NITSHACKS 2024

North-east India's Most Premium Hackathon

\nits hacks 7.0

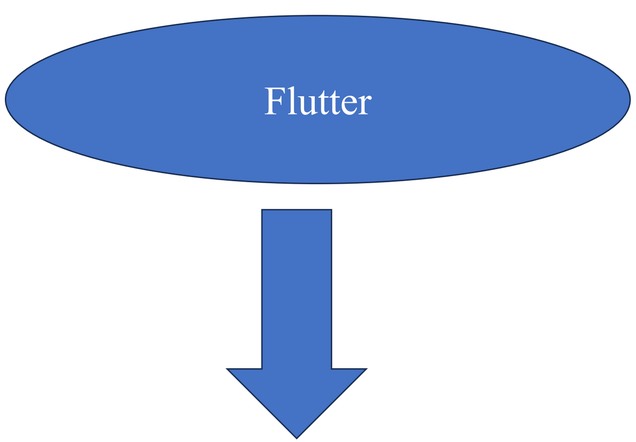
Money Link

- Micro-Lending Platform
- Blockchain and Web 3
- Team Amaraveerulu

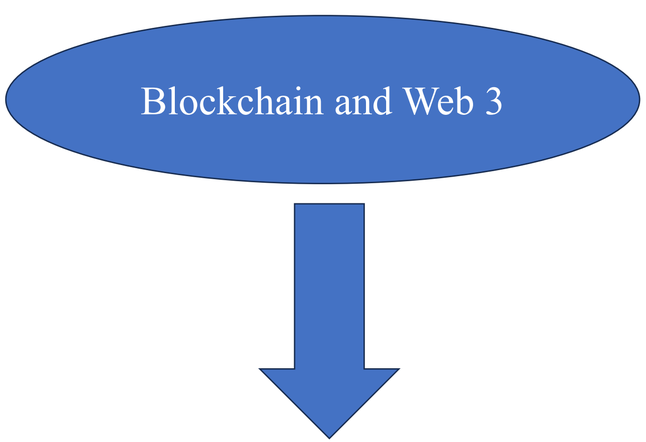
Money Link

Proposed Solution:

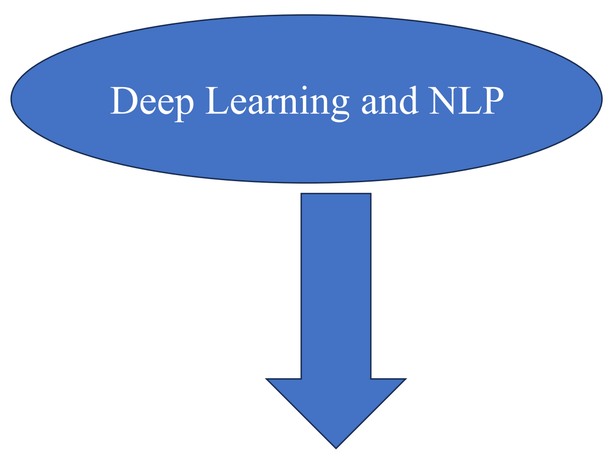
We are decentralizing a Micro-Lending cross platform mobile application in **Flutter** that uses **Blockchain, Web 3.0, Deep Learning,** and **NLP** to provide financial services to individuals and small businesses in rural areas. It features **Digital Identity Verification**, **Community-Based Lending**, **Blockchain-Backed Credit Scoring**, and **Mobile Wallet** Integration. This app platform offers a secure, transparent system with debt calculations and predictive models for borrowing and repayment.



- Cross Platform Mobile App
- UI development



- Digital Identity Verification
- KYC regulations
- Mobile Wallet Integration
- financial transactions without intermediaries



- Analyze transaction data
- Predict loan approval
- Repayment likelihood
- Debt amounts
- Accuracy of lending decisions
- Chatbot for guidance in application

TECHNICAL APPROACH FOR FEATURES

Tech	Technical Usage
Flutter	**Flutter** is used for the cross-platform usability of the Micro-Lending Platform, enabling the application to run seamlessly on both Android and iOS devices. We made an engaging UI.
P2P Transactions using Web 3	Developing **smart contracts** to automate loan agreements between borrowers and lenders, ensuring transparency, security, and automated repayments. Integrating mobile wallets (such as MetaMask or Trust Wallet) for seamless Web 3.0 transactions and enabling easy loan disbursements and repayments via **DeFi protocols**.
Blockchain	Utilizing Ethereum-based smart contracts and decentralized identifiers (DIDs) to store and verify Aadhaar-based digital identities securely.
ML/DL	Using **ML/DL models** to analyze transaction data and predict loan approval, repayment likelihood, and debt amounts, improving the accuracy of lending decisions. For Lender: Lender can see the reliability of the borrower whether the Borrower is a reliability person based in his/her income, occupation, age, assets. For Borrower: Borrower can look for the best interest price based on his/her needs and the previous lender transactions.
Transformer models and NLP	NLP is used for the Chatbot integration for the user to track and search for the details and doubts regarding the services provided the app.

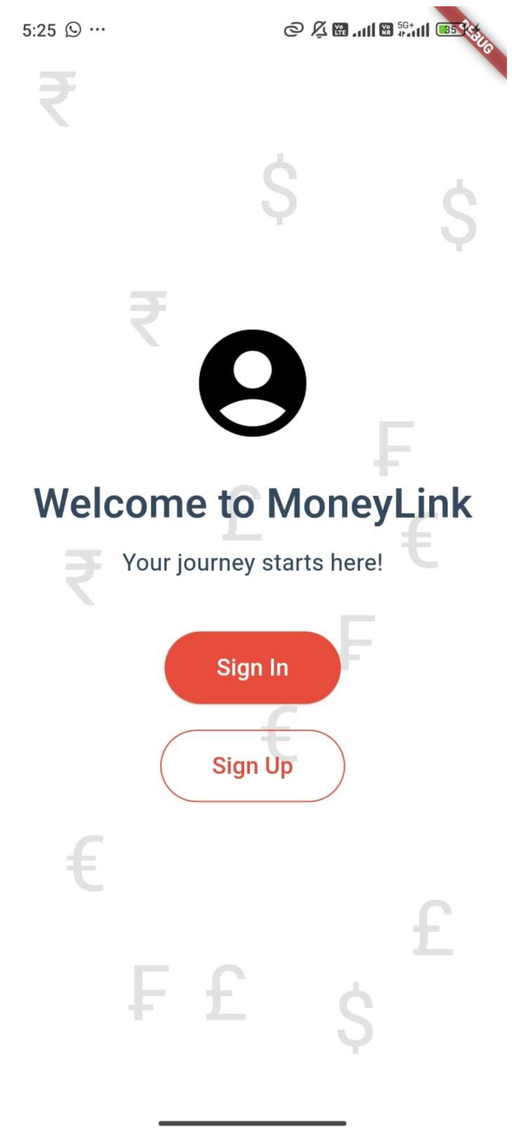
FEASIBILITY AND VIABILITY

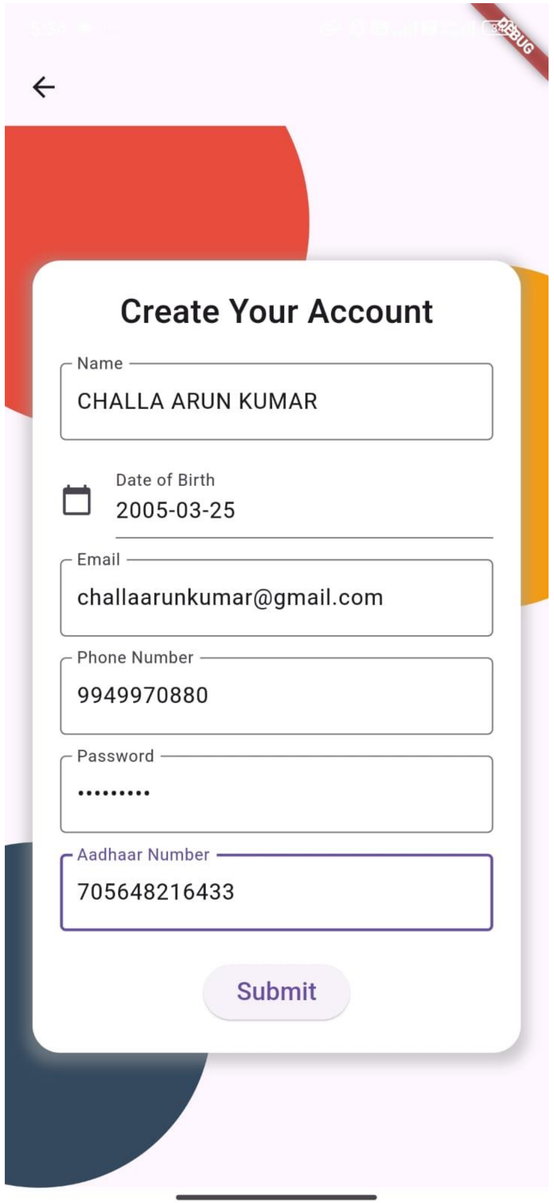
- The technical feasibility of this project is highly achievable, given the existing technologies available in **blockchain**, **Web 3.0**, **ML/DL**, and **NLP**.
- Blockchain platforms like Ethereum and Hyperledger support the required smart contracts and decentralized applications, while mobile wallet integration via **MetaMask** and **Trust Wallet** is already widely adopted in the blockchain space.
- **Machine learning** and **deep learning** models for predictions are already well-established in financial applications, ensuring the viability of the system's predictive capabilities.
- From a business perspective, **micro-lending** is a growing industry, especially in rural areas where traditional banks often do not have a presence.
- The low transaction fees and community-driven lending model provide a sustainable financial ecosystem, reducing operational costs and promoting financial inclusion.

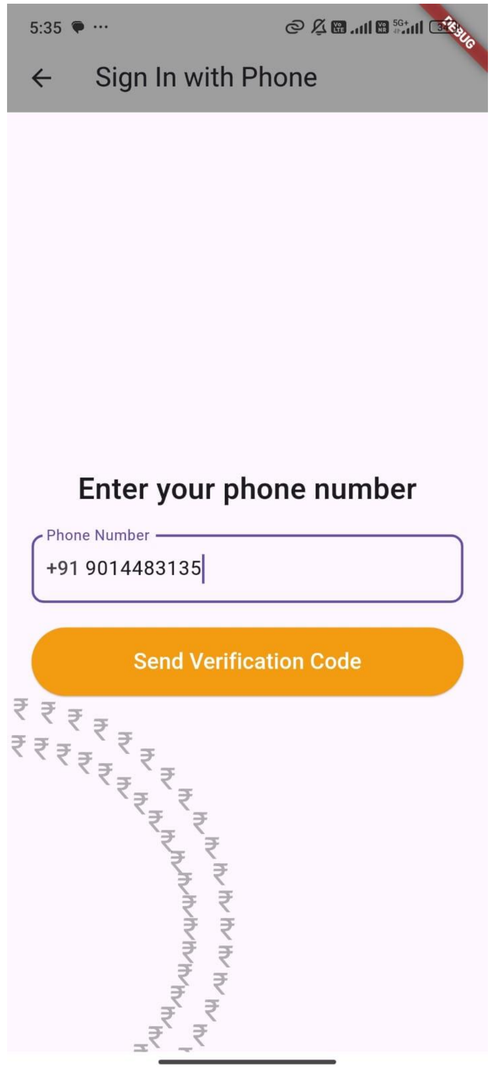
IMPACT AND BENEFITS

- **Increased Financial Inclusion**: Providing access to credit for people who traditionally lack access to banking services.
- **Economic Growth**: By enabling small businesses to secure micro-loans, the platform can help stimulate local economies and provide employment opportunities in rural areas.
- **Empowered Communities:** By fostering community-based lending models, the solution empowers rural communities to take control of their financial well-being.
- **Reduced Defaults and Risk:** The use of smart contracts, blockchain-based credit scoring, and predictive models for borrower behavior reduces the risk of defaults and fraud, making lending more secure.
- **Educational Impact:** The platform enhances financial literacy through blockchain and DeFi education, allowing users to make informed financial decisions.

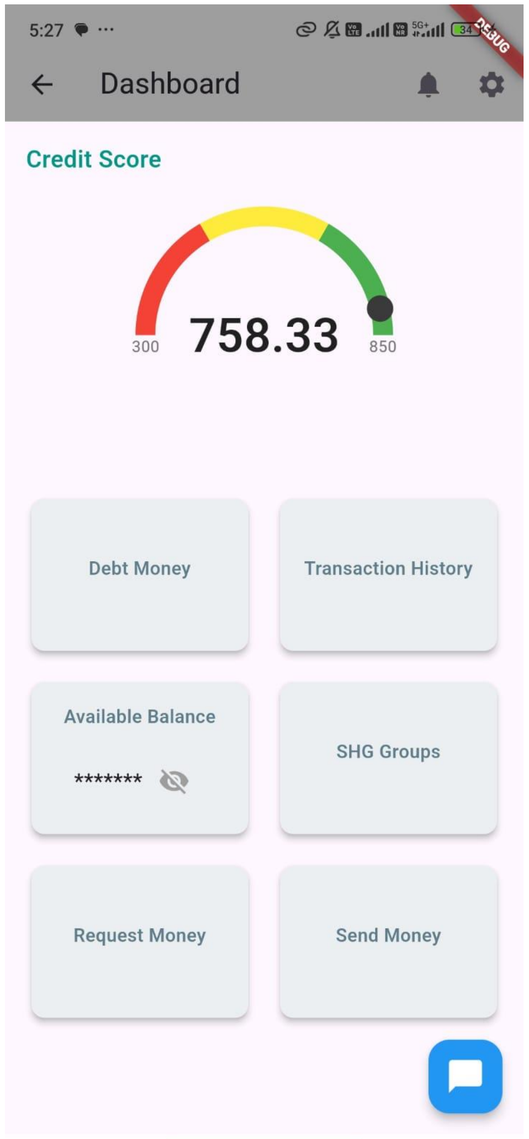
Mobile Application

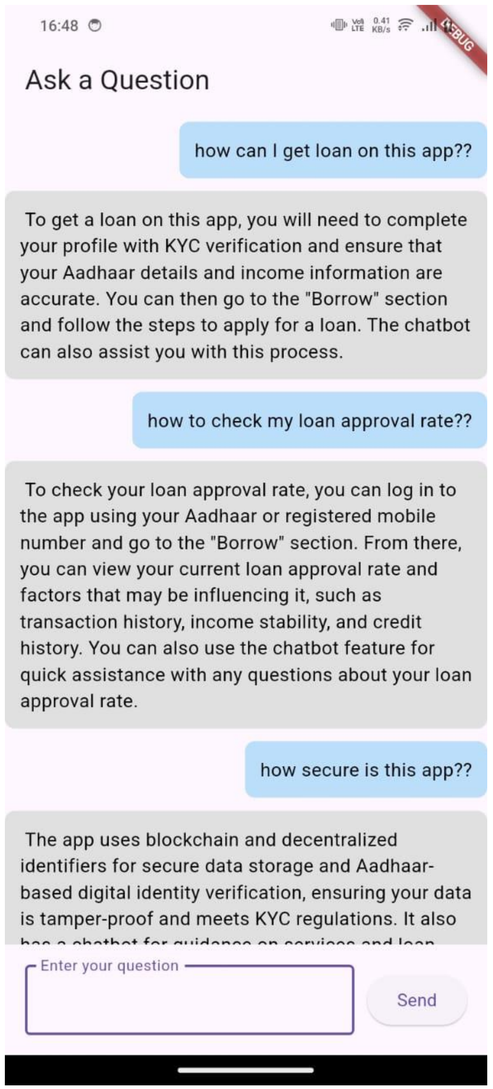


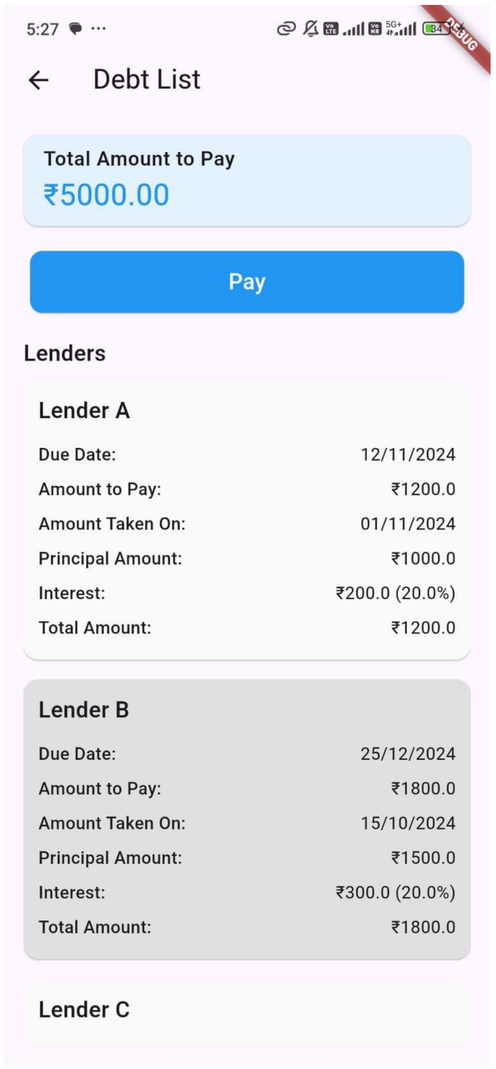


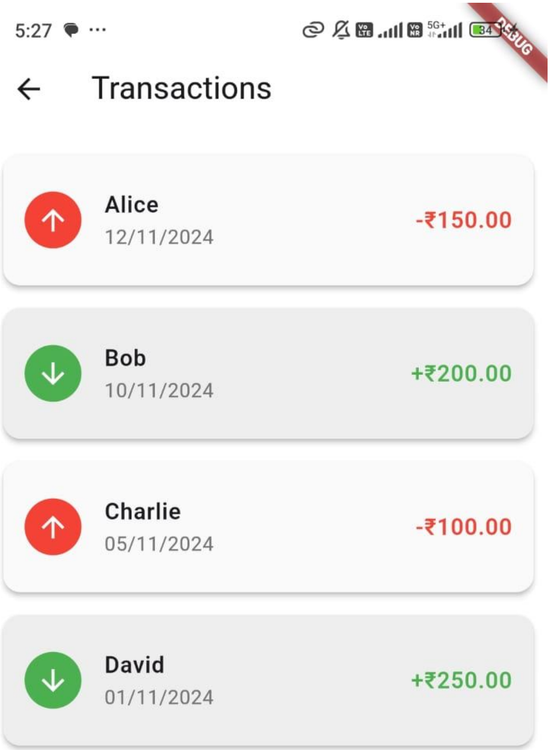


Mobile Application cont...









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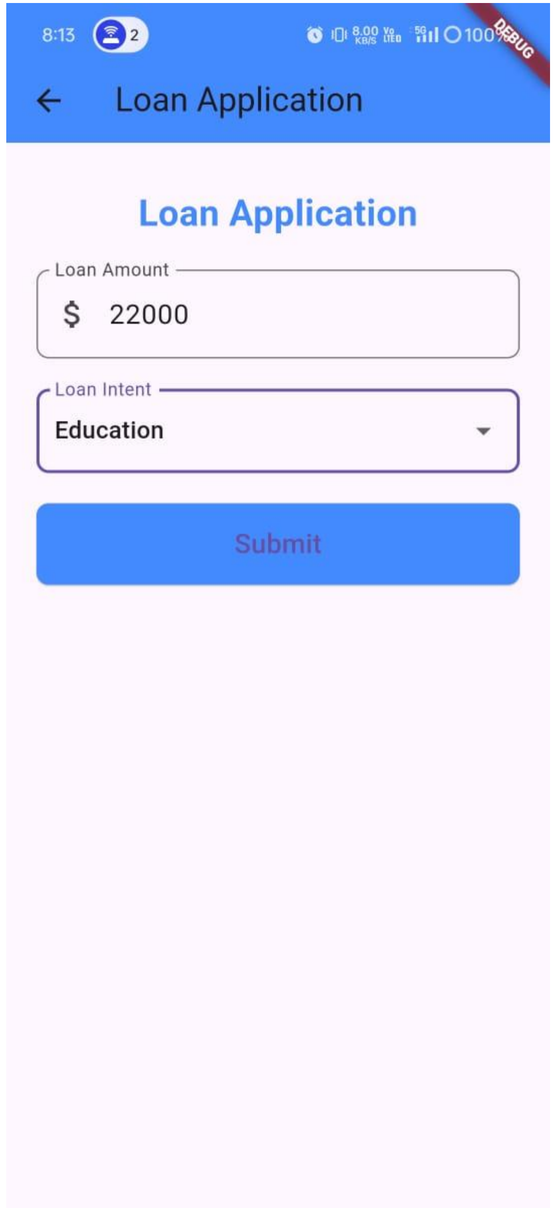
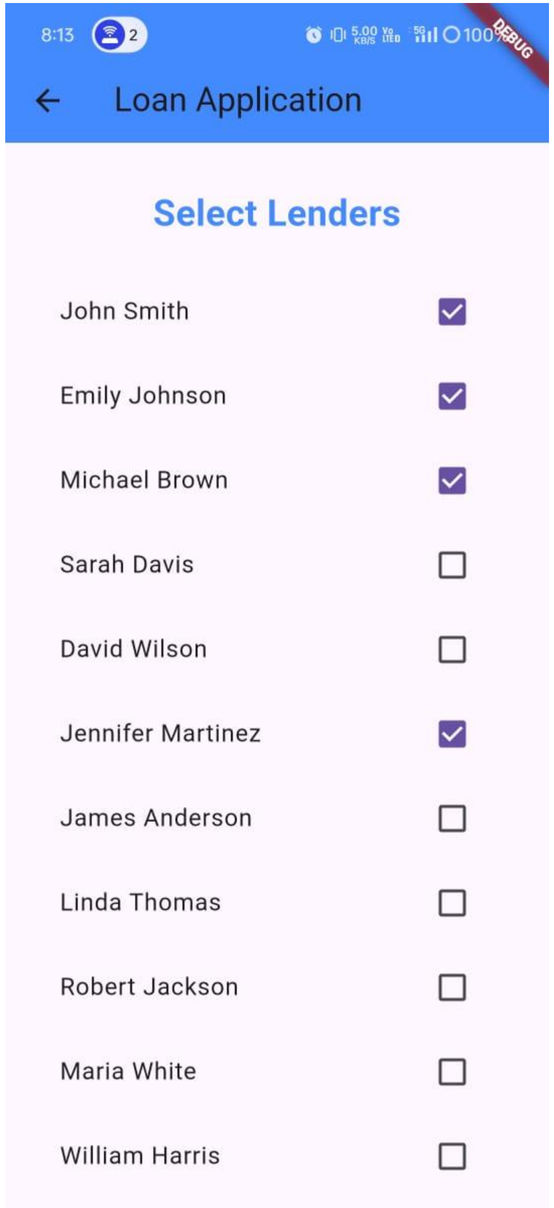
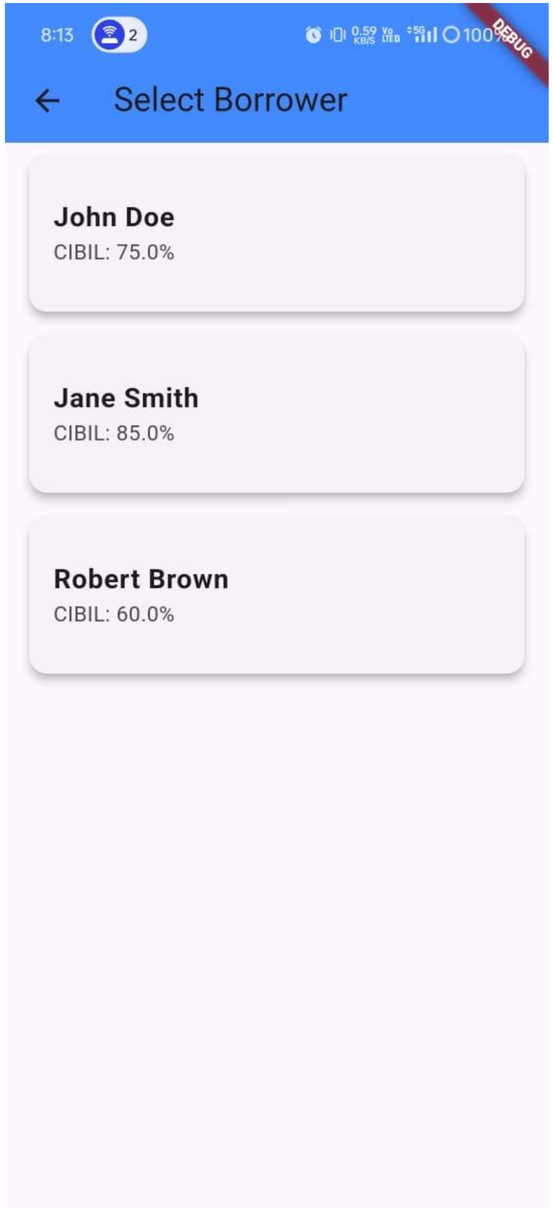
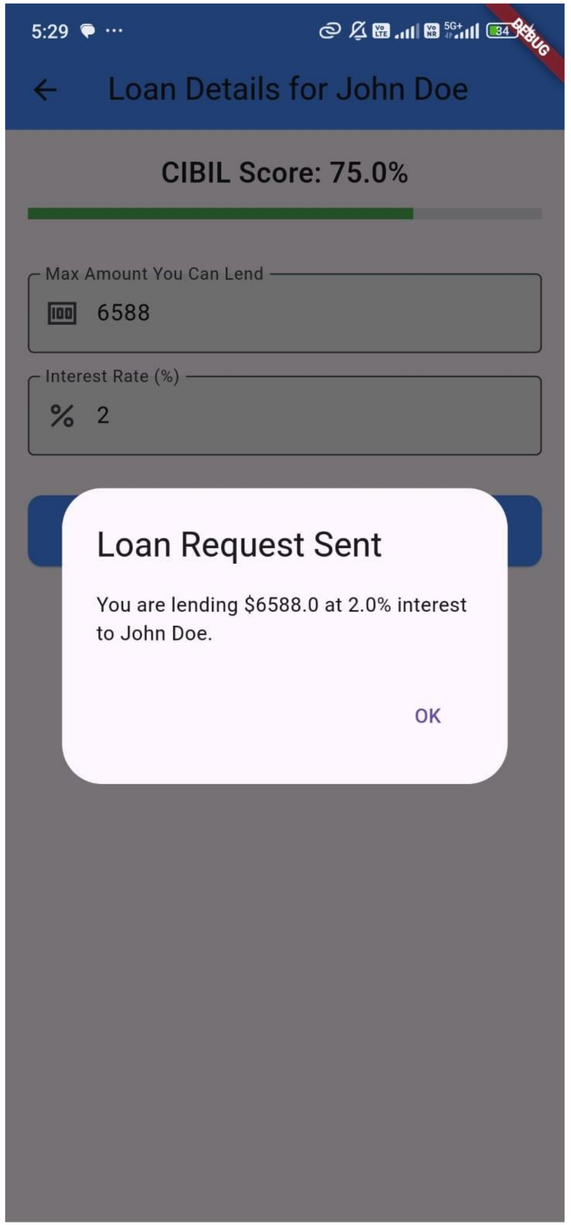
Mobile Application cont...









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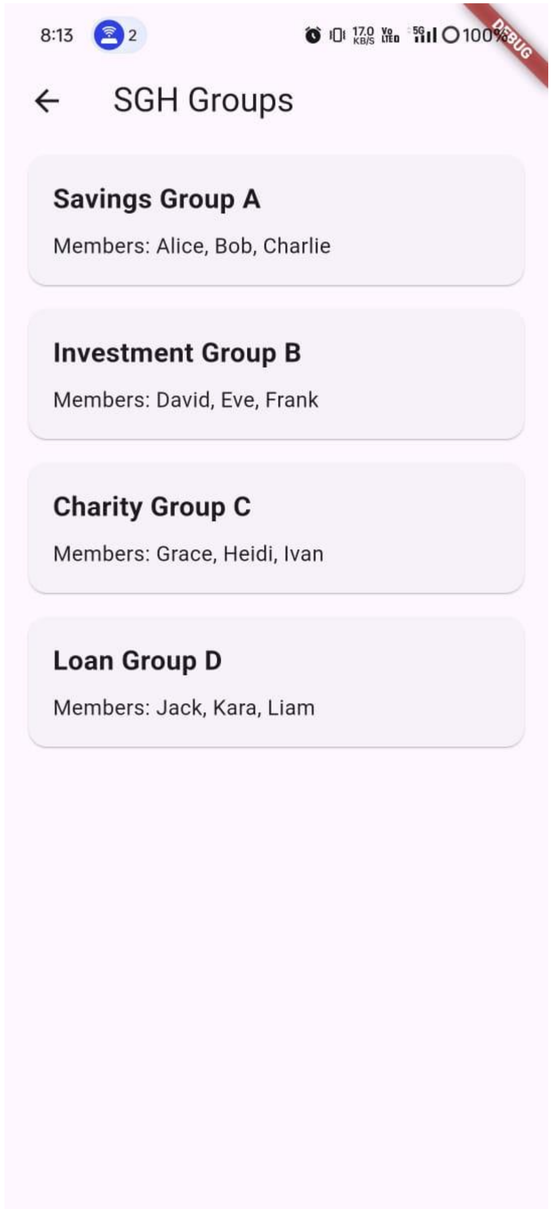

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Deep Learning and Transformer Model Accuracies and predictions

```
user_input = {
    'person_age': 37,
    'person_income': 35000,
    'person_home_ownership': 'RENT',
    'person_emp_length': 0,
    'loan_intent': 'EDUCATION',
    'loan_grade': 'B',
    'loan_amnt': 6000,
    'loan_int_rate': 11.49,
    'loan_percent_income': 0.17,
    'cb_person_default_on_file': 'N',
    'cb_person_cred_hist_length': 14
}

processed_input = preprocess_input(user_input)
predicted_acceptance = predict_acceptance(processed_input)
print(f"The predicted probability of loan approval is: {predicted_acceptance * 100:.2f}%")
```

```
The predicted probability of loan approval is: 57.76%
```

Taking Several factors into consideration, the borrower can predict the loan approval rate.
We used **CNN model with its k-fold** strategy to increase the model more robustly and predict the rate more accurately.

Here after getting better accuracy that is trained under the **DistilBERT pretrained transformer** for the reason analysis of the Borrower. By this analysis, the lender can decide whether the transaction should be done between them or not..

```
        print(f"Train Loss: {train_loss:.4f}, Precision: {train_precision:.4f}, Recall: {train_recall:.4f}, F1: {tr
        print(f"Val Loss: {val_loss:.4f}, Precision: {val_precision:.4f}, Recall: {val_recall:.4f}, F1: {val_f1:.4f
```

```
Epoch 1/3
Train Loss: 0.6908, Precision: 0.7136, Recall: 0.7092, F1: 0.7095, Accuracy: 0.7092
Val Loss: 0.6169, Precision: 0.7619, Recall: 0.7505, F1: 0.7494, Accuracy: 0.7505
Epoch 2/3
Train Loss: 0.5475, Precision: 0.7858, Recall: 0.7840, F1: 0.7841, Accuracy: 0.7840
Val Loss: 0.6106, Precision: 0.7656, Recall: 0.7623, F1: 0.7625, Accuracy: 0.7623
Epoch 3/3
Train Loss: 0.4450, Precision: 0.8316, Recall: 0.8304, F1: 0.8304, Accuracy: 0.8304
Val Loss: 0.6278, Precision: 0.7659, Recall: 0.7626, F1: 0.7633, Accuracy: 0.7626
```

```
[ ]  torch.save(model.state_dict(), 'best_sentiment_model.pth')
```

```
[ ]      # Perform the prediction
        with torch.no_grad():
            outputs = model(**inputs)
            logits = outputs.logits  # Get the logits (output before softmax)
            predictions = torch.argmax(logits, dim=1)  # Get the class with the highest score

        return predictions

    new_texts = ["I need a loan to buy a house.", "Seeking funds to purchase a new gaming console and accessories for entertainment purpose

    predictions = predict_sentiment(new_texts, model, tokenizer, device)

    sentiment_map = {0: 'Negative', 1: 'Neutral', 2: 'Positive'}
    predicted_labels = [sentiment_map[label.item()] for label in predictions]

    for text, label in zip(new_texts, predicted_labels):
        print(f"Text: {text} -> Predicted Sentiment: {label}")
```

```
Text: I need a loan to buy a house. -> Predicted Sentiment: Positive
Text: Seeking funds to purchase a new gaming console and accessories for entertainment purposes. -> Predicted Sentiment: Negative
```

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Team Members

Team Member	Role
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Ch. Arun Kumar	Flutter and UI/UX
Jithesh Kottu	Flutter and UI/UX
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Mani Kiran Batchu	Blockchain and Web 3