

Mifos Pay: Designing a Modular Multi-Method Payments & Auto-Pay System

Modular, scalable, and user-friendly mobile wallet payments

C4GT Endpoint Showcase 2025 | Biplab Dutta

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What is the Mifos Initiative?

Open Source for Financial Inclusion

Mifos stands for **Microfinance Open Source** — an open-source initiative started to support microfinance institutions.

Today, Mifos powers inclusive digital financial services across **40+ countries**.



It supports **microfinance institutions, fintechs, digital banks, and cooperatives**.

Backed by a global community of **developers, implementers, and financial inclusion advocates**.

Mission

"To create a world of 3 billion Maries — where everyone has access to the financial tools they need to create a better life."



<https://mifos.org/>



Mifos Initiative



The Mifos Tech Stack (and Apache Fineract)

Core Components & Key Applications

Core Components

Apache Fineract – Core banking engine (donated to Apache).

Mifos X – Modular platform built on top of Fineract.

Mifos PHEE - Core payments orchestration layer.

Key Applications

Field Officer App – For field staff; now being migrated to **Kotlin Multiplatform**.

Mifos Pay App – Reference wallet & merchant payments.

Mobile Banking App – For customers to access account, loans, and services.



Apache Fineract



<https://mifos.org/>

Motivation & Objective



Current Limitation: Mobile wallet could only process payments for Fineract clients.



Opportunity: Enable payments for any user, supporting multiple payment methods (UPI, bank transfers, AutoPay).

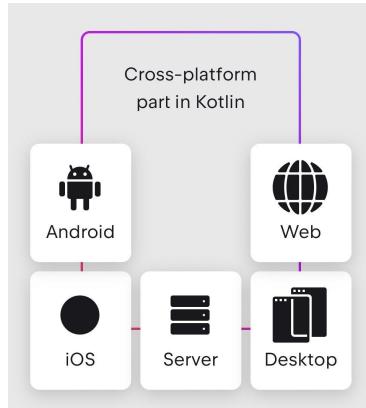
Objective: Build a modular, multi-method payment system that is:

- Extensible – easy to add new payment methods and integrations.
- Maintainable – clean, interface-based architecture.
- User-friendly – consistent UI/UX across flows.

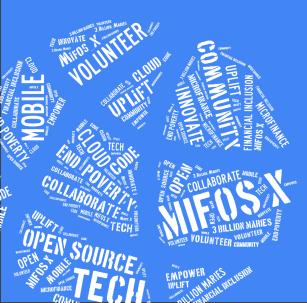


Kotlin & Compose Multiplatform

One Codebase → Many Platforms?



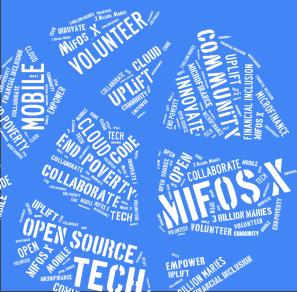
Goal: reuse core business logic and UI everywhere with Kotlin Multiplatform (KMP) + Compose Multiplatform (CMP)



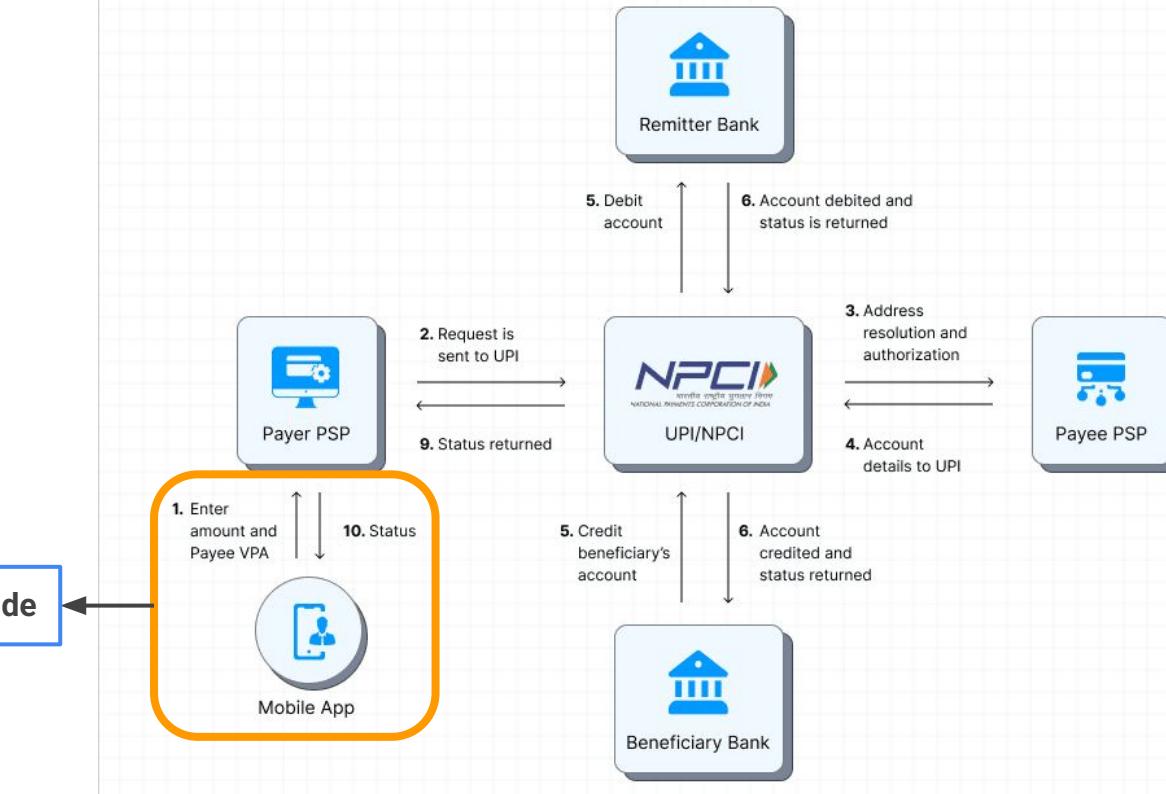
Project Overview



- **Mifos Pay Mobile Wallet:** Features under development
 - **UPI Payments:** Scan & Pay to UPI ID, Pay Anyone
 - **Bank Transfers:** To self & others
 - **AutoPay:** Recurring payments
- **Modular Approach:** KMP modules for cross-platform reusability.
- **Backend Integration:** Mifos PHEE + Fineract + PSP UPI APIs



UPI Payments Overview

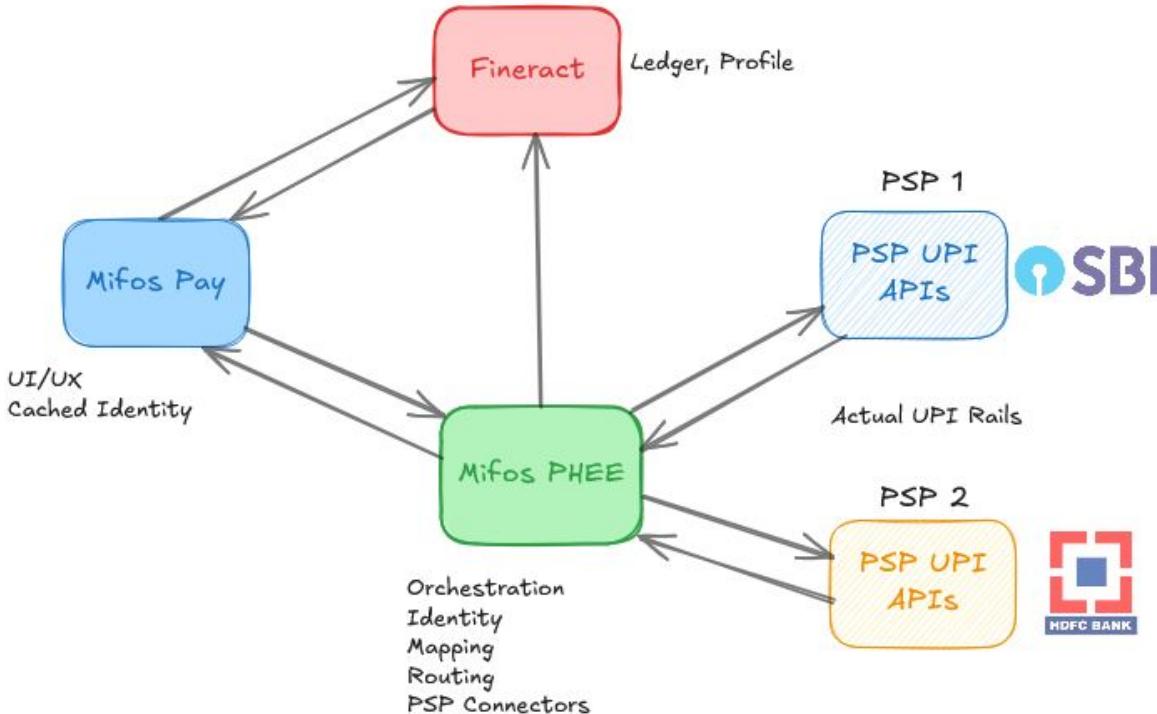
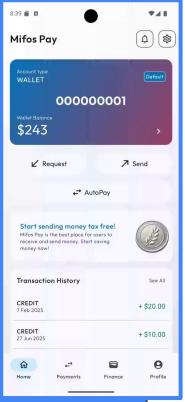


Next Slide

UPI Payments Overview



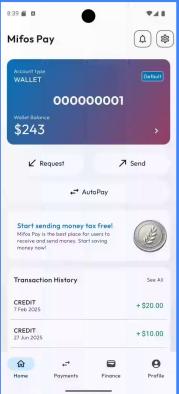
Mifos Initiative



Mobile Wallet Architecture



Overview



Pattern

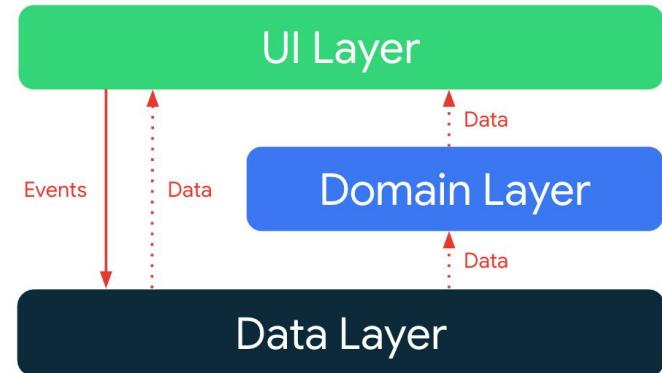
- Clean MVVM + UDF
- Kotlin Multiplatform

Layers

- UI: Compose + ViewModels
- DI: Koin per feature
- Data: Repository, Flow
- Network: Ktor/Ktorfit
- Platform: Expect/ Actual

Modules

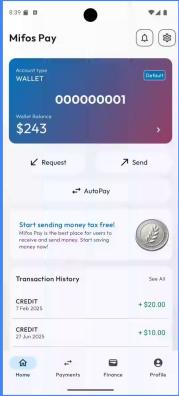
- Core, Feature, Platform



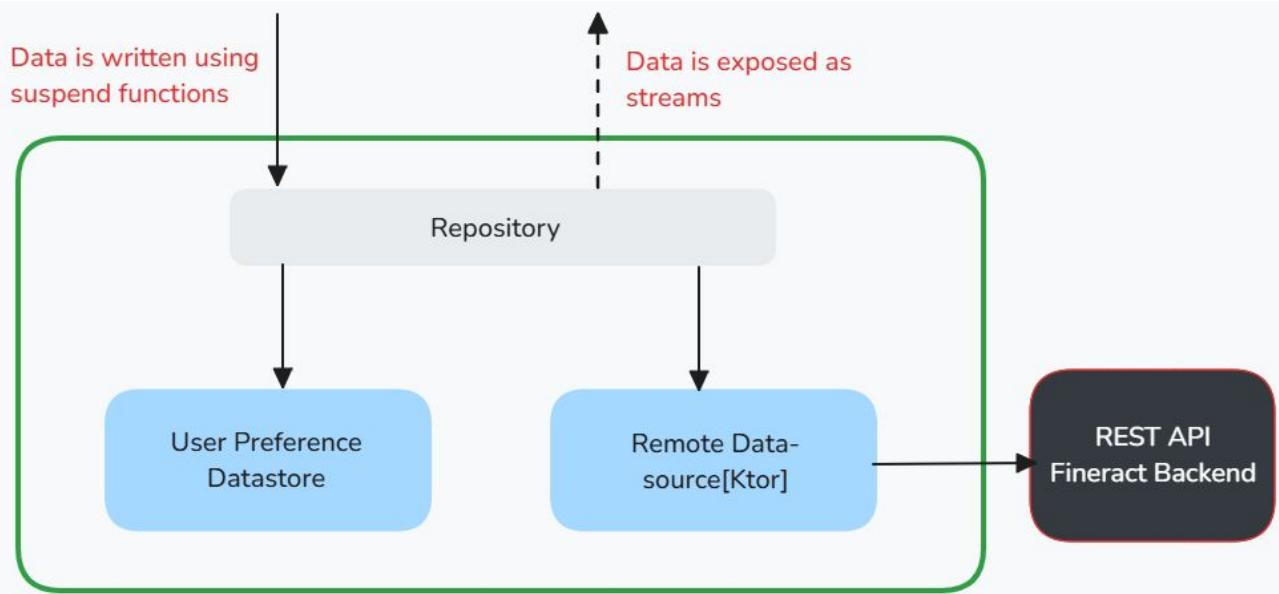
Mobile Wallet Architecture



Data Layer Overview



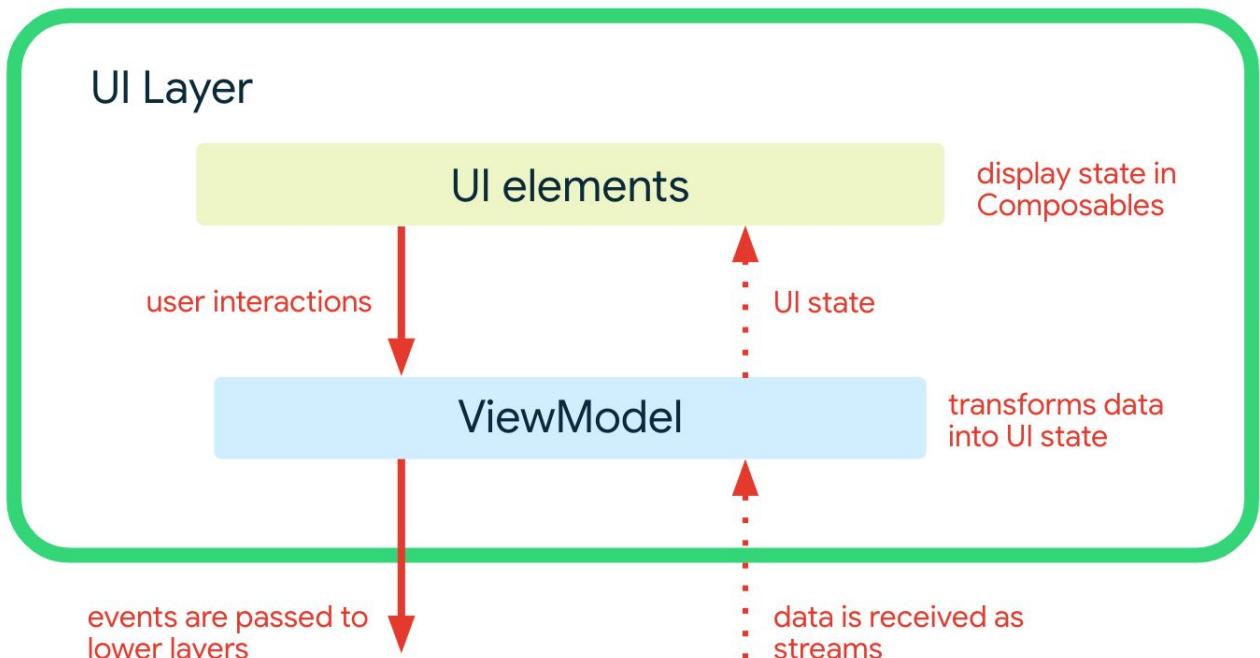
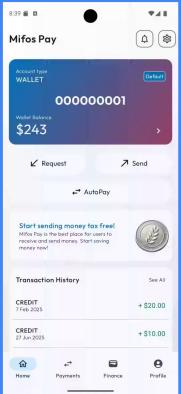
DATA LAYER



Mobile Wallet Architecture



UI Layer Overview



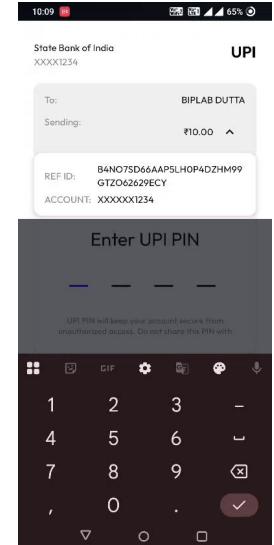
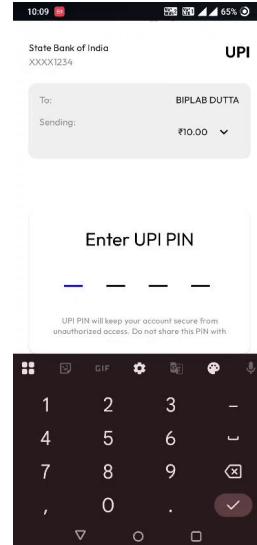
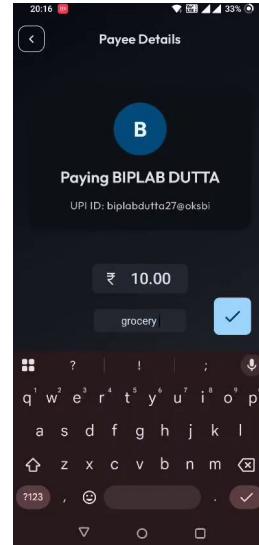
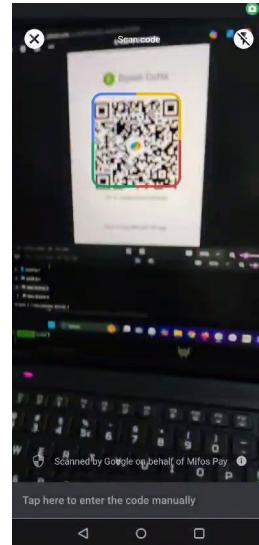
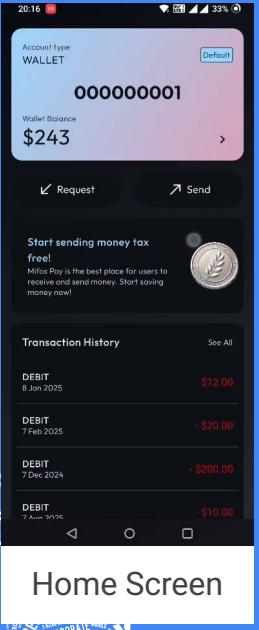
<https://developer.android.com>



UPI Payment Flow



Scan any QR code



Home Screen

Send Money
Options
Screen

Scan any QR
code Screen

Payee Details
Screen

UPI PIN Screen

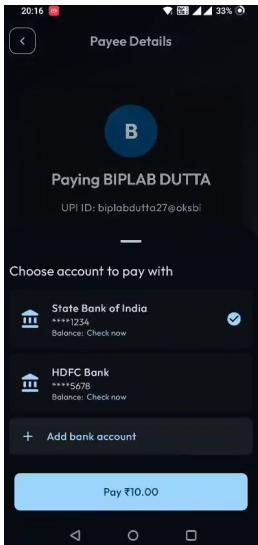
UPI PIN Screen
- REF ID &
Account

UPI Payment Flow

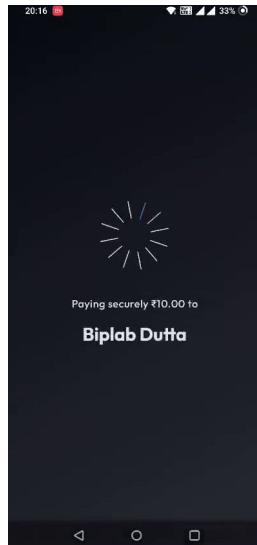
Scan any QR code



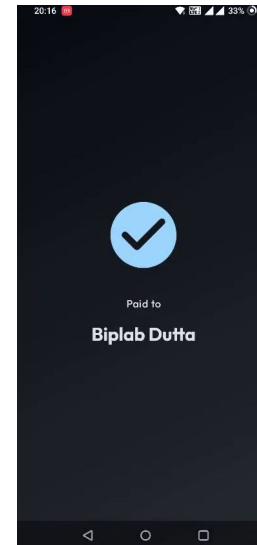
Payee Details
Screen with
Pay Button



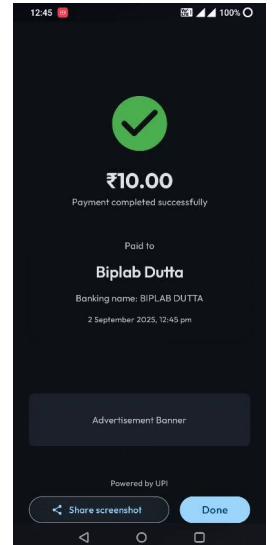
Choose
Account to Pay
with



Payment
Processing
Screen



Payment
Processing
Screen - Paid



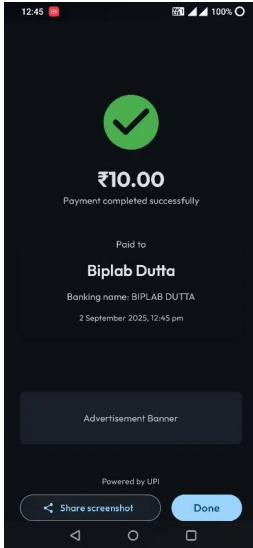
Payment
Success
Screen



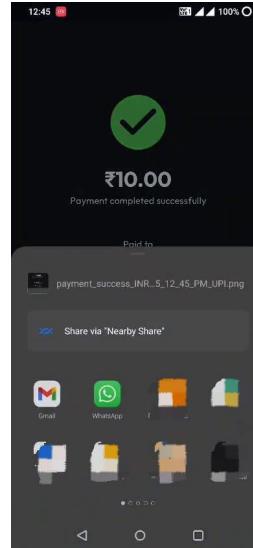
UPI Payment Flow



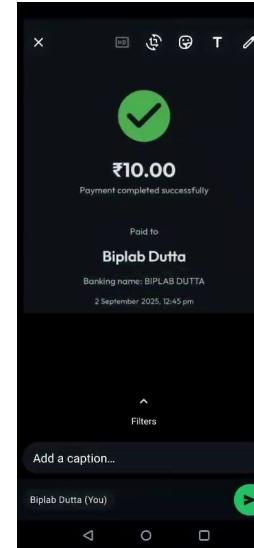
Payment Success, Share Screenshot



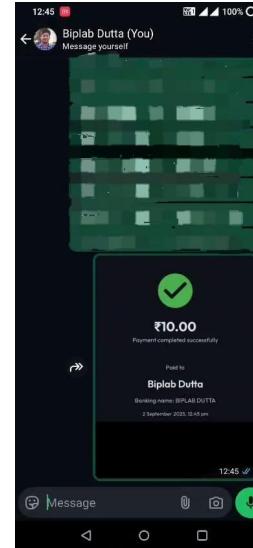
Payment Success Screen



Payment Details



WhatsApp Add Caption



WhatsApp Screenshot Sent



UPI Payments Flow



Payment Chat/History, Details, Share Screenshot

A screenshot of a mobile application interface showing payment options. It includes sections for "Send Money", "Choose how you want to send money", "People" (listing contacts like John Doe, Jane Smith, Mike Johnson, Sarah Williams), and "Merchants" (listing categories like Coffee Shop, Grocery Store, Restaurant, Gas Station). A large blue banner at the bottom says "Send Money Options".

9:14

Send Money

Choose how you want to send money

Scan any QR code Pay anyone Bank Transfer Fineract Payments

People

John Doe Jane Smith Mike Johnson Sarah Williams

Merchants

Coffee Shop Grocery Store Restaurant Gas Station

Send Money Options

A screenshot of a payment history screen. It shows a list of transactions: "Dinner payment ₹2,000.00" to Jane Smith (Paid - 26 Sep 2025), "Payment to You Movie tickets ₹750.00" (Paid - 26 Sep 2025), "Payment to Jane Lunch payment ₹1,500.00" (Paid - 27 Sep 2025), and "Payment to Jane Coffee and snacks ₹500.00" (Paid - 27 Sep 2025). A "Pay" button is at the bottom.

Payment/ Chat History

A screenshot of a payment details screen. It shows a summary: "₹1,500.00" (Lunch payment) from "HDFC Bank 1234" to "Jane Smith" (+91 98765 43210; jane.smith@upi). Below this, it shows "Payment Details" for the transaction, including UPI Transaction ID (123456789012), To (JANE SMITH), From (BIPLAB DUTTA (HDFC Bank)), and MifosPay Transaction ID (AB123456789012). It also indicates "Powered by UPI" and "Mifos Pay". A "Share Screenshot" button is at the bottom.

Payment Details

A screenshot of the bottom section of a payment details screen. It shows the same transaction summary and payment details as the previous screen. At the bottom, there is a "Completed" status indicator and a timestamp "27 Sept 2025, 2:30 PM".

Payment Details - bottom section

A screenshot of a timeline status screen for the same transaction. It shows three status points: "Payment Started", "Payment received by Jane Smith", and "Payment Completed". The timestamp is "27 Sept 2025, 2:30 PM".

Payment Details - Timeline Status

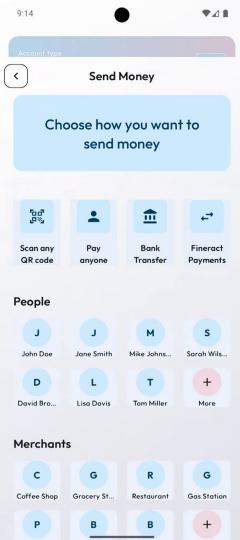
A screenshot of a share options screen for the payment details. It shows sharing icons for "Quick Share", "Print", "Drive", "Maps", and "Messages". A "No recommended people to share with" message is displayed.

Payment Details - Share Screenshot

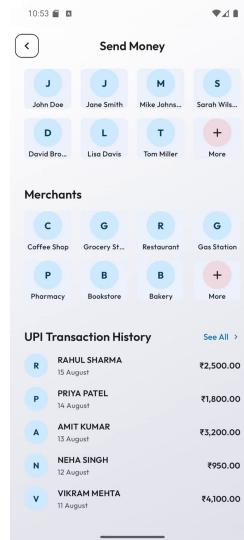
UPI Payment Flow



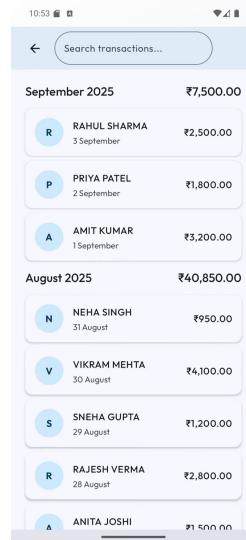
Transaction History



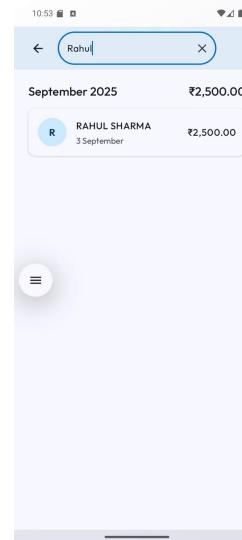
Send Money Options Screen



Send Money Options - UPI Transaction History



UPI Transaction History Screen



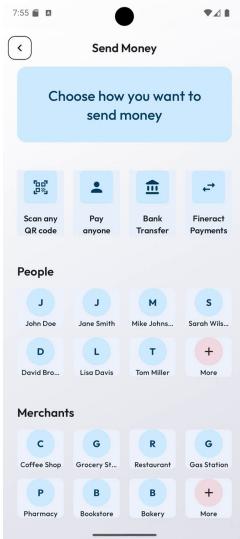
UPI Transaction History - Search

Navigate to
Payment
Details Screen

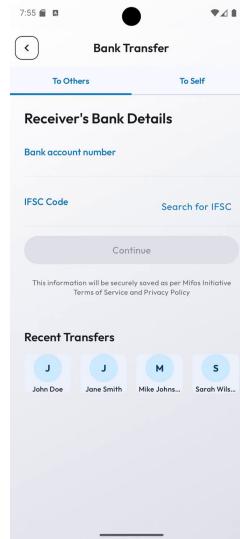
Bank Transfer Flow



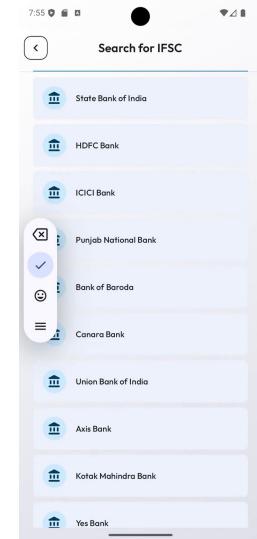
To Others



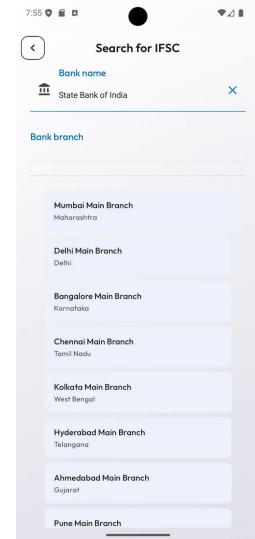
Send Money
Options
Screen



Bank Transfer
To Others
Screen



Search IFSC
Screen - Bank
Names List

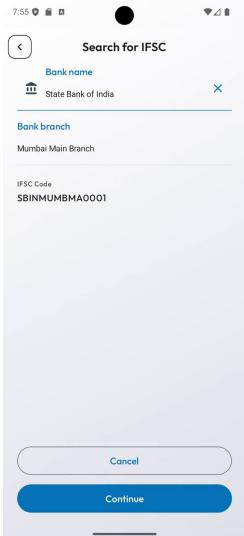


Search IFSC
Screen - Select
Branch Name



Bank Transfer Flow

To Others



7:55

Search for IFSC

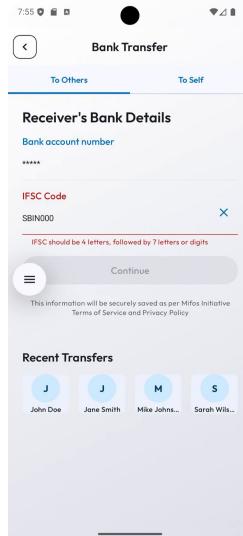
Bank name
State Bank of India

Bank branch
Mumbai Main Branch

IFSC Code
SBINMUMBMA0001

Cancel Continue

Search IFSC Screen



7:55

Bank Transfer

To Others To Self

Receiver's Bank Details

Bank account number

IFSC Code
SBIN000
SBIN should be 4 letters, followed by 7 letters or digits

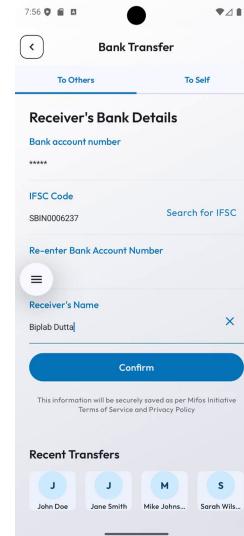
Continue

This information will be securely saved as per Mifos Initiative Terms of Service and Privacy Policy

Recent Transfers

J J M S
John Doe Jane Smith Mike Johns... Sarah Wil...

Bank Transfer -
To Others Screen



7:56

Bank Transfer

To Others To Self

Receiver's Bank Details

Bank account number

IFSC Code
SBIN0006237

Search for IFSC

Re-enter Bank Account Number

Receiver's Name
Biplob Dutta

Confirm

This information will be securely saved as per Mifos Initiative Terms of Service and Privacy Policy

Recent Transfers

J J M S
John Doe Jane Smith Mike Johns... Sarah Wil...

Bank Transfer -
Re-enter Bank
Details Screen

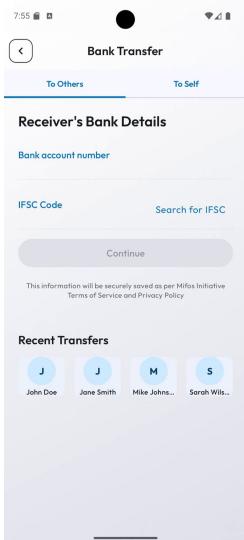
Navigate to Payee
Details Screen with
Relevant Parameters



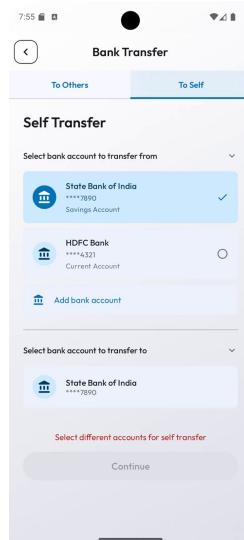
Bank Transfer Flow



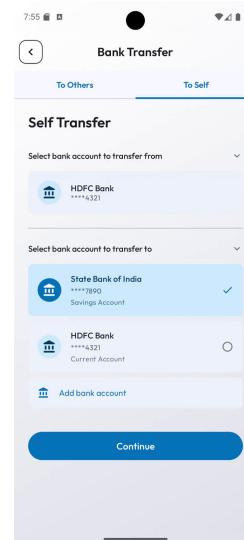
To Self



Bank Transfer
Screen



Bank Transfer
To Self Screen



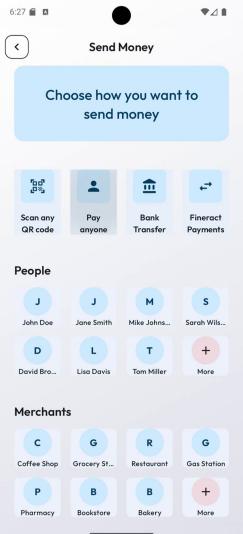
Bank Transfer
To Self Screen
- Select Bank
Accounts



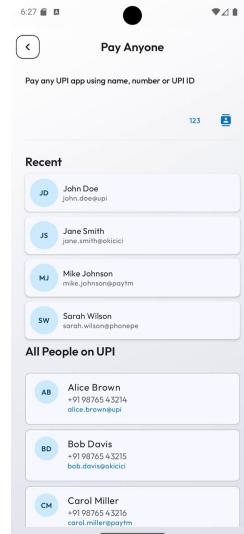
Navigate to Payee
Details Screen with
Relevant Parameters

Pay Anyone Flow

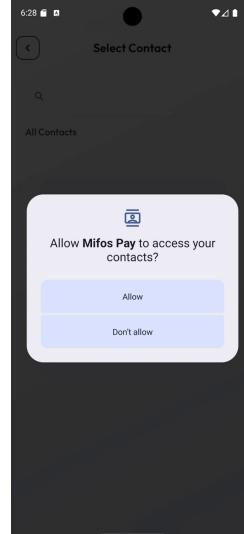
To UPI ID, Mobile Number, Name



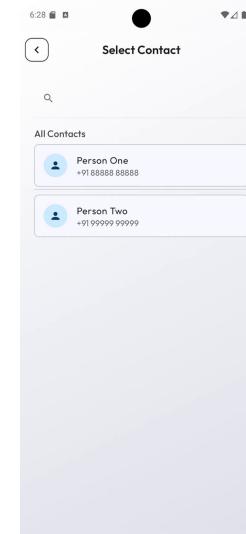
Send Money
Options
Screen



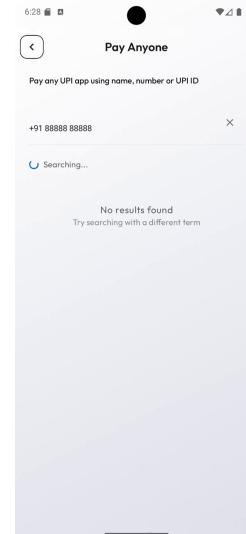
Pay Anyone
Screen



Contact
Screen - Contact
Picker Permission



Select Contact
Screen

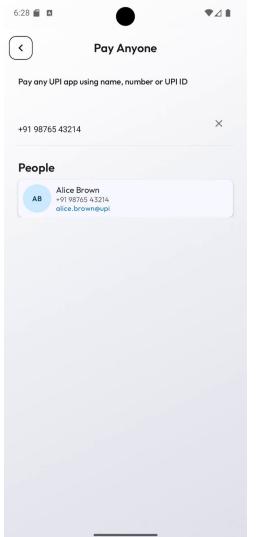


Pay Anyone
Screen -
Searching
Contact Picked

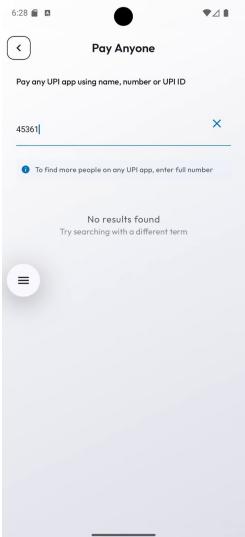


Pay Anyone Flow

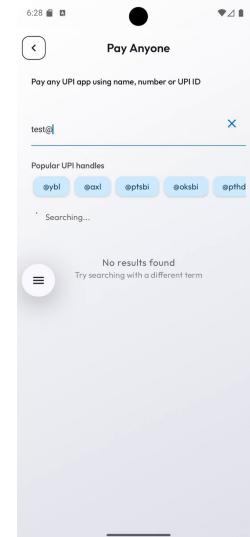
To UPI ID, Mobile Number, Name



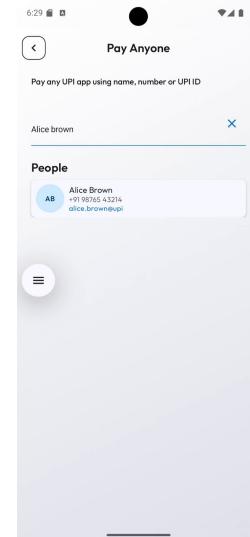
Pay Anyone
Screen - Search
using Phone
Number



Pay Anyone
Screen - Partial
Searches



Pay Anyone
Screen - Detect
UPI ID & Suggest
Handles



Pay Anyone
Screen -
Search using
Names

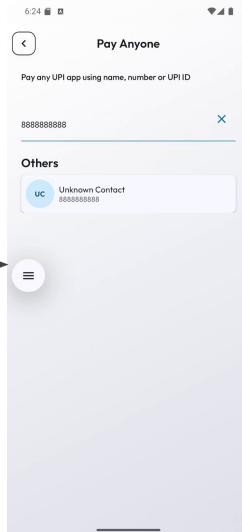
Navigate to
Payment/
Chat History

Pay Anyone Flow

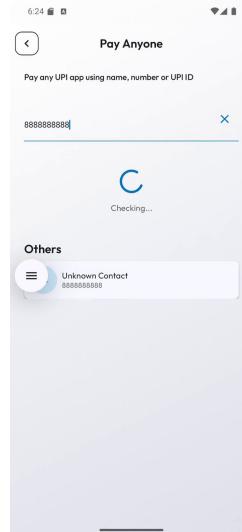
To UPI ID, Mobile Number, Name



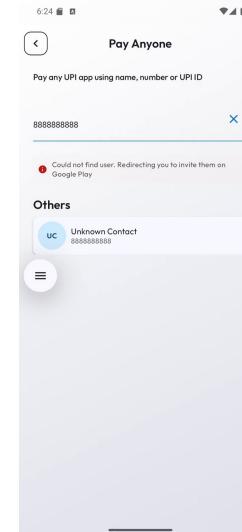
From Previous
Slide



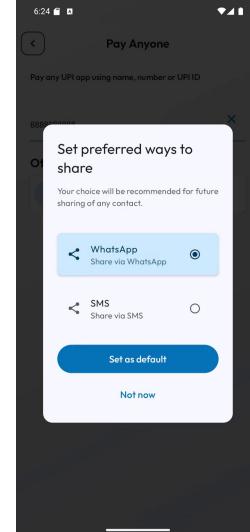
Pay Anyone
Screen - Search
using Phone
Number



Pay Anyone
Screen - Check
if Number
Available on UPI



Pay Anyone
Screen - Number Not
Found on UPI

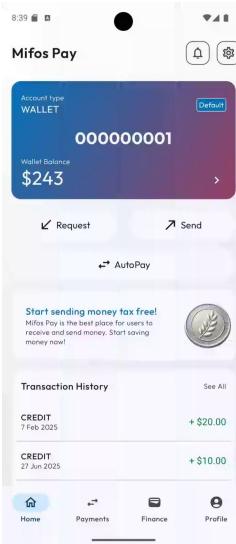


Pay Anyone
Screen - Share
Invite on SMS or
WhatsApp

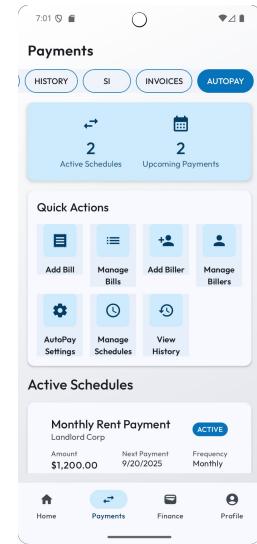


AutoPay

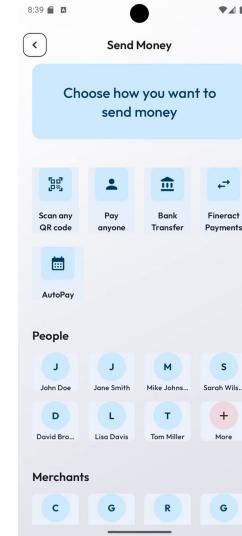
Navigation and Discovery



Home Screen -
AutoPay Option



Payments
Screen -
AutoPay Tab



Send Money
Options
Screen -
AutoPay Option



AutoPay Dashboard



The screenshot shows the AutoPay Dashboard. At the top, there are two counts: '2 Active Schedules' and '2 Upcoming Payments'. Below this, under 'Quick Actions', are four buttons: 'Add Bill' (with a plus icon), 'Manage Bills' (with a list icon), 'Add Biller' (with a person icon), and 'Manage Billers' (with a person icon). Under 'Active Schedules', there is a card for 'Monthly Rent Payment' from Landlord Corp, showing an amount of '\$1,200.00', a next payment date of '9/20/2025', and a frequency of 'Monthly'. This card has an 'ACTIVE' status indicator. Below it, another card is partially visible for 'Internet Bill' from NetConnect, also marked as 'ACTIVE'.

AutoPay Dashboard Screen

AutoPay Dashboard			
Last Month Summary			
Amount	\$1,200.00	Next Payment	2024-02-15
Frequency	Monthly		
Internet Bill			
NetConnect		ACTIVE	
Amount	\$89.99	Next Payment	2024-02-20
Frequency	Monthly		
Gym Membership			
FitLife Gym		PAUSED	
Amount	\$45.00	Next Payment	2024-02-25
Frequency	Monthly		
Upcoming Payments			
Monthly Rent Payment			UPCOMING
Landlord Corp			
Amount	\$1,200.00	Date Due	2024-02-15
Internet Bill			
NetConnect		UPCOMING	
Amount	\$89.99	Date Due	2024-02-20

Active Schedules, Upcoming Payments

8:39 AM

Schedule Details

\$1,200.00
per monthly

Schedule Information

Recipient
Landlord Corp

Account Number
*******1234**

Frequency
Monthly

Next Payment
2024-02-15

Payment Details

\$ Amount	\$1,200.00
Status	ACTIVE

Actions

Pause
 Edit

Cancel Schedule

Schedule Details Screen

8:40 AM

Add New Biller

Enter biller details to set up automatic payments

Biller Name *
biller one

Account Number *
10010101

Contact Number *
9999999999

Email (Optional)

Biller Category *
Internet & Cable

is (Optional)

Cancel **Save Biller**

Add Biller Screen

8:40 88% 🔋

My Billers

bill one
Account: 10010101
Internet & Cable

⋮

⋮

Edit

Delete

Back to AutoPay

Billers List Screen

AutoPay

Bills and Billers



8:40 8:40 Edit Biller

Update biller details

Biller Name *
biller one

Account Number *
10010101

Contact Number *
9999999998

Email (Optional)

Biller Category *
Internet & Cable

Address (Optional)

Cancel **Update Biller**

Edit Biller
Screen

7:12 7:12 Add New Bill

Enter bill details to set up automatic payments

Bill Name *
Tuition Fees

Select Biller *
test

Amount *
1000

Due Date *
10/1/2025

Recurrence Pattern *
Monthly

Description (Optional)

AutoPay Settings
Automatically pay this bill when due

Cancel **Save Bill**

Add Bill
Screen

8:41 8:41 Add New Bill

Sir

Amount *
1000

Due Date *
28-08-2025

Recurrence Pattern *
Monthly

Description (Optional)

Next Payment Dates:

28-08-2025
27-09-2025
27-10-2025
26-11-2025
26-12-2025

Cancel **Save Bill**

Add Bill
Screen - Filled
Details

7:10 7:10 Add New Bill

Monthly

Description (Optional)

AutoPay Settings
Automatically pay this bill when due

Payment Method *
Bank Account

Source Account *
1010101010

Maximum Amount Limit (Optional)
2000

This amount will be used as a safety limit for automatic payments

Next Payment Dates:

01-10-2025
31-10-2025

Cancel **Save Bill**

Add Bill
Screen - with
Autopay Enabled

7:13 7:13 Bill List

Tuition Fees test

Amount \$1,000.00 **Due Date** 10/1/2025 **Frequency** Monthly

AutoPay ACTIVE

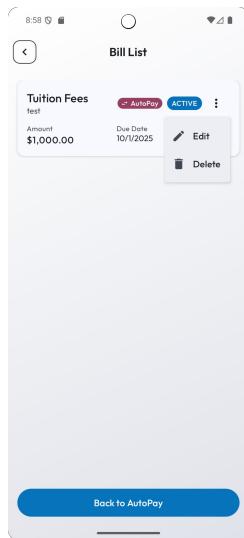
Cancel **Back to AutoPay**

Bills List
Screen

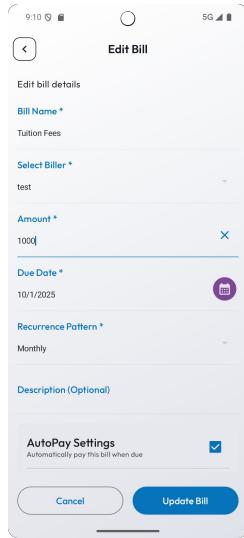


AutoPay

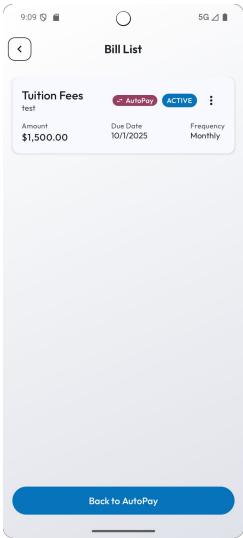
Bills and Billers



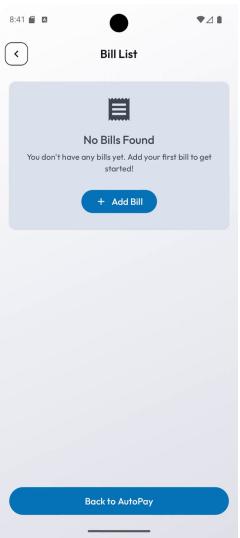
Bills List
Screen - Edit,
Delete Options



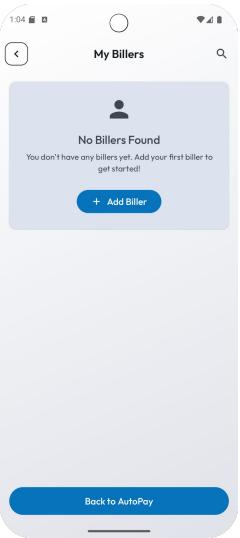
Edit Bill Screen



Bills List
Screen -
Updated Bill



Empty Bills
List Screen

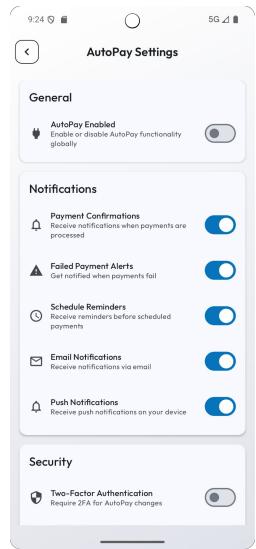


Empty Billers
List Screen

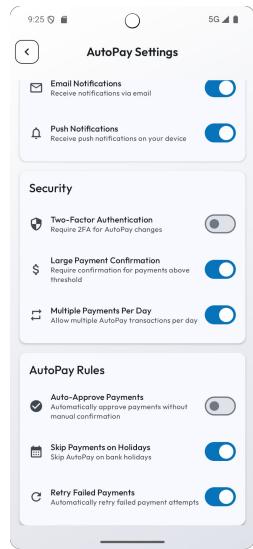


AutoPay

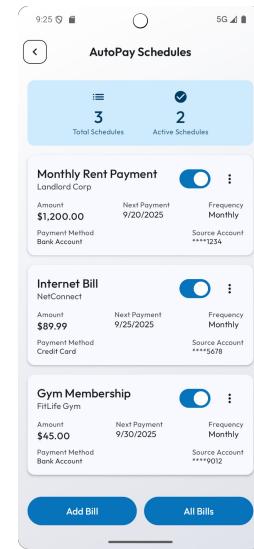
Schedules Management



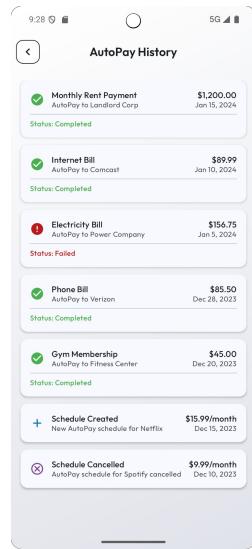
AutoPay
Settings
Screen



AutoPay
Settings
Screen -
scrolled down



AutoPay
Schedules
Management
Screen



AutoPay
History Screen



Reference Analysis

Learning from Industry Apps



- **Why?** To design intuitive and consistent payment flows in Mifos Pay.
 - **Approach:** Studied UPI flows in **GPay, PhonePe, and Paytm**.
 - **Key Takeaways Applied to Mifos Pay:**
 - **Navigation patterns** for Scan & Pay, Pay to UPI ID, Pay Anyone.
 - **Error handling & fallbacks** when input data & API data is missing or incomplete.
 - **UI/UX consistency** across different payment methods (UPI, Bank Transfers, AutoPay).
 - **Goal:** Provide an **open-source alternative** that adapts proven usability patterns, not a commercial competitor.



Next Steps



- Complete **backend integration** for UPI & AutoPay
- Implement local storage using Room DB
- Implement sync with remote when online
- Polish UI/UX across flows
- Add new payment methods (UPI-Lite, Tap & Pay etc.)
- Applied for **NPCI UPI sandbox** access – approval pending
- Implement security compliance for **NCPI certification**



Thank You



- Modular, multi-method payment system designed
 - Supports UPI, bank transfers, and AutoPay
 - Backend-agnostic frontend flows prepared for orchestration



Project Summary: bit.ly/mifos-c4gt-report



<https://github.com/biplab1>



www.linkedin.com/in/biplab26/