

Smart Image Recognition using Machine Learning to Increase Consumer Engagement and Satisfaction

CANDID



Candid's client, one of the largest consumer packaged goods companies in the world, had been receiving consumer complaints about the difficulty of entering PIN Codes in their consumer loyalty app. Candid trained a consumer solution with ML technology to remove the manual process and increase satisfaction.

BACKGROUND

Our client, one of the most recognized brands in the world, has an extensive portfolio of bottled drinks globally. A network of 60 independent bottlers throughout North America distributes millions of cases of these products annually. To market these brands, the client has executed a multi-year consumer loyalty program using alphanumeric PIN Codes printed underneath the cap of each bottle. The PIN Code is used by consumers participating in the loyalty program to qualify for rewards based on their purchases.

THE PROBLEM

Consumers long expressed a desire to eliminate the tedious manual entry of PIN Codes required to participate in the rewards program. Due to the wide range of print technology used by the bottlers, the legibility of PIN Codes varied considerably, and this variability created significant challenges for any solution attempting to automate PIN Code entry process. With a national marketing program just three months away that would rely heavily on the PIN Code engagement mechanic, getting a solution in place quickly became an imperative.

THE CANDID SOLUTION

Candid proposed a streamlined, automated solution to engage with consumers on the client's loyalty platform. This solution would be designed to be mobile-first and would leverage the scanning capabilities already inherent in smart phone devices. In addition, machine learning (ML) would be leveraged to recognize the alphanumeric characters in the PIN Codes so that codes could be processed with high accuracy and with minimal effort required for consumers. The proposed solution not only addressed a long-standing consumer engagement pain point, but would also support the client's longer term aspirations of driving increased engagement through the mobile channel.

Actions speak louder than advice.



ACTION

Candid collaborated with the consumer loyalty team to train and deploy a Deep Learning solution based on TensorFlow for processing scanned PIN Codes. Using an agile methodology model, reviews were conducted showing regular and tangible progress with the ML process.

The solution leveraged the highly elastic storage capability of the Cloud and serverless technology for the storage and processing of training data.

Key services and technology in the solution included:

- TensorFlow
- AWS Simple Storage Service (S3)
- AWS Lambda

The model was trained by scanning hundreds of thousands of PIN Codes. Each scanned character that was processed by the TensorFlow model output 10 different possible values, each with an increasing success probability of being correctly assigned as the solution learned how to best read the bottle caps.

OUTCOME

The solution that Candid implemented resulted in near perfect accuracy in recognition of PIN Codes, with our client sponsor remarking that the ML model results are “better than the human eye.”

Since implementation our client has experienced:

- Growth in PIN Code scans from 0 in early 2017 to 43M in 2019.
- This new mechanic played a significant role in driving the number of engaged users with the new loyalty platform mobile app to just under 1M users in less than 2 years with minimal marketing support.

WHAT'S NEXT

Candid has empowered the client to frequently review the PIN Code recognition model and refresh the model as needed.

Common model refresh scenarios include:

- Availability of new modeling architectures
 - The deep learning field is rapidly advancing, and in the last few years, researchers have regularly come up with modeling architecture innovations, which either decrease the model size required, or increase the model accuracy with the same amount of training data.
- Elimination of model bias
 - To avoid the possibility of the model building a bias over time or getting stuck in a local minimum during the active learning process, it is a best practice to tune hyperparameters periodically.
- Changes in the PIN Code printing process
 - The PIN Code printing process at the bottling plant goes through subtle changes over time due to natural wear and tear or possibly updates to its print technology, all of which can lead to a gradual decline in model accuracy.
- Changes in the shape/size of bottle caps
 - Any such changes can affect the model accuracy and may require a model refresh.

ABOUT CANDID

Candid is an Atlanta-based technology and management consulting firm that develops tailored solutions for complex enterprises. We design, build, implement and manage sophisticated infrastructure for the largest organizations in the world. With no external investors or debt, Candid is the only independent cloud firm with the scale and expertise for our clients to adopt the cloud at their own pace. We've successfully performed over 250 cloud initiatives and have never failed.

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Contact Candid to find out how we can put advice into action for you.

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