



Crying for Help: Using Predictive Models to Handle Struggling Callers

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Overview

- In a typical IVR, handling of caller difficulty is uniform
- This simplistic approach leads to sub-optimal results:
 - i. Some callers hang up in frustration (and may never call back)
 - ii. Others who would have happily completed the call are transferred prematurely
- The solution is a transfer strategy based on a caller *experience metric* that predicts the likelihood of call success

Introducing the Experience Metric

- Scores the current satisfaction level of the caller experience:
 - i. Gives a reward for positive events: e.g., completing a turn successfully
 - ii. Gives a penalty for negative events: e.g., no matches, rejections, agent requests
 - iii. Considers a call's entire event history, but assigns more weight to recent events
- Predicts the likelihood of overall transaction success:
 - i. Callers who breeze through the system are likely to complete even when they encounter occasional problems
 - ii. Callers who experience repeated minor difficulties (none of which are sufficient to transfer the call) are likely to hang up in frustration

Constructing the Experience Metric (μ)

Computed in real time

$$\mu_{i+1} = \alpha\mu_i + value(\tau_{i+1})$$

$$\mu_0 = 0$$

Where

α is the discount parameter

$value(\tau_{i+1})$ is the satisfaction score for the i th dialog turn

Case Study: Airline Fare Shopper

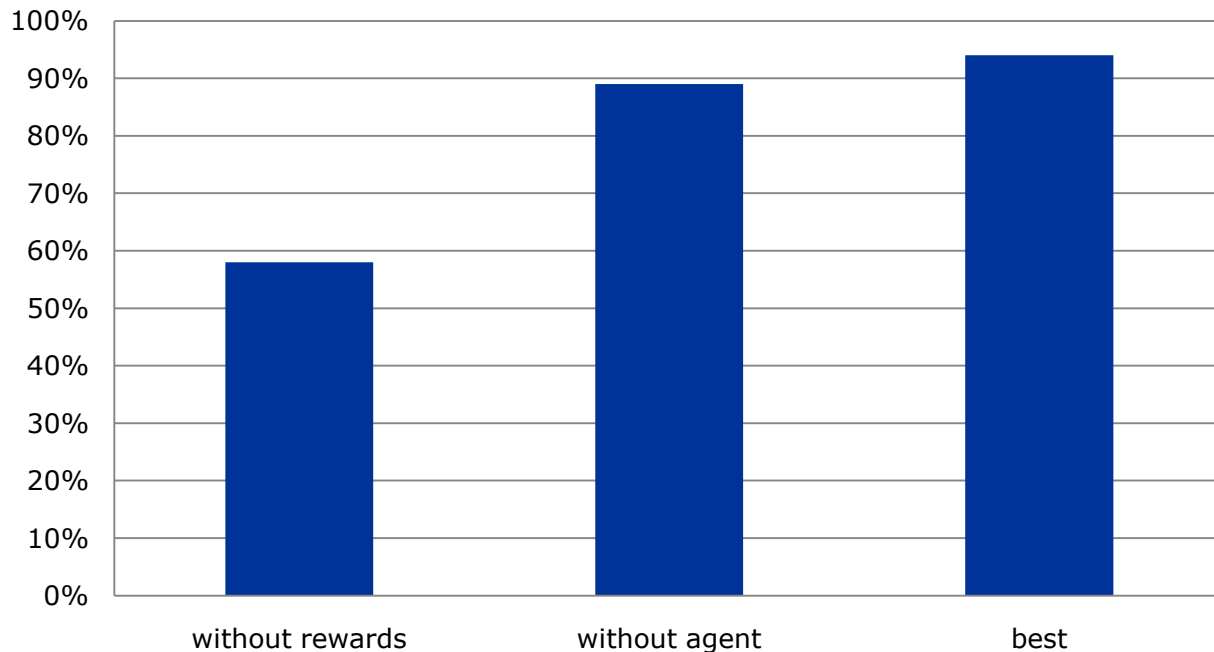
- Search *Transaction*
 - i. One-way/roundtrip?
 - ii. Departure City/Airport
 - iii. Arrival City/Airport
 - iv. Departure Date
 - v. Return Date
 - vi. Auxiliary dialogs based on business rules

Sample call with low Experience Metric

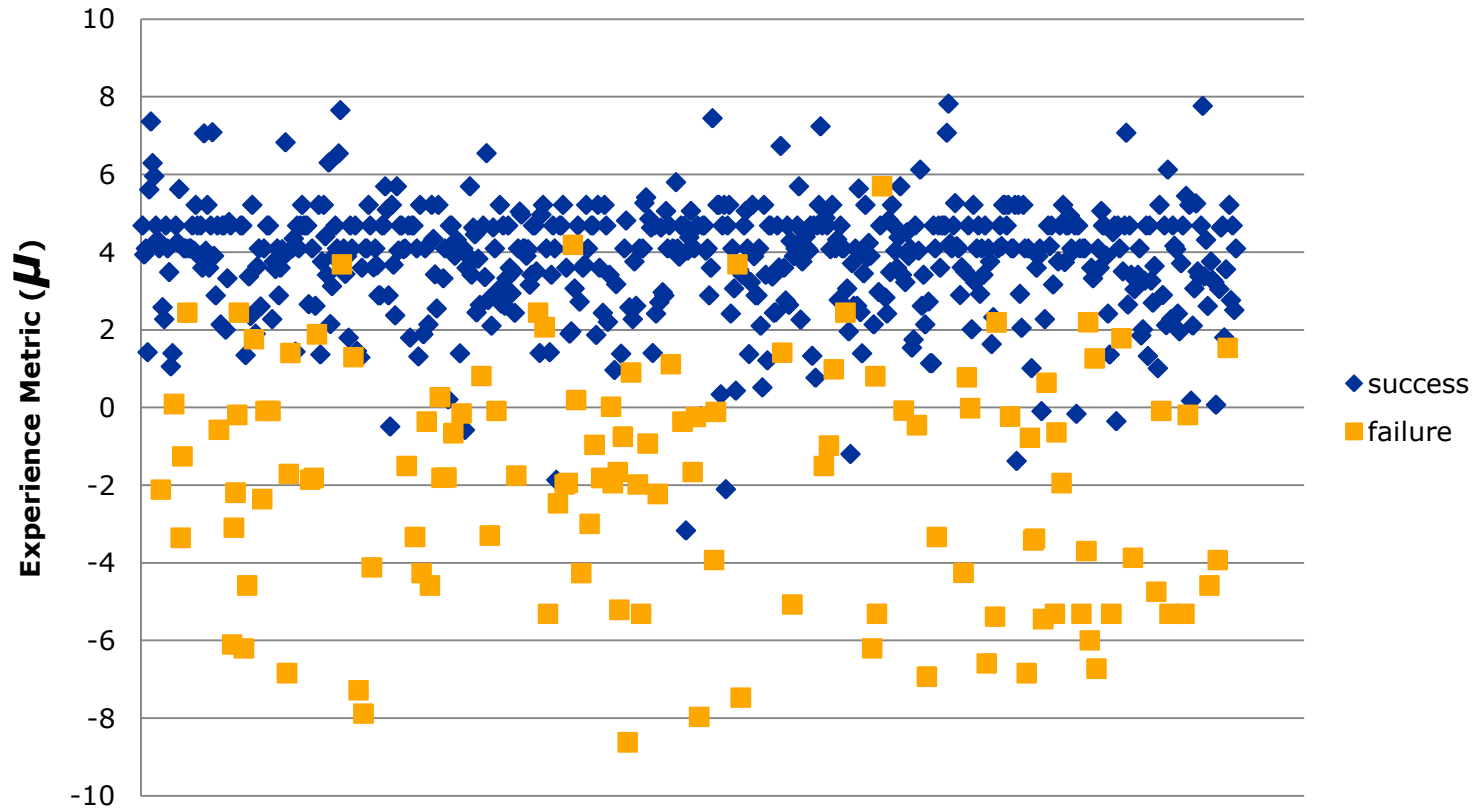
round trip
Departure City NM
Departure City NM
Departure City NM
yes to TryAgain
Departure City MM
Rejection
Departure City MM
Rejection
Departure City NM
Departure City MM
Rejection
Departure City NM
Departure City Match
Arrival City Match
Disamb Match
Departure Date MM
Rejection
Departure City NM
Departure Date MM
Confirmation NM
Rejection
Etc....

Constructing the Experience Metric (μ): Choosing the right ingredients

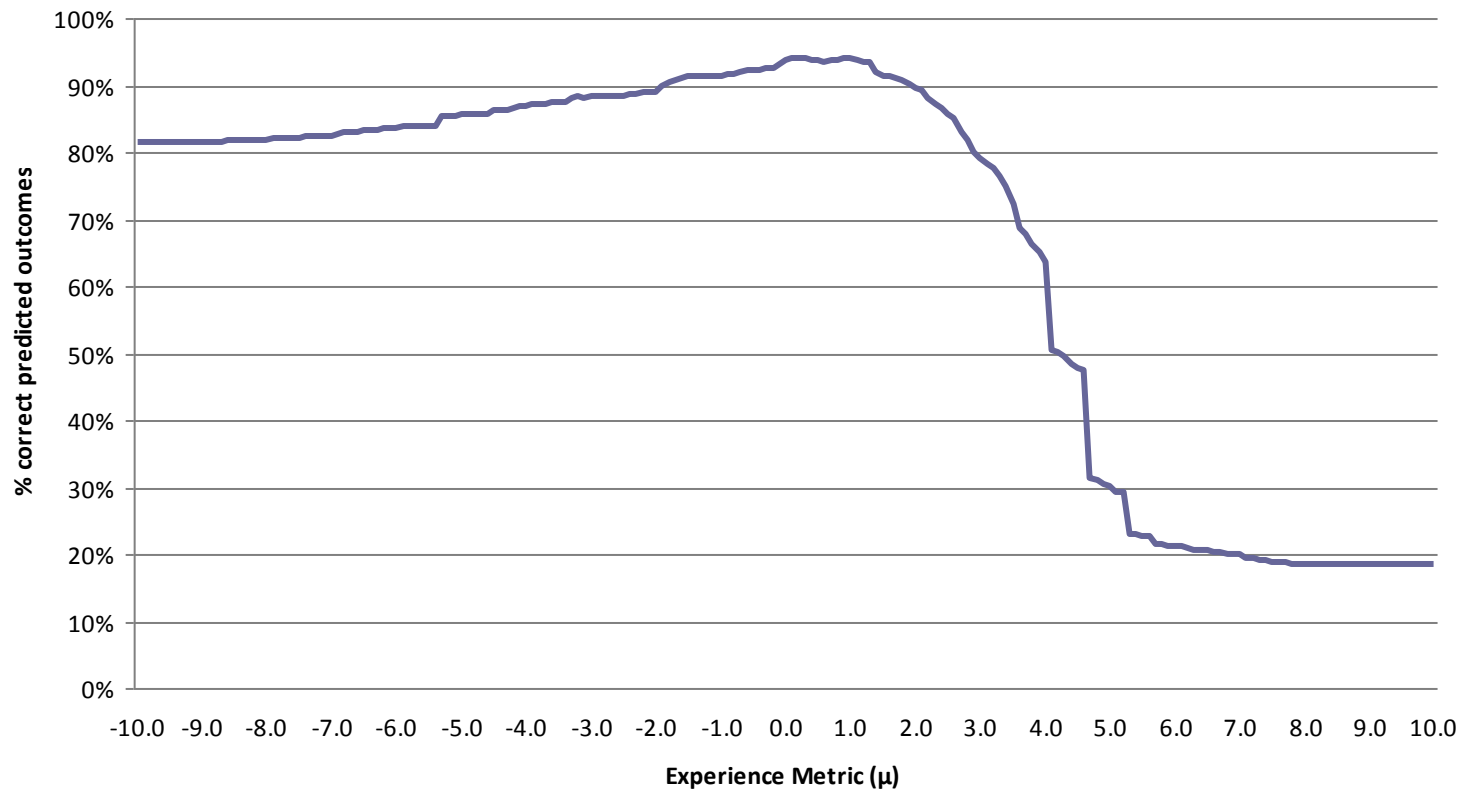
Max Predictive Power



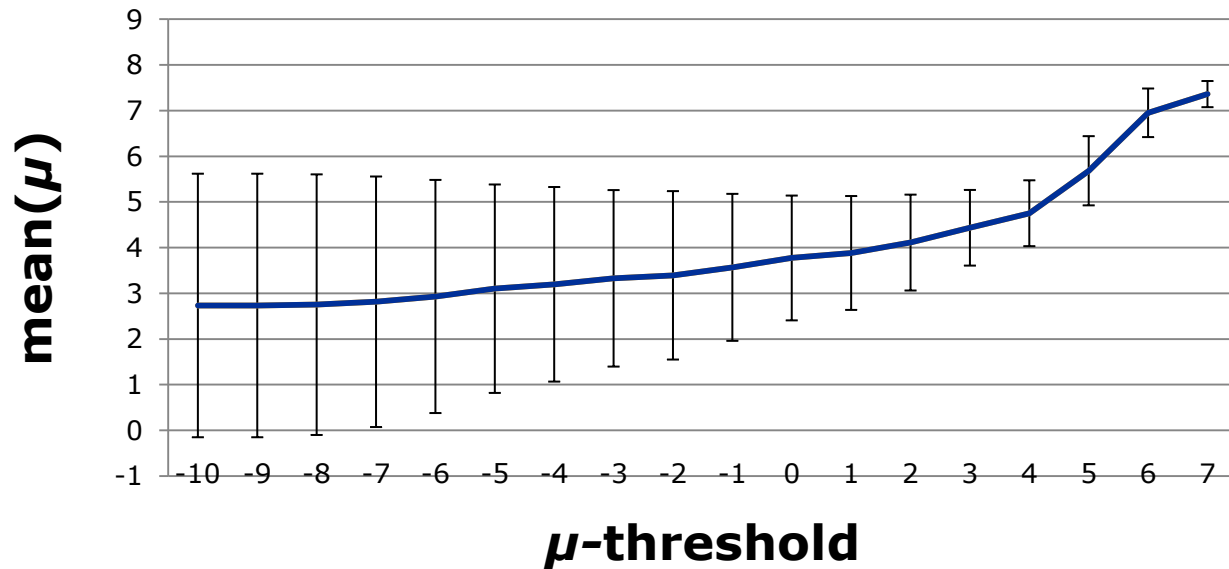
Evaluating the Experience Metric (μ): Transaction Results



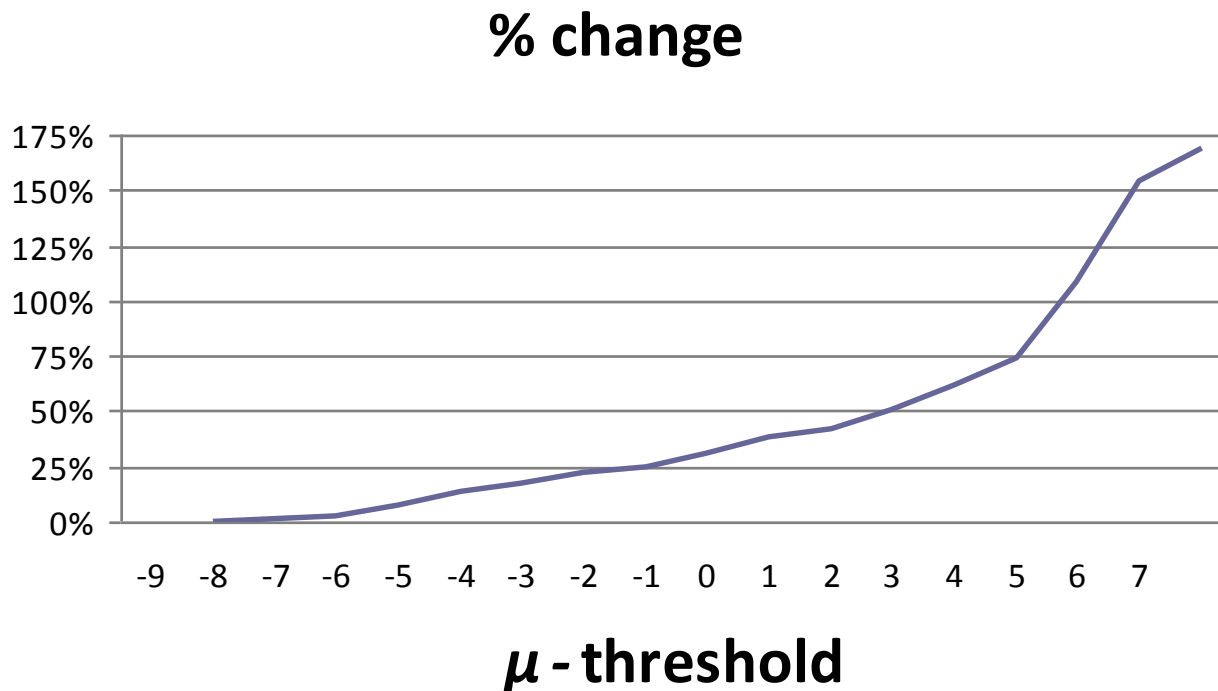
Evaluating the Experience Metric (μ): Predictive Power



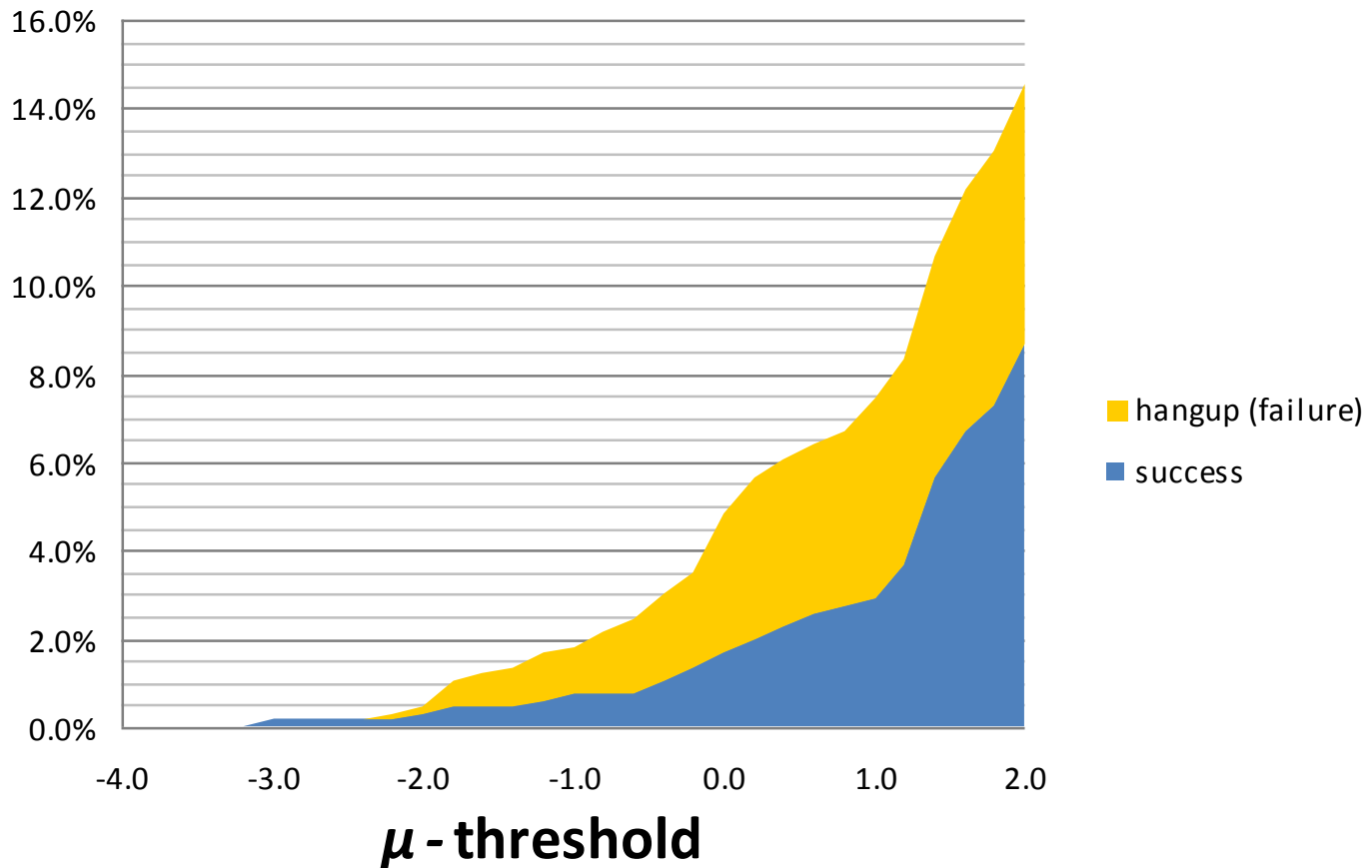
Effects of transfers based on μ -threshold: Mean caller experience



Effects of transfers based on μ -threshold: Mean caller experience



Effects of transfers based on μ -threshold: Additional Transfers



Future Directions

- Automatic setting of model parameters
- Automatic selection of thresholds based on high-level policy settings
- Initializing μ_0 from a database of previous calls
- Specialized prompting for “at-risk” callers

Questions?

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