



SENTIMENT ANALYSIS SYMPOSIUM

# Critical Factors in Building Successful AI-Powered Conversational Interfaces

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Nuance Communications

# Cognitive Innovation Group

Applying the latest in AI to Customer Care

- High Value Problems
- Can be generalized to a product / market
- Work with Strategic Partners and Definitional Customers



# Overview



- Industry and Consumer Trends in Conversational Interfaces
- 5 Critical Factors
  1. Not all Chatbots and Virtual Assistants are created equal.
  2. Leverage existing content to answer questions
  3. Bring human agents into the loop: provide great UX and make the VA smarter at the same time
  4. Learn from live agent chat log data to improve the VA
  5. Ensure a smooth transition to a human agent for the long tail of interactions the VA can't handle (yet)
  6. Target the right customer at the right time with the right message in the right way.
- Summary
- Questions

**Chatbots will be responsible for cost savings of over \$8 billion annually by 2022, up from \$20 million in 2017.**



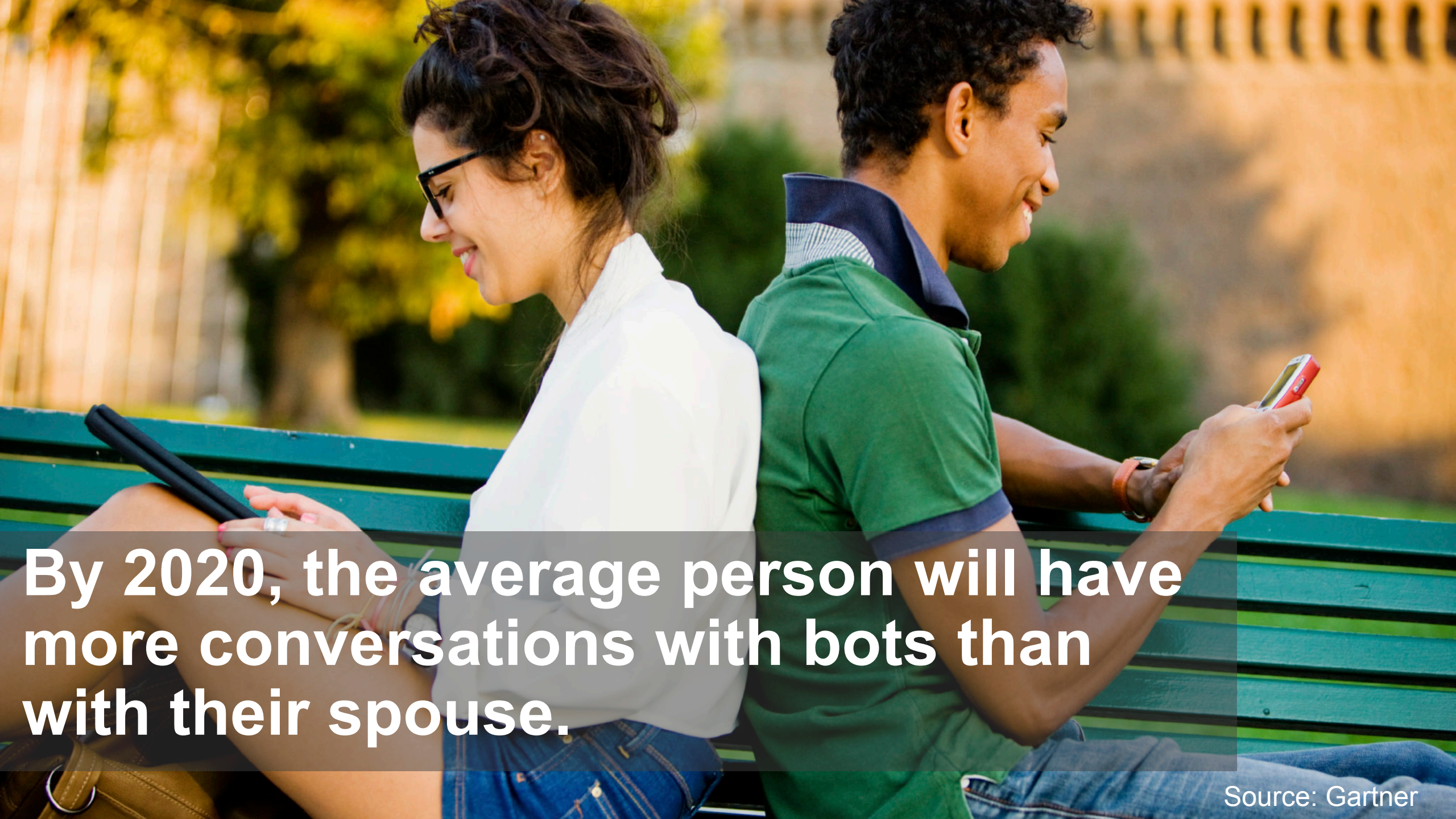




**42% of consumers already use digital assistants, while 72% of business execs and 53% of millennials are using them.**

Source: PwC





**By 2020, the average person will have more conversations with bots than with their spouse.**

Source: Gartner



**As long as they can get help quickly and easily, 40% of consumers don't care whether a chatbot or a person answers their customer service questions; 53% for simple requests.**



Source: Hubspot Research





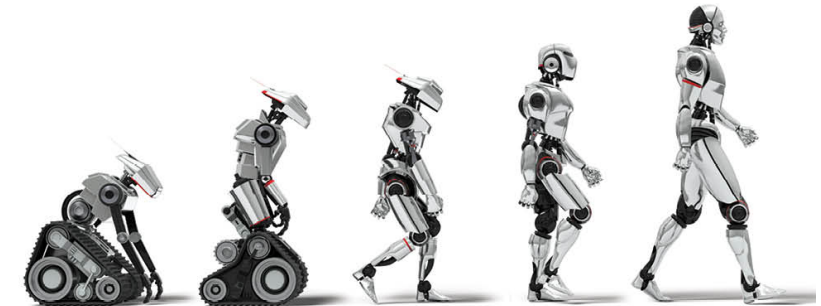
**Chatbots will power 85% of all  
customer service interactions by the  
year 2020.**

Source: Gartner



# #1 Not all Chatbots/VAs are created equal

- There is no industry standard for terms like *Chatbot* and *Virtual Assistant*
- Regardless of the .ai in a company's name, many chatbots are not built with AI
  - Many are heavy on the rules and regexes, light on the AI
  - Sometimes people are pulling the levers
- Virtual Assistants should be powered by **Conversational AI**
  - This covers research in conversational agents, dialogue systems, natural language understanding (NLU) and natural language generation (NLG)
  - Today Conversational AI works best with a blend of automation, machine learning and human-assistance





# Key Features of a Virtual Assistant

Automation that reduces costs while creating effortless experiences

- **Targeting Engine** - Target the right visitor at the right time with the right engagement
- **Conversational** – Recognize intent with high accuracy, personalize responses to the user, based on context, and troubleshoot using conversational strategies, if needed
- **Integrated** – Reference 3rd party data to inform context and integrate with backend systems to access pertinent account/product information and complete transactions
- **Data-Driven** – State-of-the-art machine learning and NLP and NLU that are continually enhanced by learning from previous chat logs and IVR transcripts
- **Secure** – Ensure your customers are who they say they are without ever leaving the Virtual Assistant, with secure Multifactor Authentication through Biometrics



# Benefits of a Virtual Assistant



## Efficient

A virtual assistant provides the quickest way to give customers the answers they need, using **natural conversation**.

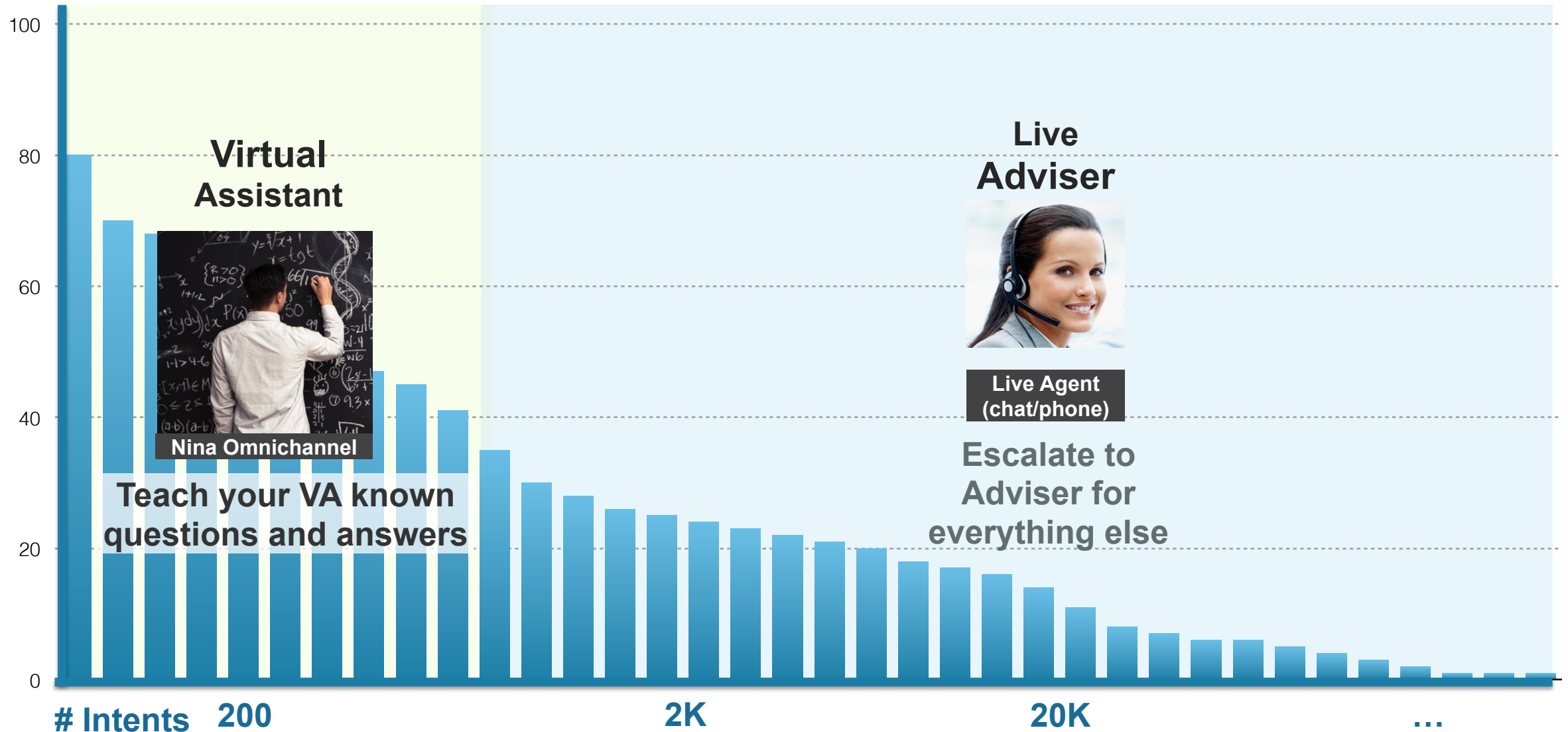
## Consistent

Offer customers a **consistent experience across digital channels**. This ensures the quality of service the customer expects.

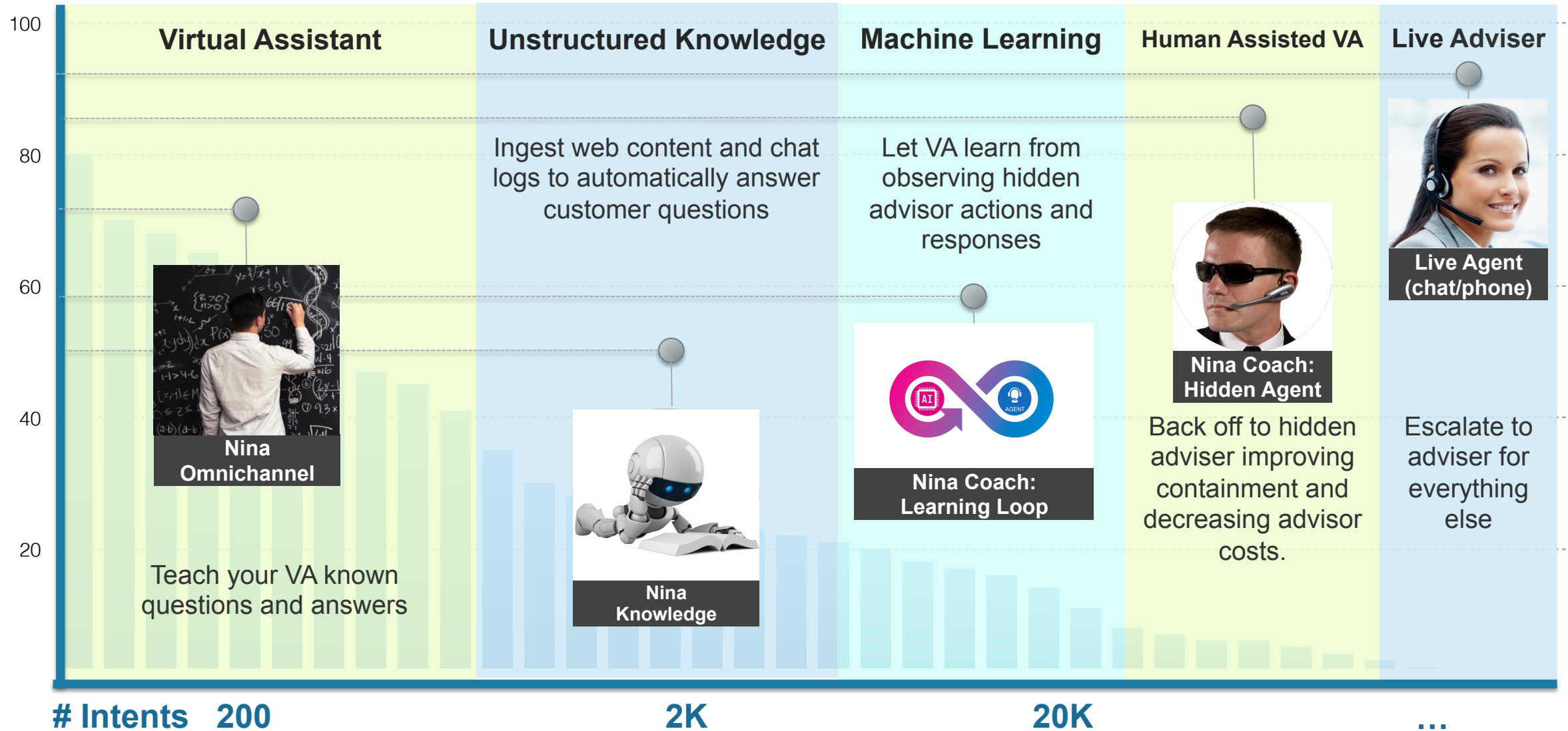
## Enterprise-Ready

**Build for large enterprises**, supporting each company's unique brand, data privacy & security, and system integration requirements to deliver complete solutions and high ROI.

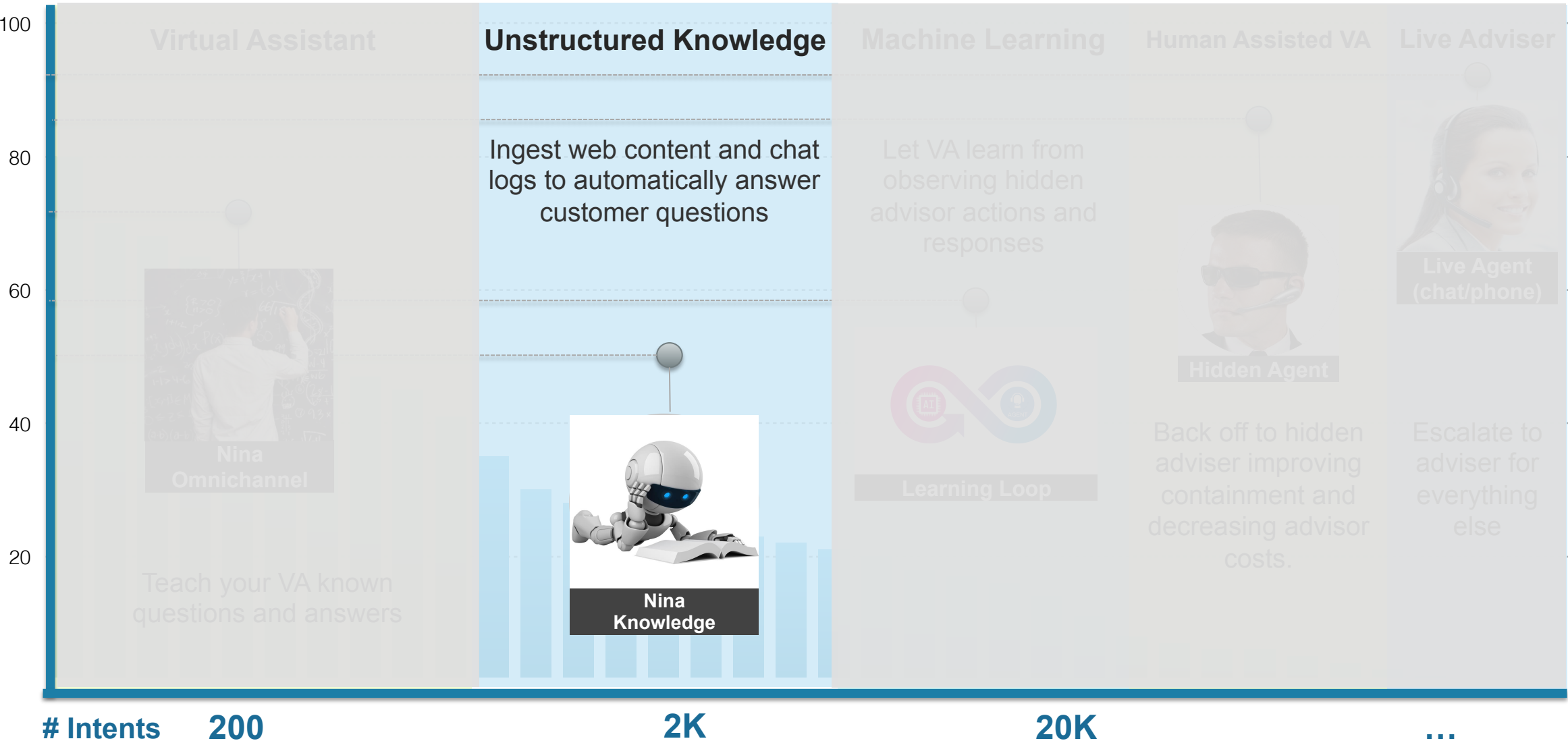
# Automation Today Handles Hundreds



# Conversational AI Handles Tens of Thousands



# #2 Leverage existing content to answer questions





# Nina Knowledge

*Cognitive Innovation Group Prototype*

- Ingest content from web sites, documents, knowledge bases PDFs
- Use a range of AI techniques from NLP, question answering and search (information retrieval) to find answers to questions
- These answers may not always be exactly in the data:

**User asks a question:**

*“How do I adjust the side mirrors?”*



**Virtual Assistant with Nina Knowledge**

**Finds passage in manual about:**

*“Controlling the exterior mirrors”*

Audi A4 Owners Manual >

Audi A4 Owners Manual

1 Passages identified

Audi A4 Owners Manual

The Audi A4 holds the distinction of single-handedly reviving the Audi brand after its big sales slump some two decades ago. Launched in the mid-'90s, the A4 quickly proved a favorite among luxury-car buyers thanks to it...

VIEW MORE

# Benefits of Question Answering with Nina Knowledge

1. Answer customer questions from existing content
2. Save time by implementing basic “information seeking” intents and responses automatically
3. Gain more time to work on complex business rules and processes that still require human intelligence

# #3 Bring human agents into the loop: provide great UX and make the VA smarter at the same time

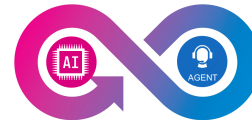
Nina  
Omnichannel

Teach your VA known  
questions and answers

Intent Discovery,  
Bootstrapping  
& Nina  
Knowledge

## Machine Learning

Let VA learn from  
observing hidden  
advisor actions and  
responses



Learning Loop

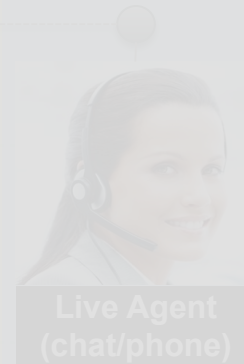
## Human Assisted VA



Hidden Agent

Back off to hidden  
advisor improving  
containment and  
decreasing advisor  
costs.

## Live Adviser



Live Agent  
(chat/phone)

Escalate to  
advisor for  
everything  
else

# Intents 200

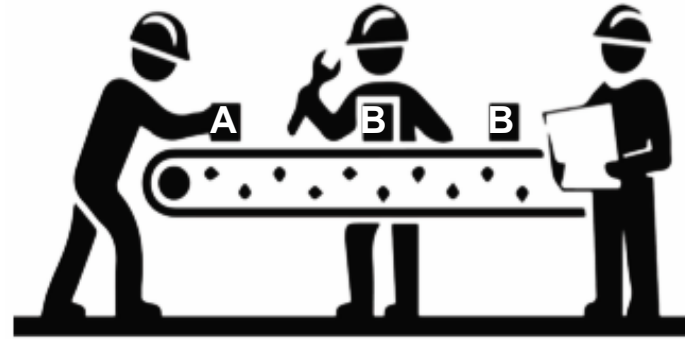
2K

20K

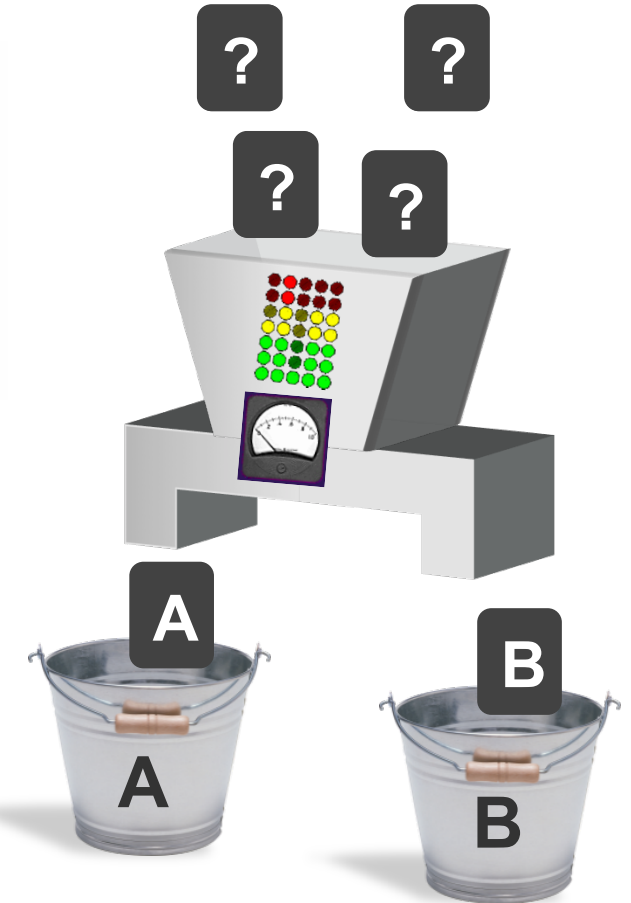
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# Supervised Learning

- Humans label a large number of examples to train a machine learning model
- The model learns patterns and can then label new items automatically
- Building training datasets is time-consuming and expensive
- When you hear people talk about Machine Learning, they're almost always talking about Supervised ML

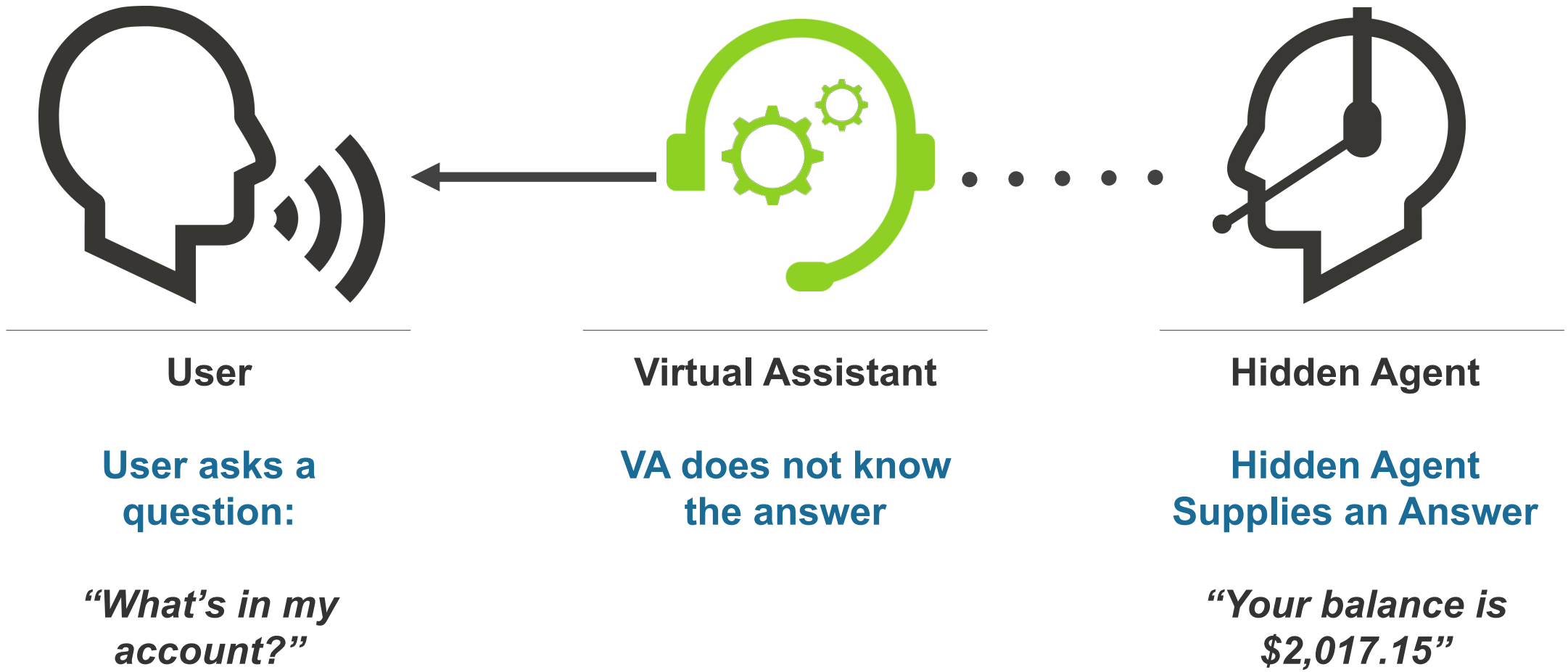


Train on labeled  
data  
Predict on new  
items

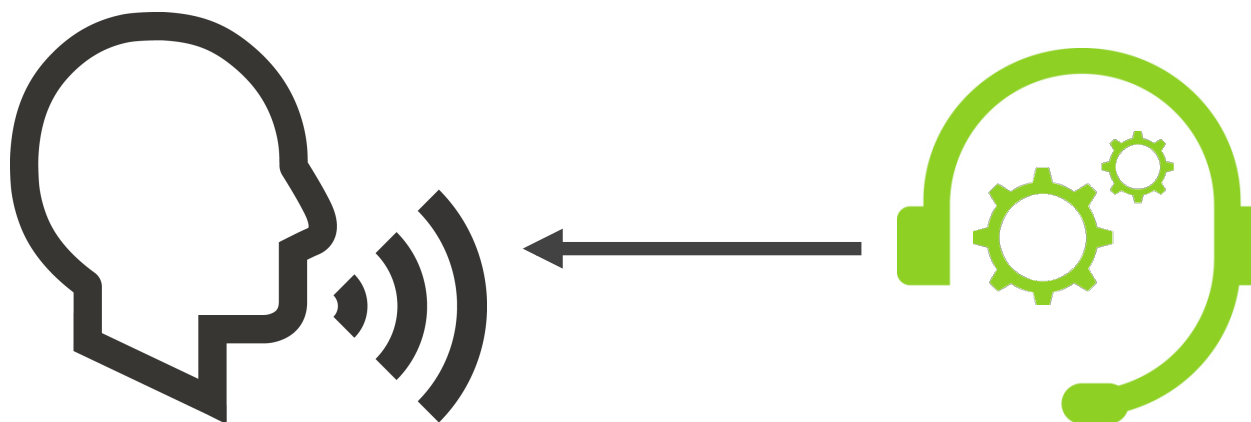
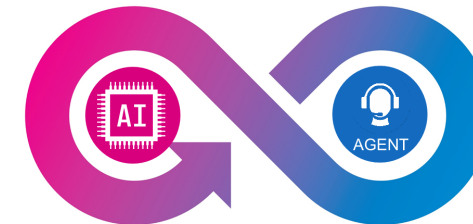




# Nina Coach: Intelligently Escalates and Observes Human Agents



# VA Learns the answer



User

Virtual Assistant

User asks a  
question:

VA knows  
the answer

*“What’s in my  
account?”*

*“Your balance is \$2,017.15”*

# Benefits of Human Assistance

1. Reduce negative user experiences when the virtual assistant doesn't know how to respond
2. Live chat agents can assist the VA while doing their normal work. Dedicated hidden agents are not required.
3. Avoid the need for expensive training data collection to train a VA. Nina Coach creates the labeled data needed to train machine learning and deep learning models, and allow customers to continue to move closer to full automation

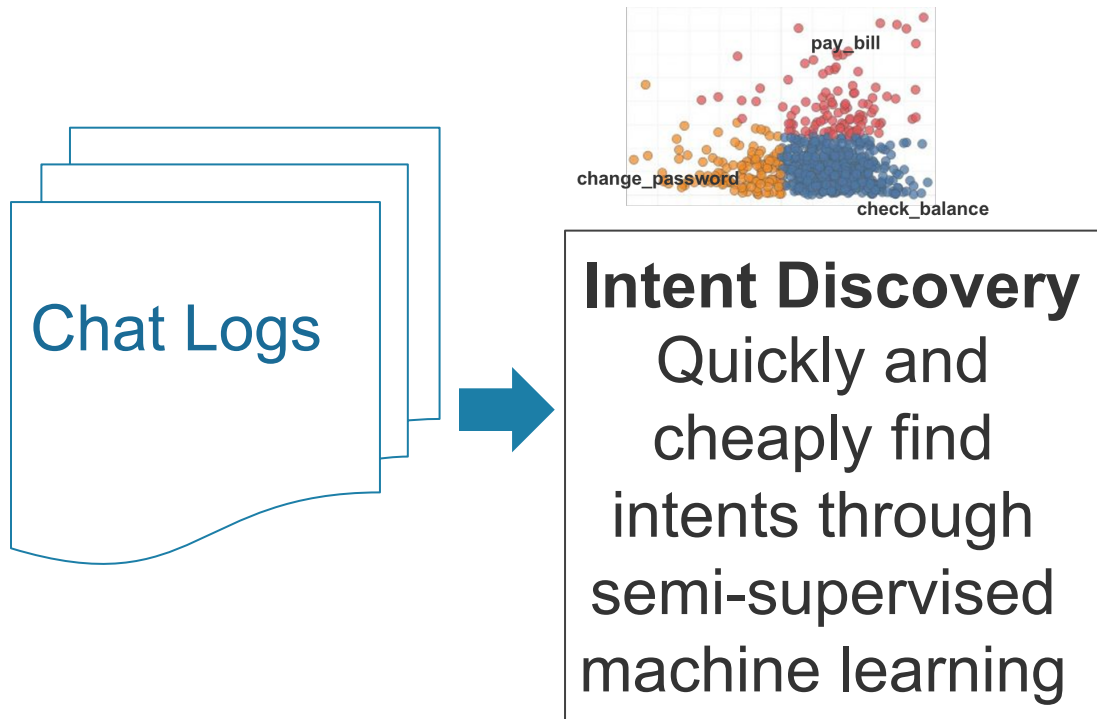
## #4 Learn from live agent chat log data to improve the VA



Begin by ingesting a dataset of *unlabeled* chat logs collected from live agents

Go to market with a VA in **hours**, not months. Then improve and tune by learning, while the systems is already online fielding calls.

# Bootstrapping new virtual assistants from data



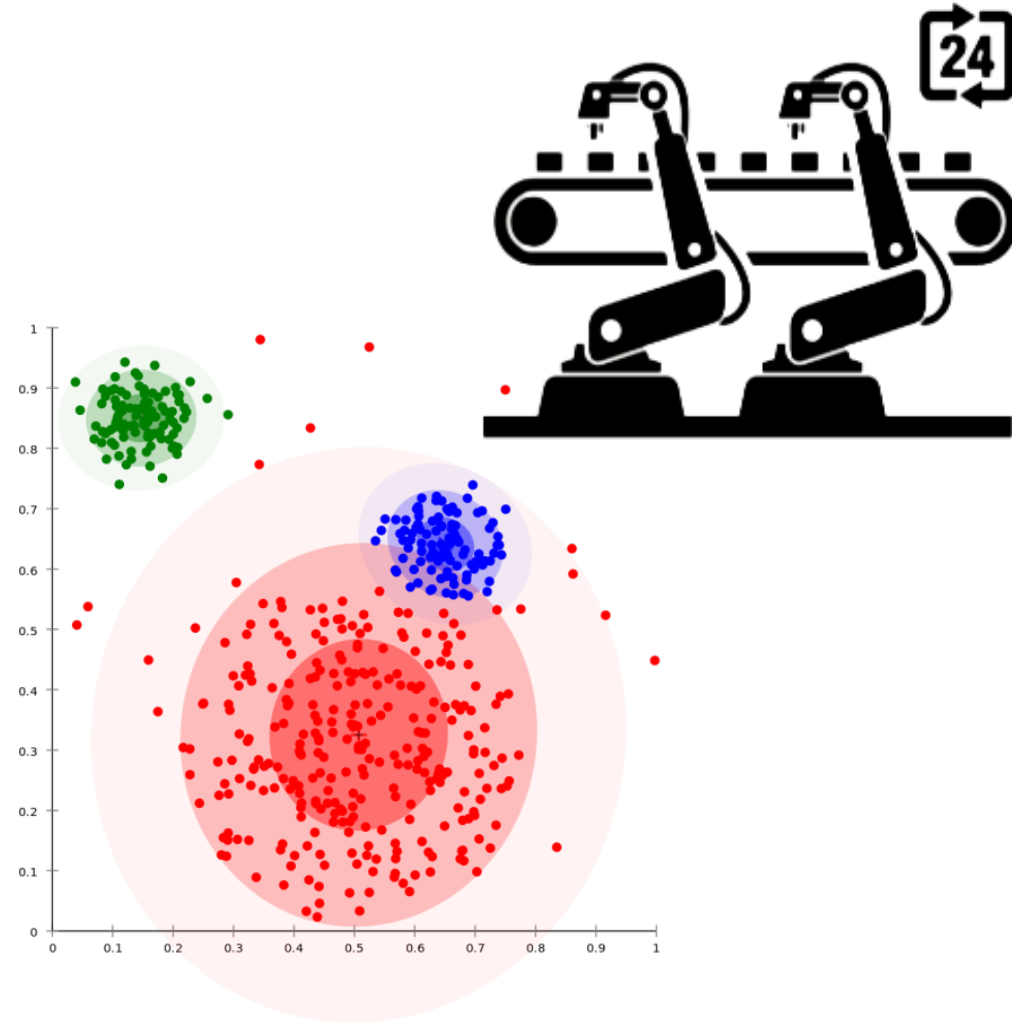
No labeled training data required!

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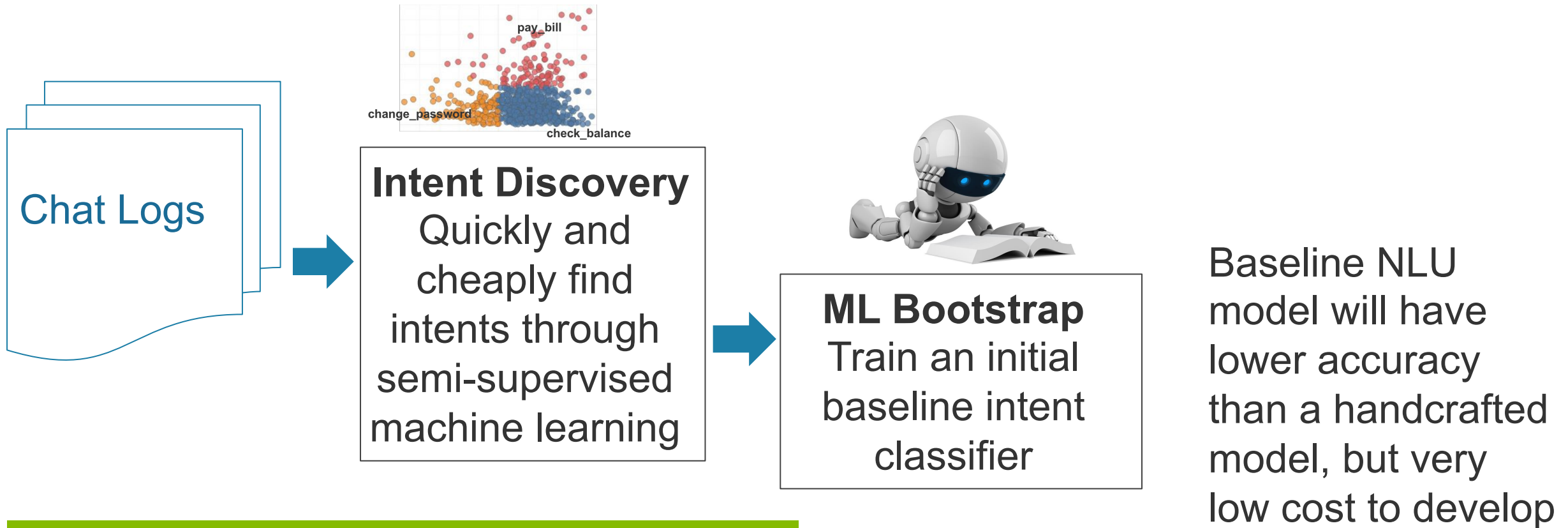


# Unsupervised Learning

- Only “unstructured” data, a.k.a. unlabeled data
- Algorithm automatically finds patterns in the data
- Unsupervised learning is largely used for exploratory data analysis (EDA)

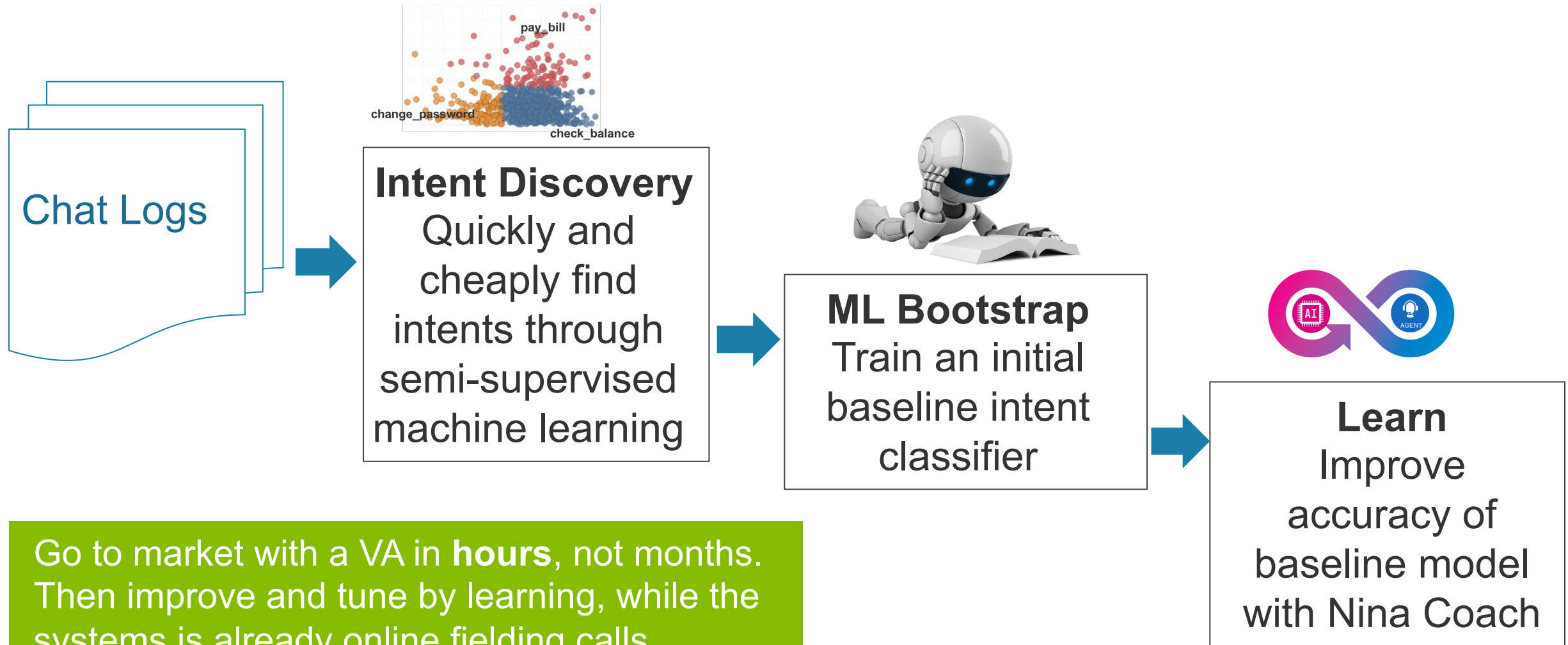


# Bootstrapping new virtual assistants from data



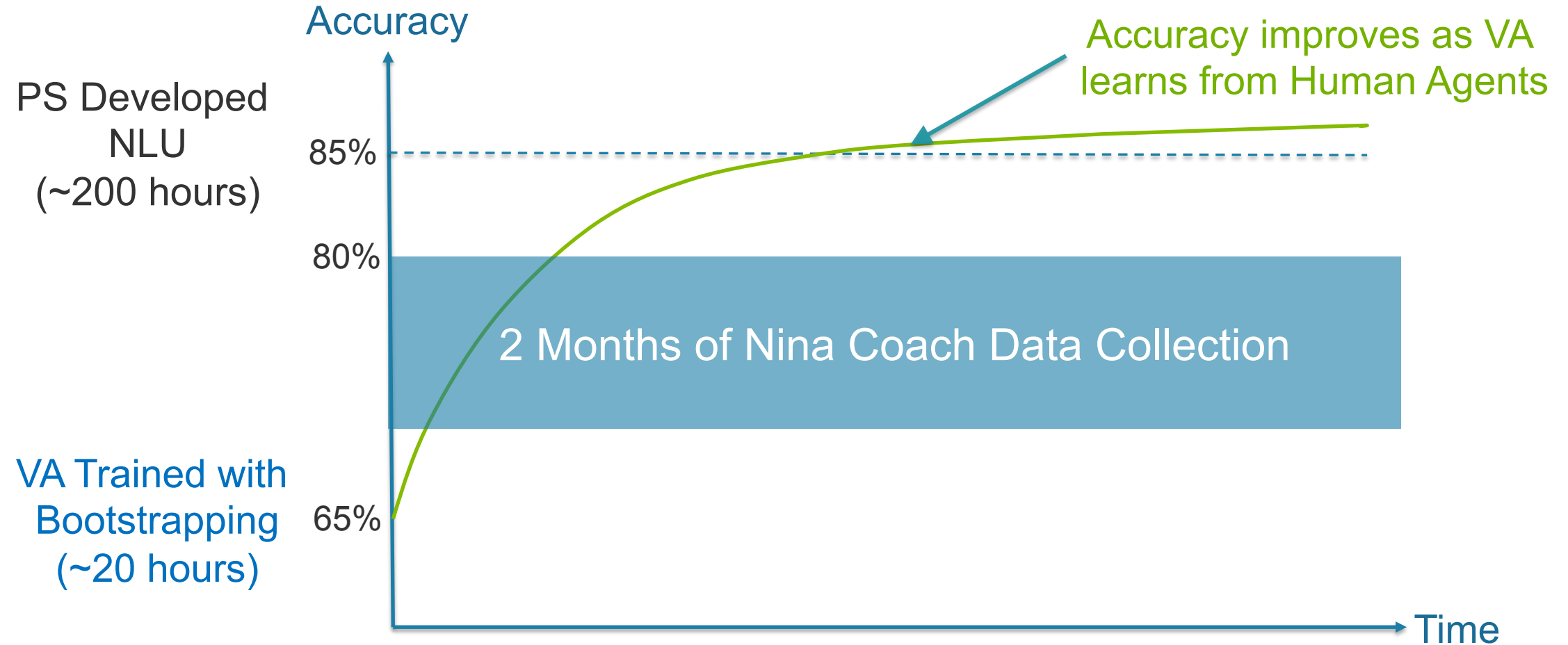
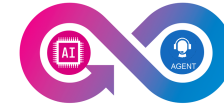
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# Bootstrapping new virtual assistants from data

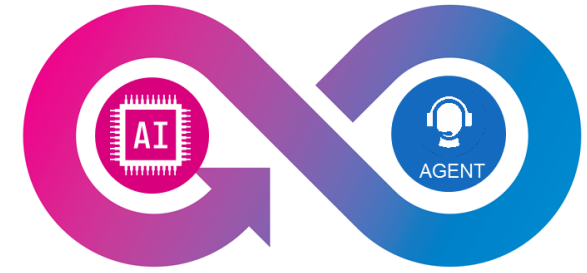


Go to market with a VA in **hours**, not months. Then improve and tune by learning, while the systems is already online fielding calls.

# Bootstrapping + Nina Coach



# Bootstrapping + Nina Coach



10X  
Improvement  
in Scalability

# #5 Ensure a smooth transition to a human agent for the long tail of interactions the VA can't handle (yet)

Live Agent



Live Agent  
(chat/phone)

Escalate to  
agent for  
everything  
else

Hidden Agent

Back off to hidden  
adviser improving  
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Learning Loop



Intent Discovery,  
Bootstrapping  
& Nina  
Knowledge

Teach your VA known  
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Nina  
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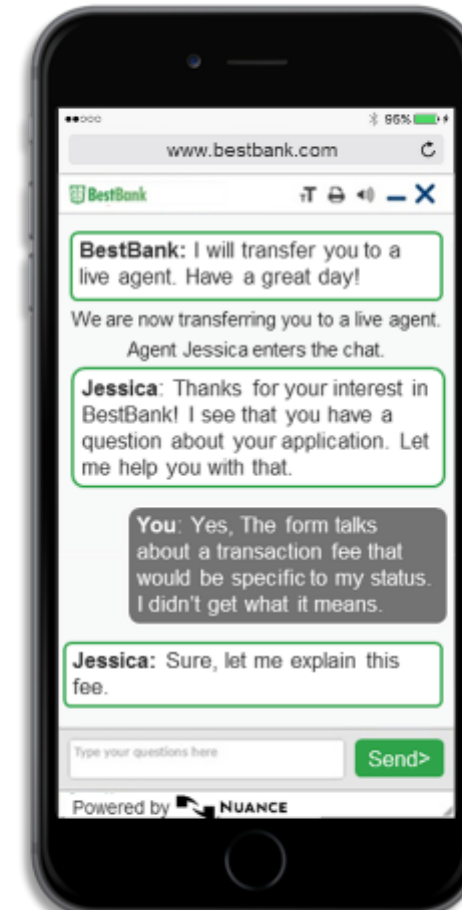
# Intents 200

2K

20K

...

# Seamlessly Transfer to Live Agents in the Same Window



## #6 Target the right customer at the right time with the right message in the right way.

**WHO**

To target

**WHAT**

Medium to use

**WHEN**

To trigger

**WHERE**

To launch

**HOW**

It should look

**WHY**

To engage

**Nuance Real-time Targeting Engine**





# Virtual and Live Assistance – Better Together

Delivers intelligent automated conversations, leading consumers to self-serve

**By leveraging VAs, Live Chat and our Targeting Engine brands are able to:**

- Seamlessly escalate from virtual assistant to live agent, as needed, while maintaining the context of the conversation
- Serve the right digital interaction to the right visitor at the right time
- Measure and optimize KPIs along the funnel

**Nuance enables brands to:**

- **Increase revenue and improve user satisfaction** by offering consumers human-like dialog with the virtual assistant
- **Reduce agent handle time** by training the virtual assistant engine using transcripts from live chats



**Provide Enterprises with Optimal Combination of Virtual Assistant and Live Chat Interactions**

# Summary

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2. Leverage existing content to answer questions.
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# Questions?



# Thank You