

# Bank Leumi

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*Predict Loan Default Risk*

## The Challenge

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Bank Leumi, the second largest bank in Israel, was faced with a very high loan default rate. They needed to find innovative technologies to reduce the default rate outside of the sophisticated financial predictive tools they were already using, such as financial status and payment history of their prospective borrowers.

The current loan approval system that Bank Leumi uses is purely financial, credit scores, payment history, financial strength, etc, along with the predictive models they created. Bank Leumi realized however, that while many loan defaults resulted from financial difficulties encountered by their customers, they also assumed that a percentage of loan borrowers were more likely to default based upon their personalities: risk taking, impulsiveness, low integrity.

Bank Leumi wanted to see what predictive models were available that were accurate, valid and worked within their system and could be used early in the loan approval process that involved a short web registration followed by a phone conversation.

## The Solution

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Bank Leumi asked Voicesense to see if their acoustic analysis technology could predict high-risk loan borrowers based upon identifying those high-risk characteristics from analyzing their voice.

The Voicesense Loan Default Predictor analyzes a prospect's voice and creates a risk stratification based upon high-risk behavioral tendencies.

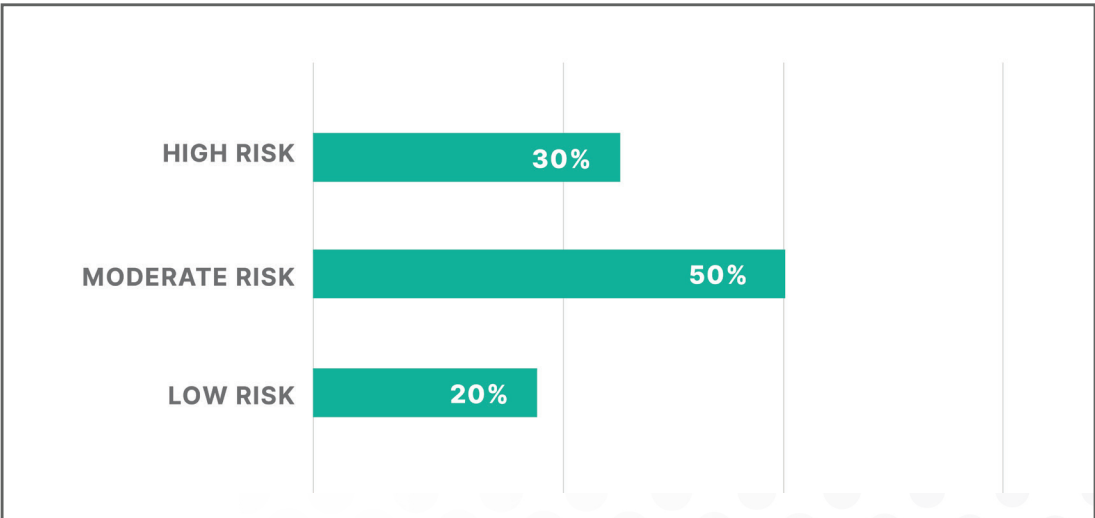
Initially Bank Leumi wanted to evaluate the accuracy of Voicesense's Behavioral Predictive tools. A validation study consisting of over 1000 phone interaction recordings of real customers that received loans was used to test the system.

Voicesense ran call recordings from actual loan approval conversations through their vocal analysis technology. These recordings were from customers whose loan period had already ended, thereby enabling Voicesense to use their Machine Learning to calibrate a predictive tool based upon knowledge of the default outcome (yes/no) for the approved loans.

The model was then applied to a blind testing sample. Bank Leumi was then able to compare the predictive classifications from Voicesense to the actual default outcome.

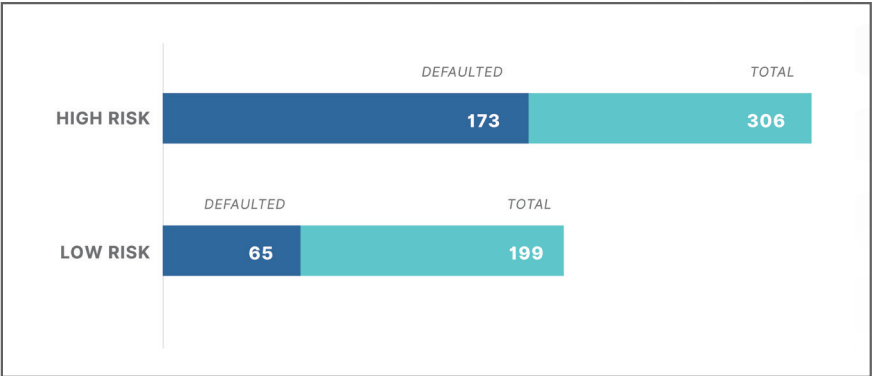
# Results

Voicesense classified default risk predictions into three categories – High, Moderate and Low Risk. About 30% of the borrowers were classified as High Risk, 50% as Moderate Risk and 20% as Low Risk.



The results demonstrated that the default rate among the borrowers classified by the Voicesense Loan Default Predictor as High Risk were twice as high as the default rate among the borrowers classified as Low Risk.

Within the identified High Risk group of 306 clients, 173 people defaulted on their loan; whereas, of the 199 clients grouped as Low Risk, only 65 people defaulted.



Bank Leumi was thereby able to apply stricter lending parameters, early in the loan approval process, to those clients with High Risk classification