

EasyVoice© Proposal

Objective

SBI is the largest bank of India and it caters to a diverse set of people. The bank aims to provide the best experience to its customers by the use of various technical and non-technical solutions.

EasyVoice© aims to improve the experience of the customers of the bank by enabling them to do voice based transactions and queries from within the SBI Anywhere Application.

Background

AllinCall Research and Solutions Private Limited is a startup from IIT Bombay alumni. The team members combine very strong technology knowledge with an excellent business background. AllinCall offers a suite of products to improve customer experience:

- EasyVoice©
- EasyChat©
- EasyCall©
- EasySearch©
- EasyAnalytics©

People who use banking services always want an easy-to-use, intuitive and secure way of banking. People want that in minimum hassle and in lowest time possible, they should be able to achieve what they want. By the use of voice in performing activities like balance enquiry, mobile recharge, etc, people will be able to make the best use of the SBI Anywhere application.

Solution

Our solution is powered by VEMSAS© platform which is a Voice-enabled Multilingual Secure Artificial Intelligence based Services Platform. The platform allows user to perform several transactions and queries with the bank's mobile application using simple natural language based voice statements. For instance, a user could say - I want to know my account balance and she/he will be shown the account balance.

Use cases

The following are simple use cases of EasyVoice in SBI Anywhere Application:

- Enquiring account balance
- Getting a mini statement
- Performing mobile recharge
- Performing DTH recharge

- Logging out of the application

Benefits for the bank

- Improve customer service: EasyVoice© will help the bank to provide a great product to its customers that will help them transact easily.
- Increase service reach: with the ease of app usage, more customers would be attracted towards the bank and benefit from the products
- Optimize cost to serve: with a easy-to-use bank app, lesser customers will call the call centers, leading to a direct cost reduction
- Leader in technology: with a cutting-edge tech, bank becomes a tech-leader

Process flow

Here is a brief description of the process flow:

- The user uses natural language to speak a statement
- VEMSAS© platform converts the speech to text and later performs natural language processing to identify the intent of the query
- The intent is used to fire a query to SBI's servers so as to fetch the desired result for the user
- Random sampling is done so as to store some anonymous voice samples on a feedback server hosted on SBI's private cloud

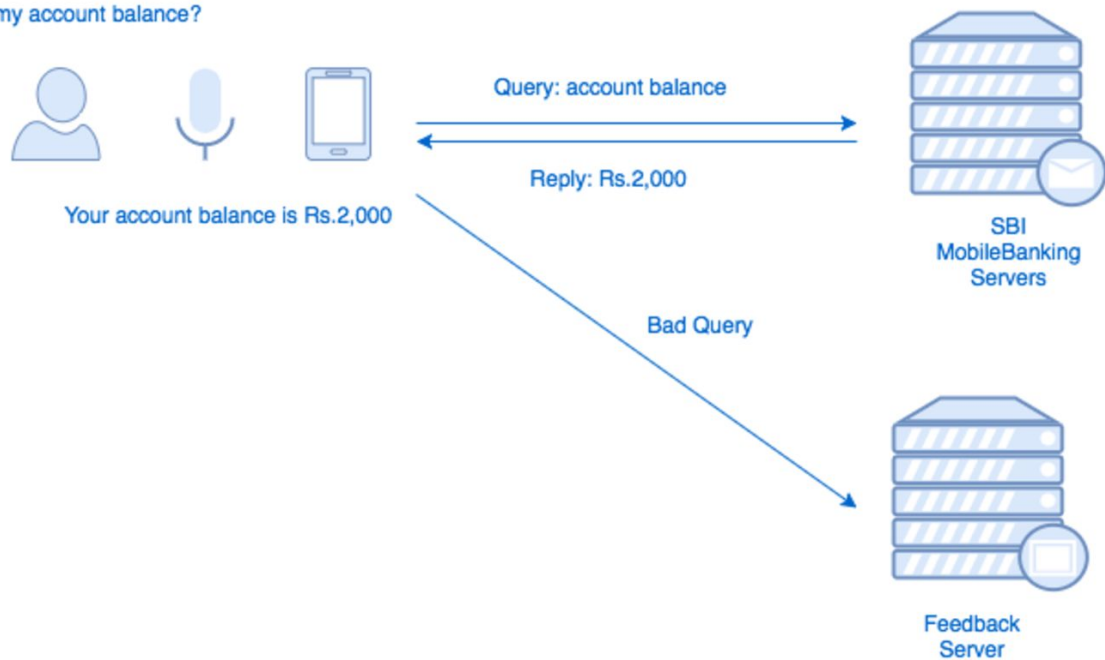
Solution Architecture

We have come up with a unique 'Distributed Serverless' architecture that provides the following 3 benefits:

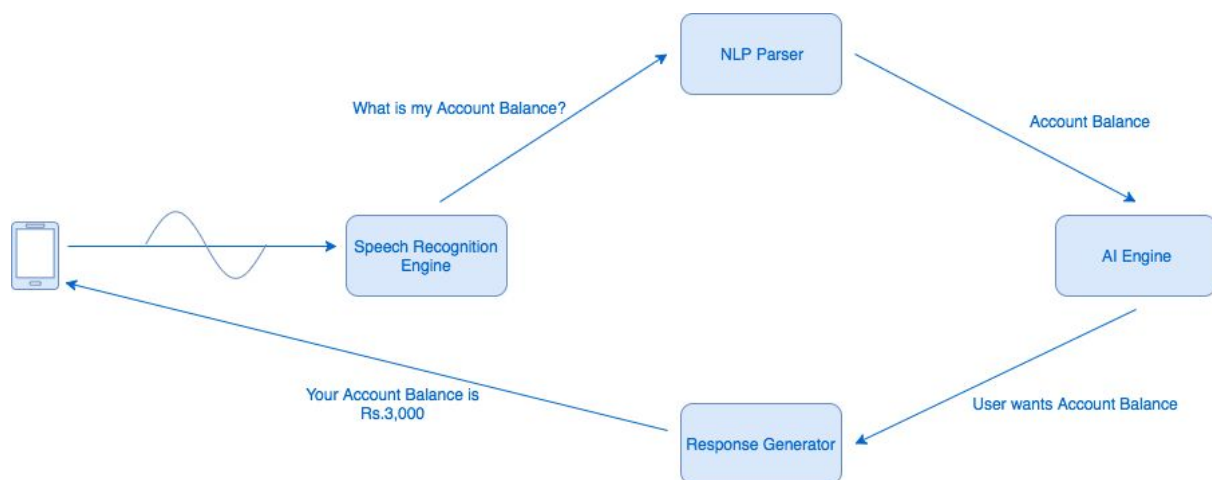
- Offline technology - to ensure that there are no servers involved and so, performance received is the best
- Distributed Scalability - to ensure that there are no single point of failures and no bottlenecks in the architecture
- Highest level of Security - to ensure that the user's data is sent nowhere other than SBI's own servers

The diagram below illustrates the architecture of VEMSAS© platform

What is my account balance?



Technology stack



Technology consists of the following parts:

- **Speech Recognition Engine:** We have built our own Speech Recognition engine using Open-Source Speech Recognition Library called as PocketSphinx, that does NOT rely on any third party (like Google Speech-to-text or Amazon Alexa). We have recompiled the modified source code at our end. Also, we have made our own machine learning models for Speech Recognition. The engine converts the user spoken words into textual form. The Speech Recognition engine does identification at phoneme level and is robust enough to cater to different types of accents.
- **Natural Language Processing Module:** the NLP Module is used to breakdown the sentence into its constituents for further processing. We have

built it using an Open-Source Natural Language Processing Framework called as Apache OpenNLP. We have made our own models for Natural Language Processing in OpenNLP.

- **Artificial Intelligence Engine:** the AI Engine uses the information from NLP Module and Deep Learning (Recurrent Neural Networks) to understand the intent of the user's query.

Hardware requirements

Since we have a serverless architecture, there is no need of any specialized central hardware. However, some hardware will be needed for the feedback server to store anonymous data samples and process them. The following is an indicative hardware requirement:

- RAM: Preferably 16 GB
- Disk: 512 GB SSD
- Processor: Intel® Core™ i7-7700HQ Processor (or above) with GPU support (GeForce GTX 960M or above)

Scope/Deliverables

As per the discussion with the Mobile Banking team, the following services will be implemented as a part of the decided scope:

- Account balance query
- Mini statement enquiry
- Mobile Recharge
- DTH Recharge
- Logging out of the app

All of these queries will be supported on natural language in Hindi and English.

Expected Performance

- The bot will provide an accuracy comparable to that of the present industry standards (50% initially). Later the accuracy may go up to 65%.
- Uptime: Due to Serverless Architecture, uptime metric is not applicable.
- Concurrency: Our Distributed Serverless Architecture will be able to support all possible users concurrently.

Warranty

The commercials include first year warranty. Warranty includes bug fixing, global releases.

Commercials

We are pleased to offer discounts on various charges exclusively to SBI. The commercials will consist of the following components:

Component	Regular Charge	Discounted Charge for SBI
Base T&M Charge	Rs.30 lakh	<u>Rs.25 lakh</u> for the following: <ul style="list-style-type: none"> • Integration Support • Feedback Server • Speech Recognition Engine • AI Engine • NLP Engine
Initial Customization T&M Charge	Rs.20 lakh	<u>Rs.15 lakh</u> for the development/customization of following features in Voice: <ul style="list-style-type: none"> • Account balance • Mini statement enquiry • Mobile Recharge • DTH Recharge • Logging out of the app
T&M Charges for development of new features in future.		Regular T&M Resource charges of <u>Rs.1.5 lakh per month per Resource</u> as per requirements of the department and negotiation/finalization of efforts by the effort estimation committee of the department.
Post Warranty Annual Maintenance Charge	Rs.15 lakh	Rs.12 lakh for: <ul style="list-style-type: none"> • Providing time to time global updates for the Speech Recognition, AI and NLP Engines • Improving the accuracy of each of the engines • Integration Support

The Base T&M Charges and the T&M Charges for development of new features in future are subject to WPI increment year-on-year.

All charges are excluding taxes.

Payment Schedule

Charge	Due
Base T&M Charge	30% after deployment of engines and UAT.

	70% after production including closure of Security Review.
Initial Customization T&M Charge	30% after deployment of features and UAT. 70% after production including closure of Security Review.
Base T&M Charges of new features	30% would be released after UAT testing. 70% would be released after production rollout.
Post Warranty Annual Maintenance Charge	25% of Annual Maintenance charge will be payable every 3 months, in arrears.