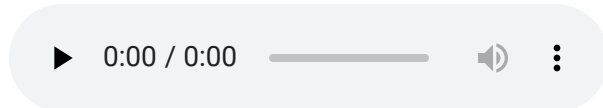# NPCI is Exploring AI-Powered Futuristic Payment Frontiers: CTO

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The National Payments Corporation of India (NPCI) was at the heart of the widespread adoption and success Unified Payments Interface (UPI) had in India. Now, NPCI is experimenting with AI to further enhance the payment ecosystem in India.

"NPCI is exploring futuristic use cases for payment operators focusing on technologies like graph analysis, speech recognition, ANPR (Automatic Number Plate Recognition) as well as generative AI," Vishal Kanvaty, chief technology officer at NPCI, told **AIM** in an exclusive interaction.

The most intriguing among them is using ANPR, which typically involves a combination of computer vision and machine learning techniques.

"Leveraging ANPR technology at toll booths and parking facilities enables seamless and contactless payments by automatically recognising vehicle licence plates and debiting the corresponding payment accounts," Kanvaty said.

Exploring futuristic use cases for payment operators

"By employing graph analysis techniques, NPCI strives to uncover and deter money laundering and other illicit activities by recognising intricate patterns and connections within transaction networks.

"By integrating behavioural biometrics such as keystroke dynamics, mouse movements, and touchscreen interactions enhances user authentication by continuously verifying identity based on unique behavioural patterns, reducing reliance on traditional authentication methods like passwords and PINs," Kanvaty added.

Employing predictive analytics powered by machine learning enables payment operators to analyse customer behaviour and preferences in real-time, allowing for dynamic pricing strategies and personalised offers tailored to individual users.

According to Kanvaty, payment operators like NPCI can establish a collaborative platform, where fintechs and other stakeholders can co-create and share AI models. This can be done for various use cases such as risk assessment, credit scoring, customer segmentation, fostering innovation and accelerating the adoption of AI in the payments industry.

Conversational payments

Last year, RBI launched *'Hello UPI'*, introducing voice-based payment capabilities, which went live on the BHIM app.

Hello UPI offers an AI-powered user-friendly interface that doesn't require literacy or advanced digital skills, making financial services more accessible to underserved communities, including those in rural areas or with limited access to traditional banking infrastructure.

"By enabling payments through simple voice commands, AI-powered solutions lower the barrier to entry for individuals who may be intimidated by or unfamiliar with traditional payment methods. This empowers more people to participate in the formal financial system and access a wide range of financial services," Kanvaty said.

This initiative enables a conversational interface for completing transactions, available both through the app and via 123Pay, a service originally intended for audio/IVR payment interactions. This integration empowers advanced speech-based AI platforms developed by NPCI to significantly expand payment accessibility beyond conventional methods.

Speech-recognition engineering pipeline

"NPCI's speech-recognition engineering pipeline is a state-of-the-art high-performance system that enables us to orchestrate several chains of models per language. This is entirely built on the open-source tech stack and highly configurable. We can change the models quickly, and scale out quickly," Kanvaty said.

Building a pipeline from scratch using open-source principles provides maximum flexibility and allows NPCI to architect without vendor lock-ins and without assuming cloud speech APIs being available.

Moreover, it enables them to figure out the right chain of models that do the job thoroughly, and experiment and finetune without any constraints or dependencies.

"We are equipped to deploy an effective mix of models that not only perform tasks efficiently but also maintain low latency. The effectiveness of our voice system is realised when it is fully embraced and utilised by the payment ecosystem.

"To facilitate this, we are prepared to offer the requisite thought leadership and guidance. We are also actively coordinating with our ecosystem partners to ensure this integration is successful, " he said.

Collaboration with Bhashini

To bring AI-powered conversational capabilities in the 22 official languages of India, NPCI is working closely with Bhashini, a government of India initiative aiming to bridge linguistic disparities in India.

"The voice systems use a variant of the BERT-like system adapted for Indian languages for aspects like intent recognition and entity recognition. BERT is one of the earliest large-scale Transformer Encoder models to have emerged on the scene.

"The Bhashini and AI4Bharat teams have been our key partners in collaborating with us on this exercise. They have been instrumental in working closely with us and guiding to the India-made Indian language speech models that can be used for this exercise," Kanvaty said.

Bhashini's translation models such as IndicTrans, developed in association with AI4Bharat, an initiative of IIT Madras, are already being used by government and private institutions. Most notably, Prime Minister Narendra Modi's speech at the Kashi Tamil Sangamam in Varanasi was translated in real-time to Tamil using Bhashini's translation models.

However, NPCI has not disclosed a timeline for the availability of this feature to consumers, as it remains a work in progress.

"This partnership works both ways, as it also validates the usage of these models for a large-scale exercise, and proves that they are ready for prime time. We push the models to the fullest and tweak them so that they are production ready," Kanvaty explained.

Testing generative AI

Besides automating customer service interactions through chatbots and responding to customer queries in multiple languages, LLMs can be leveraged to identify suspicious patterns or anomalies indicative of fraudulent activities, according to Kanvaty.

"This can help payment systems detect and prevent fraud more effectively. By analysing user transaction history, spending patterns, and demographic information, LLMs can generate personalised recommendations for financial products, services, and offers.

"This can help payment systems increase customer engagement and loyalty," he added.

Moreover, LLMs can facilitate language translation services within payment systems, allowing users to interact in their preferred language and enabling seamless communication between customers and service providers.

"LLMs can also assist payment systems in interpreting and adhering to regulatory requirements by analysing legal documents, compliance guidelines, and industry standards. This can help ensure that payment systems operate within the boundaries of applicable laws and regulations," Kanvaty concluded.