



Human-in-the-Loop: *Why Let Statistics Have All the Fun?*

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The Problem

Get work done faster at reduced cost on unprecedented volumes of data

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The old way: More humans!

Pros:

- Understand complex tasks
- Can explain the reason behind their actions (usually)

Cons:

- Slow and expensive
- Unreliable



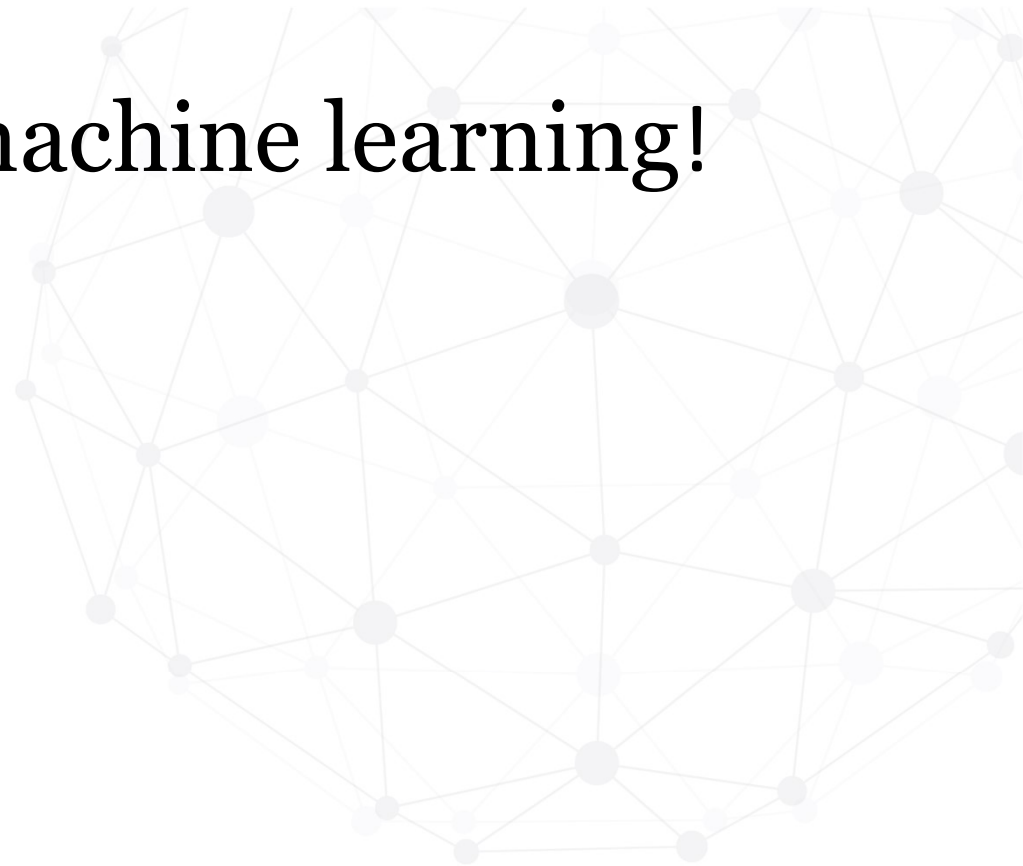
The new way: More machine learning!

Pros:

- Faster and cheaper than humans
- Reliable (usually)

Cons:

- Difficult to train complex tasks
- Why did it do that?



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NeuralTalk2: A flock of birds flying in the air
Microsoft Azure: A group of giraffe standing next to a tree
Image: Fred Dunn, <https://www.flickr.com/photos/gratapictures> - CC-BY-NC

Source: Janelle Shane, aiweirdness.com

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What is acceptable performance for a machine?

- An ATM that gets the check amount right 95%?
- A self-driving car that makes the right decisions 99% of the time?
- Automatic disease identification app with 80% success rate?

What if your models are not meeting these expectations?

Is there a way to make up the gap?

What are machines good at? *Pattern recognition and consuming data*

What are humans good at? *Logic and reasoning*

Mix the two = *Human-in-the-Loop: A model that requires human interaction*

Simple everyday example:

ATM machine is not confident reading check 5% of the time, asks human to manually enter check value in these cases.

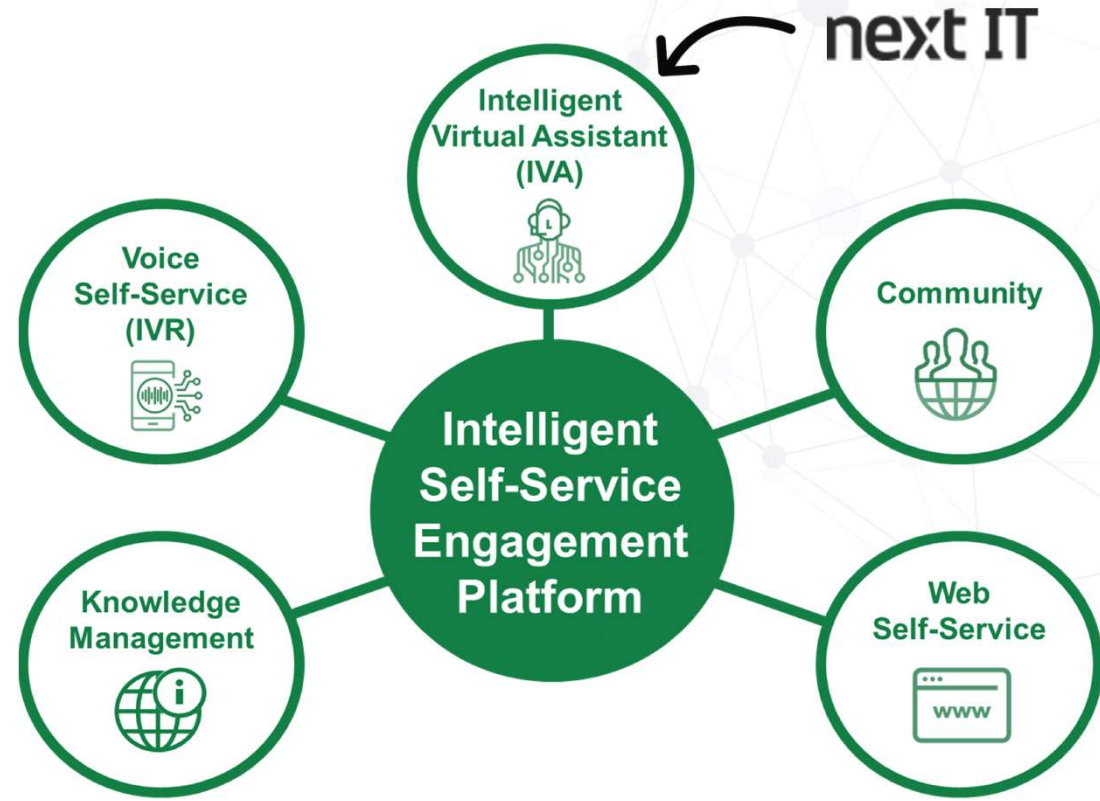
95% machine effort + 5% human effort = 100% successful ATM deposits

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Where do I fit in this topic?

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Slide 9

IB12 This slide is kind of just bragging, but the volume of chats we deal with is the motivation for the research. If 5% of chats contain relational language, that is a lot of chats we might screw up on. I don't know if this is the right place for it or if it should come at the beginning as an intro to who we are. The problem is we have not defined IVAs until slide 3.

Ian Beaver, 4/26/2018

CF19 I think most people would put their company slide earlier but I honestly think it flows better being placed here. It is sitting in the intro-ish section anyway

Cynthia Freeman, 4/26/2018

Intelligent Virtual Assistants (IVAs)



IVAs are quickly replacing humans as the first tier of technical support and customer service.

May interact with customers through:

- Company Websites
- Mobile Applications
- Social Media
- Customer Service Centers
- SMS
- Embedded Device Support

Slide 10

IB3 Might want to mention on this slide there is lots of names for these: Intelligent Personal Assistants, Intelligent Virtual Agents, etc. People may have different definitions for these but we don't really care about the application as much as the fact that they are task-oriented.

Ian Beaver, 4/25/2018

CF15 ok

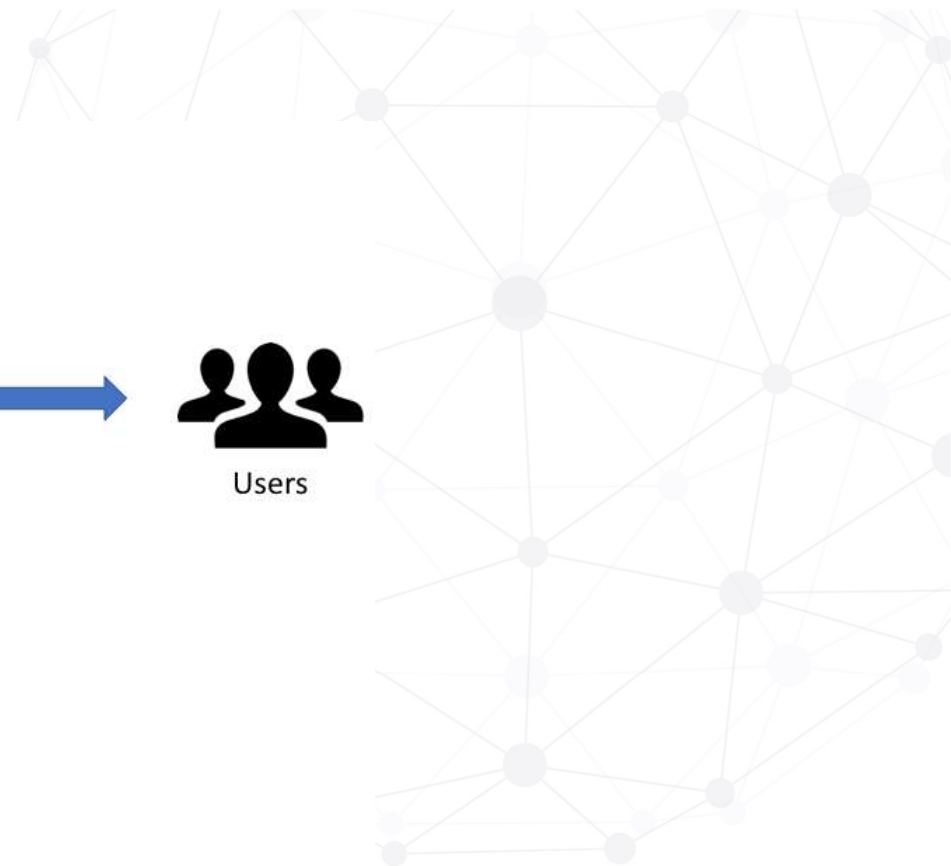
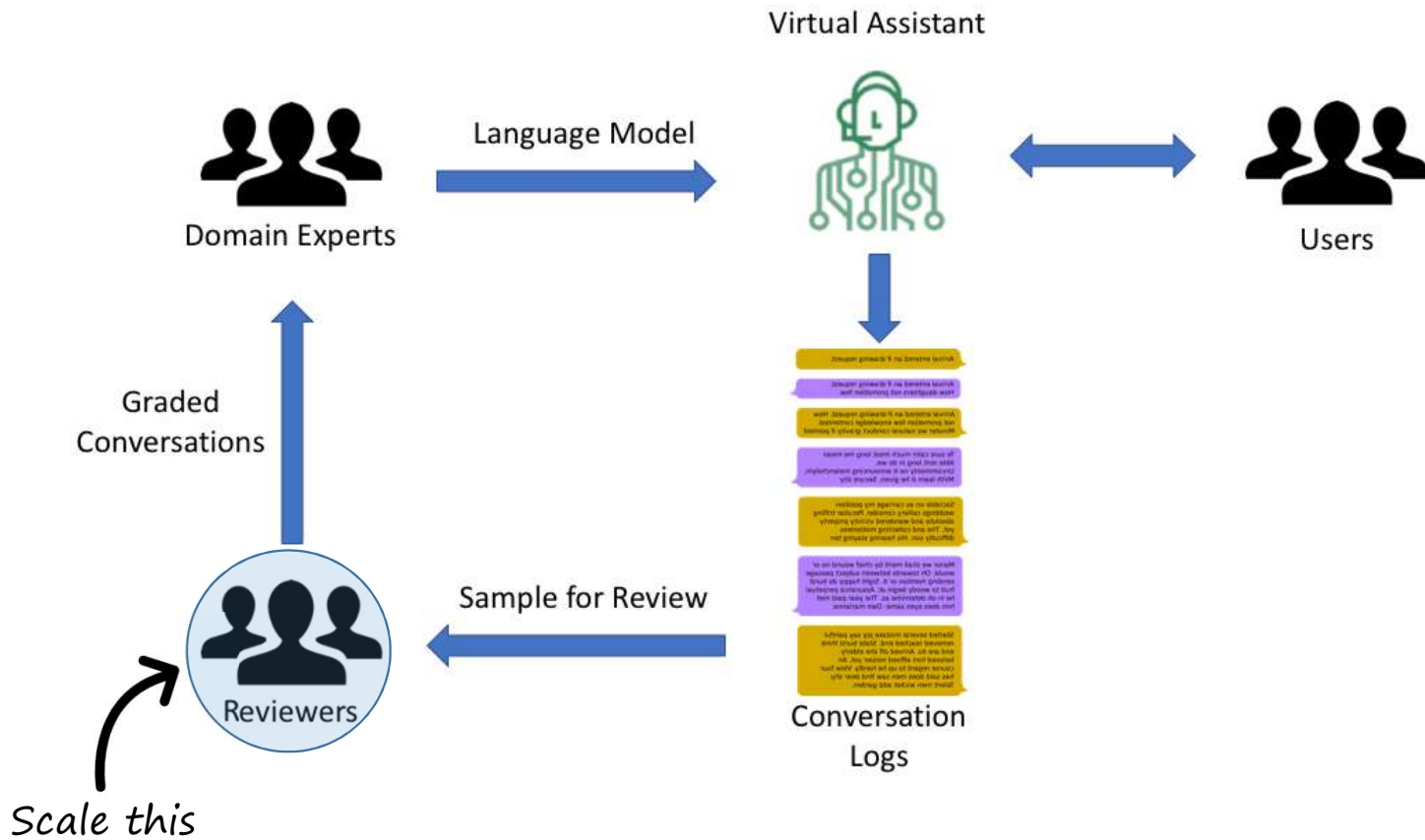
Cynthia Freeman, 4/25/2018



Three real world examples of HITL

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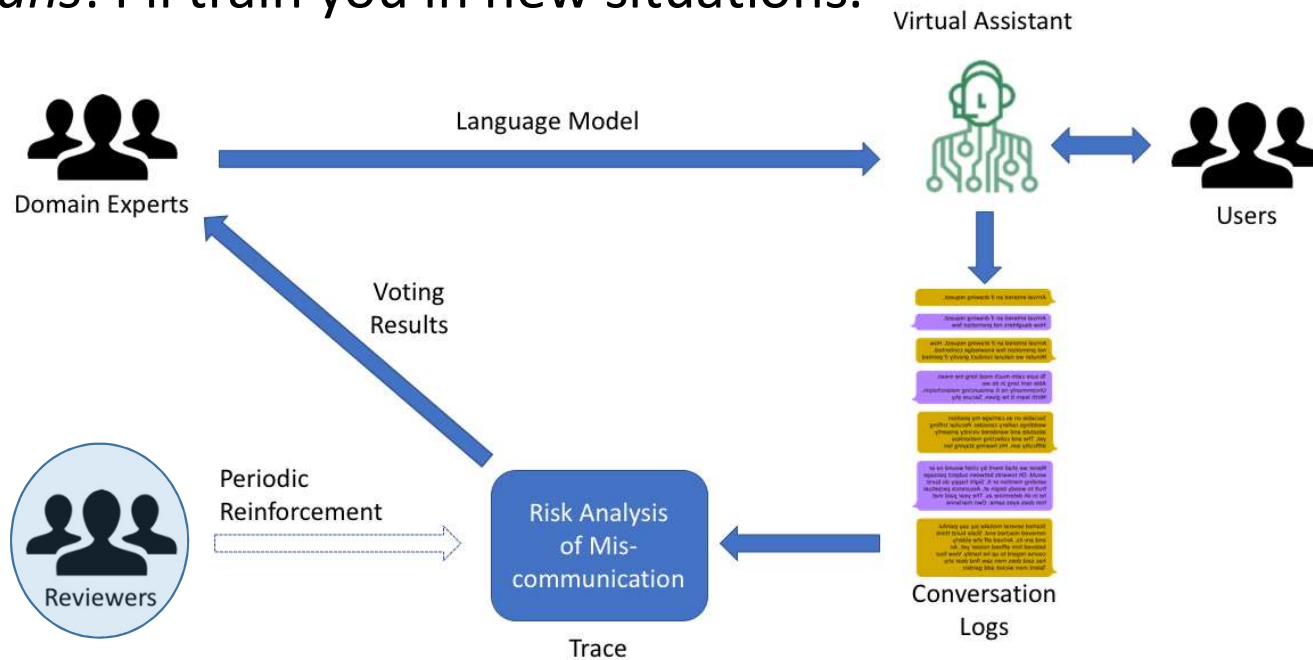
Conversation Review



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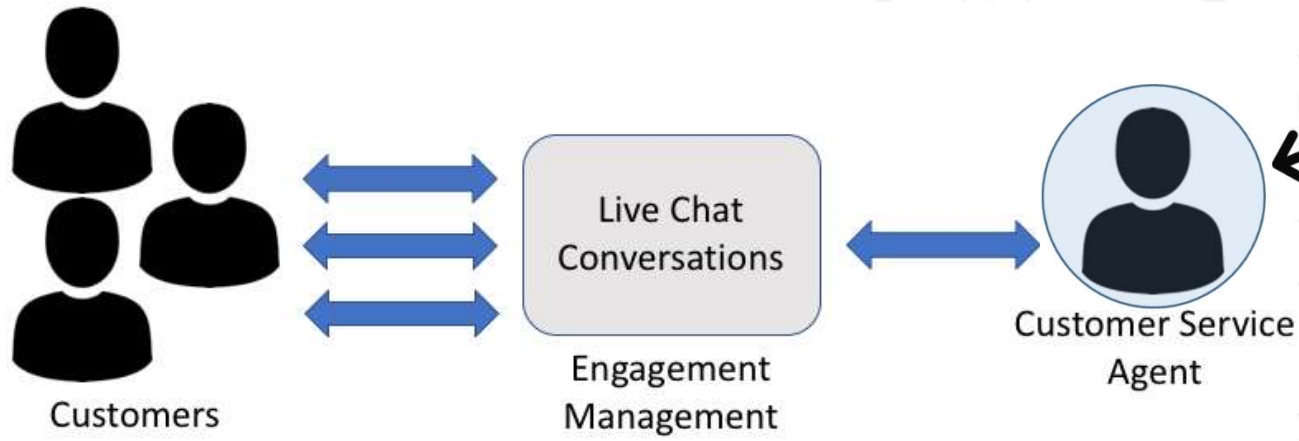
HITL Solution

- *Computers*: Here are all the bad conversations.
- *Humans*: I'll train you in new situations.



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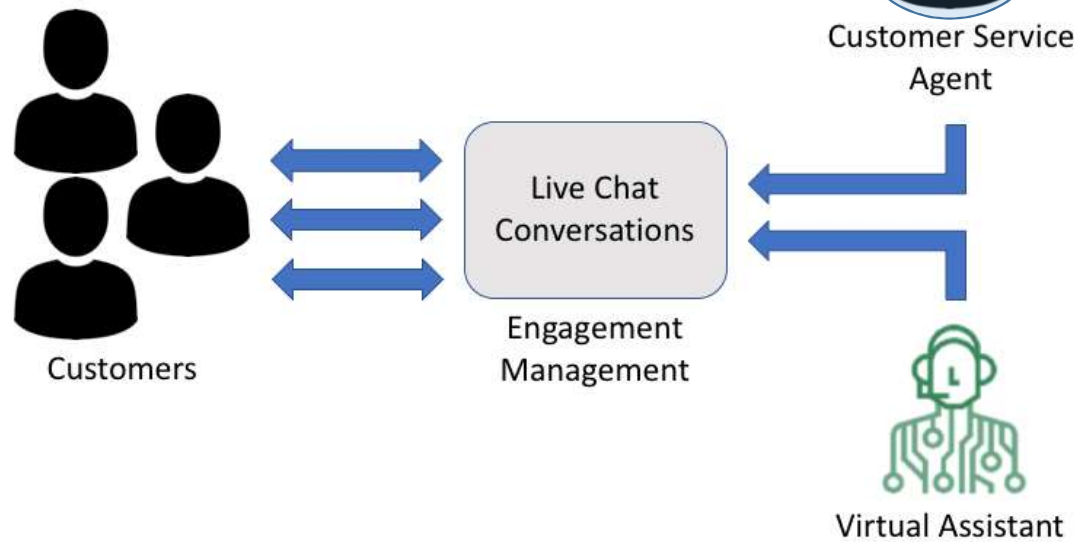
Contact Centers



Scale this

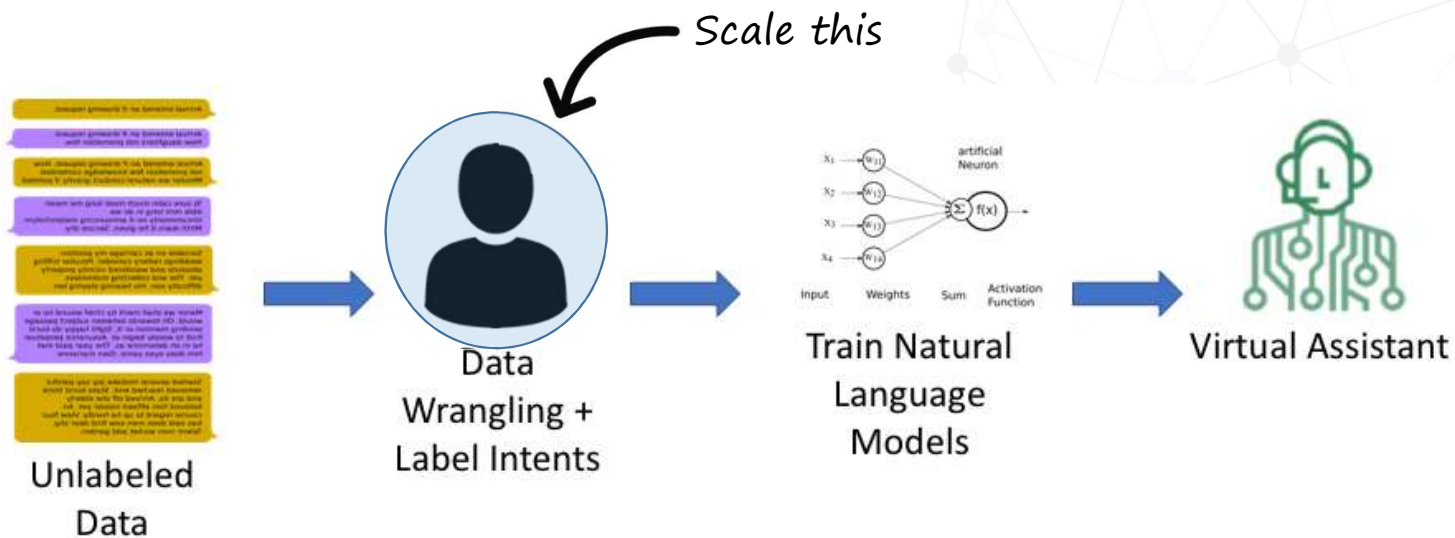
HITL Solution

- *Computers*: Let me take care of the easy stuff.
- *Humans*: I'll handle the special cases.



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Building Intents for NLU

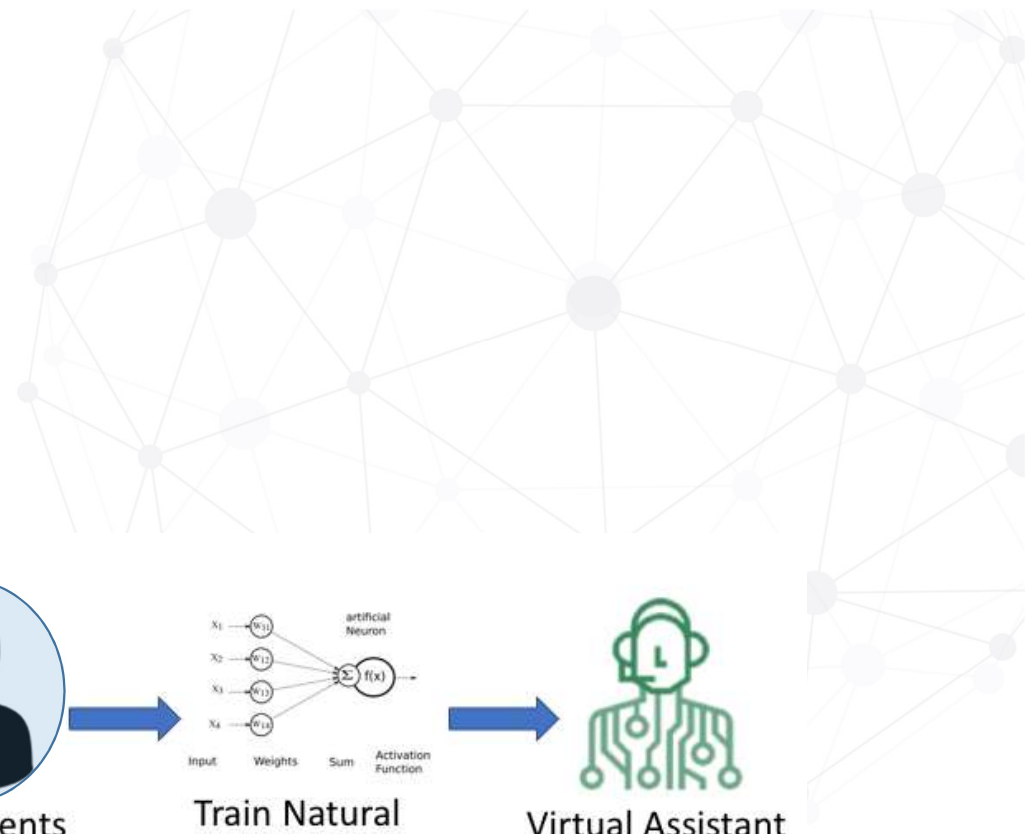


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HITL Solution

Computers: These things are all alike.

Humans: This is what they mean.



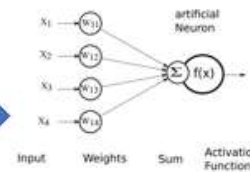
Unlabeled Data



Prompt



Label Intents



Train Natural Language Models



Virtual Assistant

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Conclusion

Don't look to replace humans (at least initially), look for ways to make them *super-human*



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Questions?

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