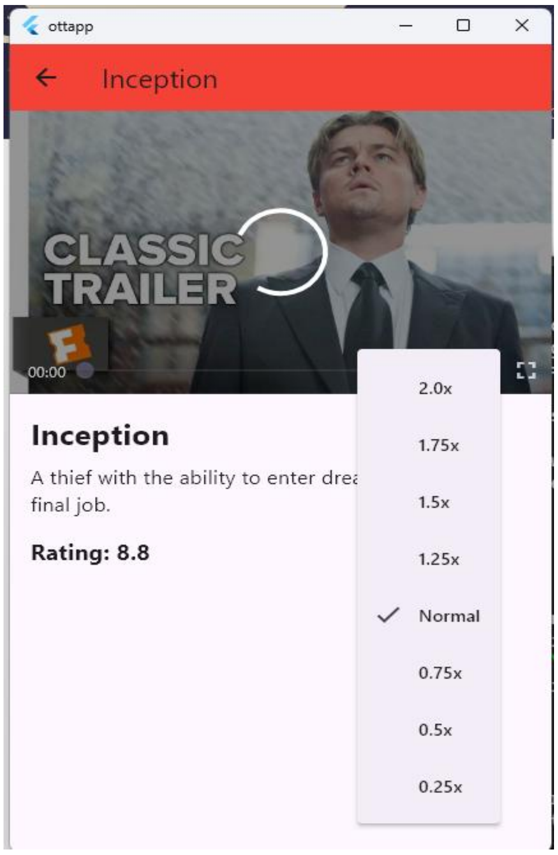
```
import 'package:flutter/material.dart';
import 'package:youtube_player_flutter/youtube_player_flutter.dart';

class MovieDetailsScreen extends StatefulWidget {
  final Map<String, dynamic> movie;

  MovieDetailsScreen({required this.movie});

  @override
  _MovieDetailsScreenState createState() => _MovieDetailsScreenState();
}

class _MovieDetailsScreenState extends State<MovieDetailsScreen> {
  late YoutubePlayerController _controller;

  @override
```

```
void initState() {
  super.initState();
  _controller = YoutubePlayerController(
    initialVideoId: YoutubePlayer.convertUrlToId(widget.movie['video'])!,
    flags: YoutubePlayerFlags(
      autoPlay: false,
      mute: false,
    ),
  );
}

@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text(widget.movie['title']),
      backgroundColor: Colors.red,
    ),
    body: SingleChildScrollView(
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          YoutubePlayer(controller: _controller),
          Padding(
            padding: const EdgeInsets.all(16.0),
            child: Column(
              crossAxisAlignment: CrossAxisAlignment.start,
              children: [
                Text(
                  widget.movie['title'],
                  style: TextStyle(fontSize: 24, fontWeight: FontWeight.bold),
                ),
                SizedBox(height: 8),
                Text(
                  widget.movie['description'],
                  style: TextStyle(fontSize: 16),
                ),
                SizedBox(height: 16),
                Text(
                  'Rating: ${widget.movie['rating']}',
                  style: TextStyle(fontSize: 18, fontWeight: FontWeight.bold),
                ),
              ],
            ),
          ),
        ],
      ),
    ),
  );
  }

  @override
  void dispose() {
    _controller.dispose();
    super.dispose();
  }
}
```

OUTPUT:



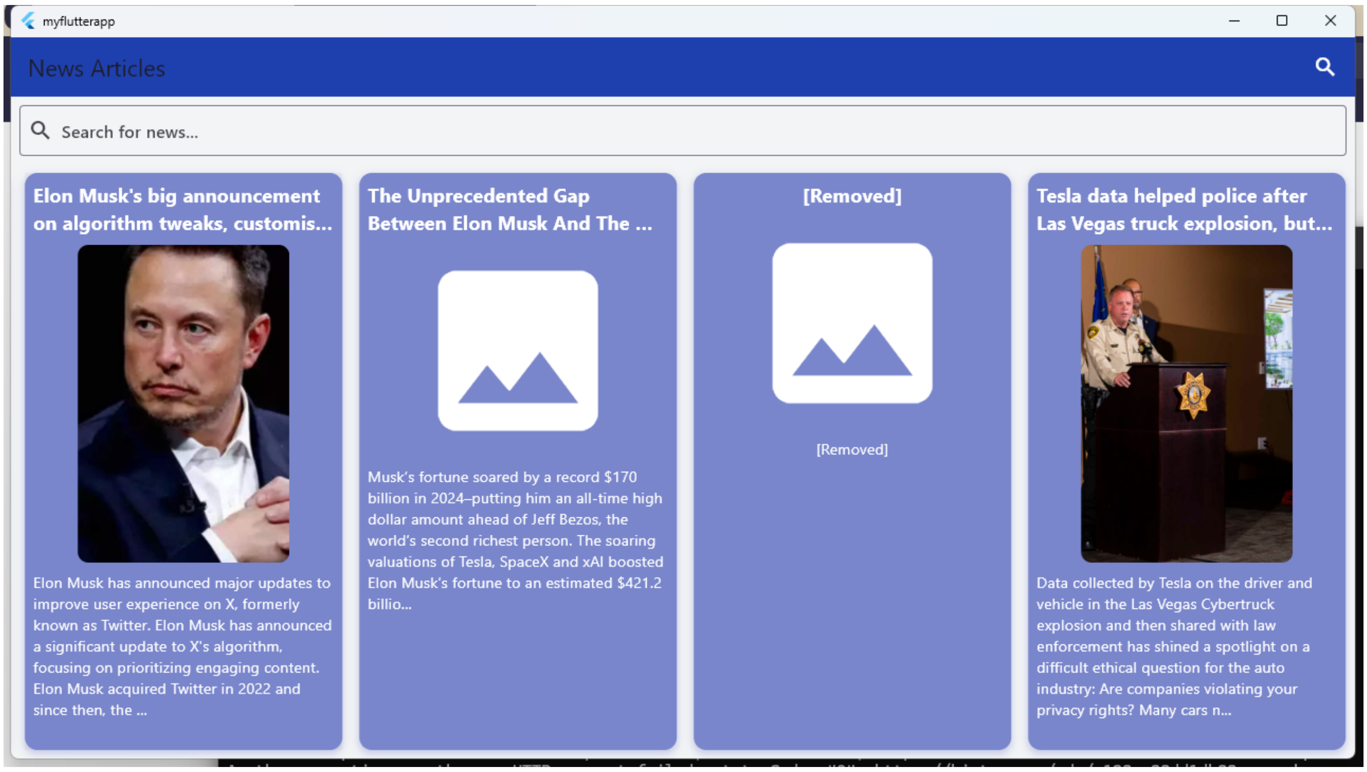




Inception

A thief with the ability to enter drea
final job.

Rating: 8.8



Elon Musk's big announcement on algorithm tweaks, customis...

Elon Musk has announced major updates to improve user experience on X, formerly known as Twitter. Elon Musk has announced a significant update to X's algorithm, focusing on prioritizing engaging content. Elon Musk acquired Twitter in 2022 and since then, the ...

The Unprecedented Gap Between Elon Musk And The ...

Musk's fortune soared by a record $170 billion in 2024–putting him an all-time high dollar amount ahead of Jeff Bezos, the world's second richest person. The soaring valuations of Tesla, SpaceX and xAI boosted Elon Musk's fortune to an estimated $421.2 billio...

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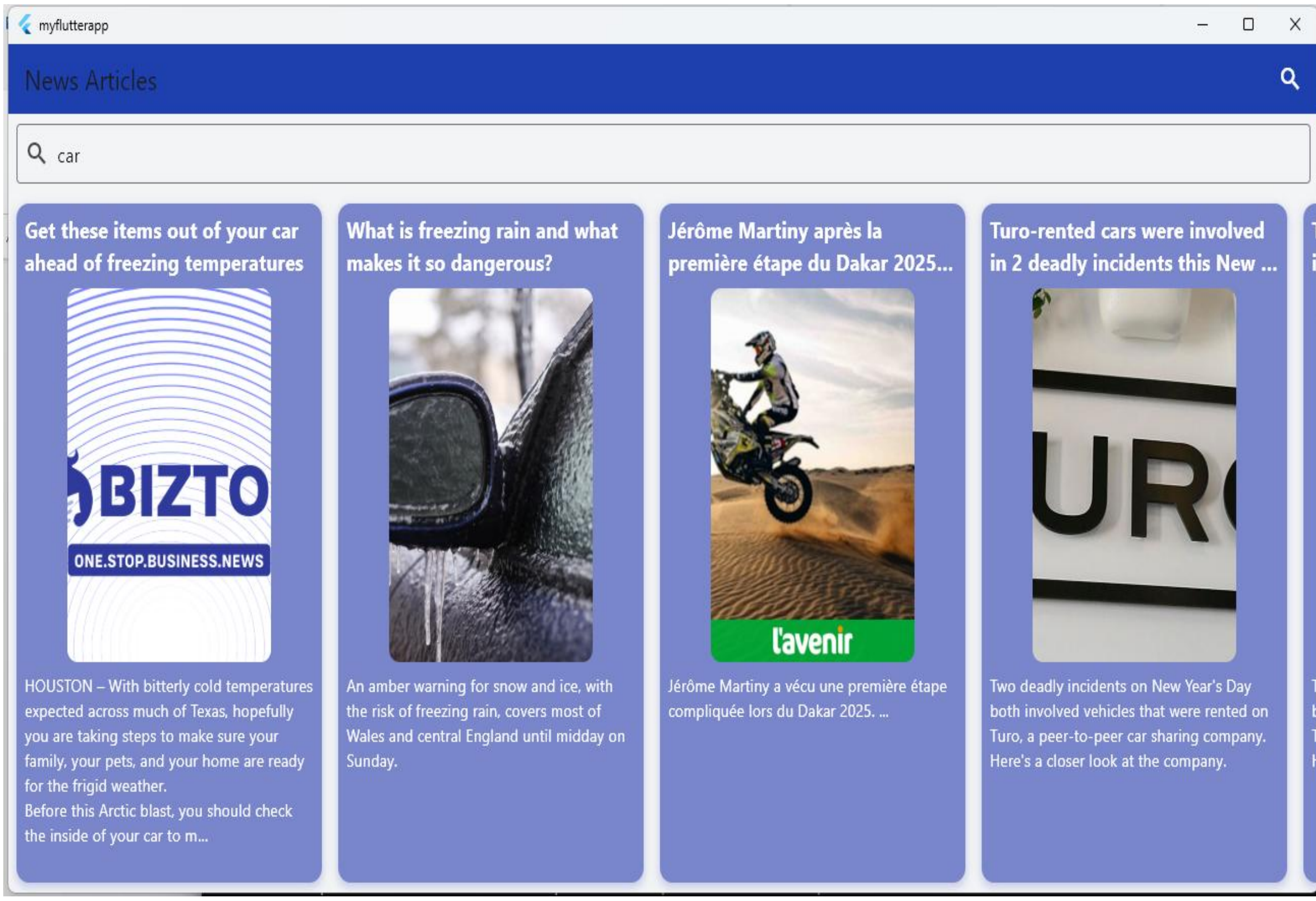
Tesla data helped police after Las Vegas truck explosion, but...

Data collected by Tesla on the driver and vehicle in the Las Vegas Cybertruck explosion and then shared with law enforcement has shined a spotlight on a difficult ethical question for the auto industry: Are companies violating your privacy rights? Many cars n...



Get these items out of your car ahead of freezing temperatures

HOUSTON – With bitterly cold temperatures expected across much of Texas, hopefully you are taking steps to make sure your family, your pets, and your home are ready for the frigid weather.
Before this Arctic blast, you should check the inside of your car to m...

What is freezing rain and what makes it so dangerous?

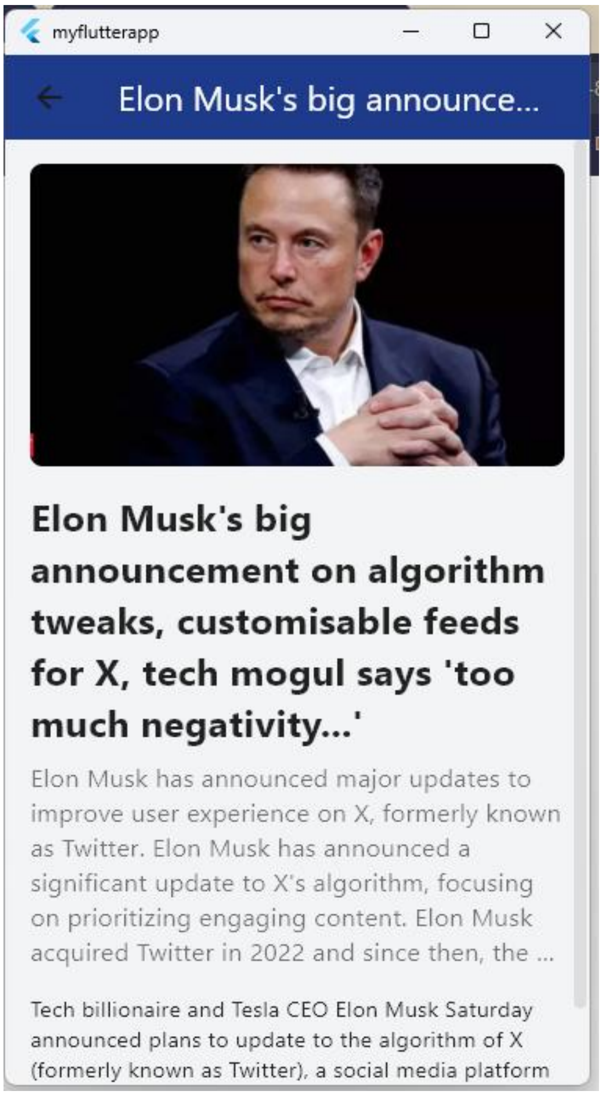
An amber warning for snow and ice, with the risk of freezing rain, covers most of Wales and central England until midday on Sunday.

Jérôme Martiny après la première étape du Dakar 2025...

Jérôme Martiny a vécu une première étape compliquée lors du Dakar 2025. ...

Turo-rented cars were involved in 2 deadly incidents this New ...

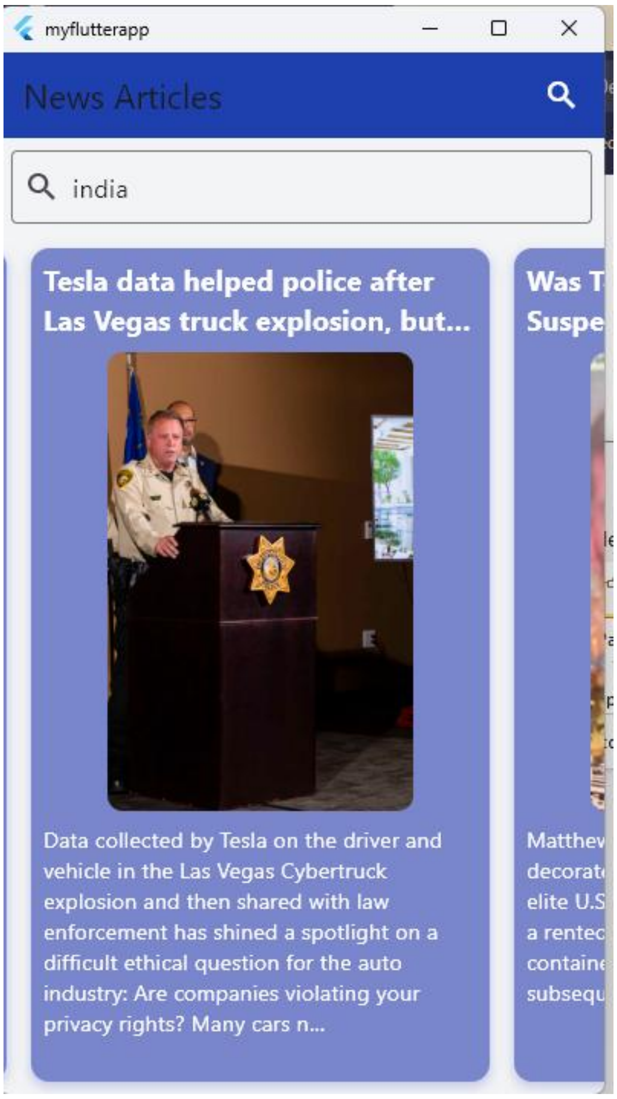
Two deadly incidents on New Year's Day both involved vehicles that were rented on Turo, a peer-to-peer car sharing company. Here's a closer look at the company.



Elon Musk's big announcement on algorithm tweaks, customisable feeds for X, tech mogul says 'too much negativity...'

Elon Musk has announced major updates to improve user experience on X, formerly known as Twitter. Elon Musk has announced a significant update to X's algorithm, focusing on prioritizing engaging content. Elon Musk acquired Twitter in 2022 and since then, the ...

Tech billionaire and Tesla CEO Elon Musk Saturday announced plans to update to the algorithm of X (formerly known as Twitter), a social media platform



Tesla data helped police after Las Vegas truck explosion, but...

Data collected by Tesla on the driver and vehicle in the Las Vegas Cybertruck explosion and then shared with law enforcement has shined a spotlight on a difficult ethical question for the auto industry: Are companies violating your privacy rights? Many cars n...

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Learning Outcomes

1. State Management:
   - Understanding StatefulWidget for creating dynamic and interactive UI components.
   - Using factory constructors to create reusable and efficient widgets.
2. Networking:
   - Performing HTTP GET requests to interact with REST APIs and manage external data.
3. Scrollable Widgets:
   - Implementing SingleChildScrollView for single scrollable views.
   - Using ListView for creating efficient, scrollable lists.
4. Routing and Navigation:
   - Creating routes using Navigator and MaterialPageRoute.
   - Managing navigation stack efficiently in multi-page applications.
5. Multimedia Integration:
   - Embedding and controlling YouTube videos using controllers.
6. Custom UI Creation:
   - Using CustomScrollView for building complex, scrollable layouts.
   - Implementing GridView for grid-based layouts.
7. Future and Stream Management:
   - Using FutureBuilder and StreamBuilder for asynchronous data handling.
8. Latest Flutter Applications:
   - Logistics apps with dynamic routing and inventory management.
   - Educational apps with interactive scrollable lists and multimedia embedding.
   - Social media apps with video playback features.
   - E-commerce apps with grid-based product layouts.

Latest Applications

1. E-Commerce Application

- Displaying products using GridView and ListView.
- Fetching product details via HTTP GET requests.
- Interactive navigation between product categories using routes.

2. Video Streaming App

- Embedding YouTube videos using youtube_player_flutter.
- Displaying video lists dynamically using ListView.

3. Social Networking Platform

- Integrating scrollable posts feed (ListView or CustomScrollView).
- Implementing user-generated video content using YouTube controllers.

4. Dashboard or Management App

- Using ListView or GridView for displaying user tasks or inventory.
- Fetching data and updates dynamically from a backend.