



# Customer Journey Optimisation

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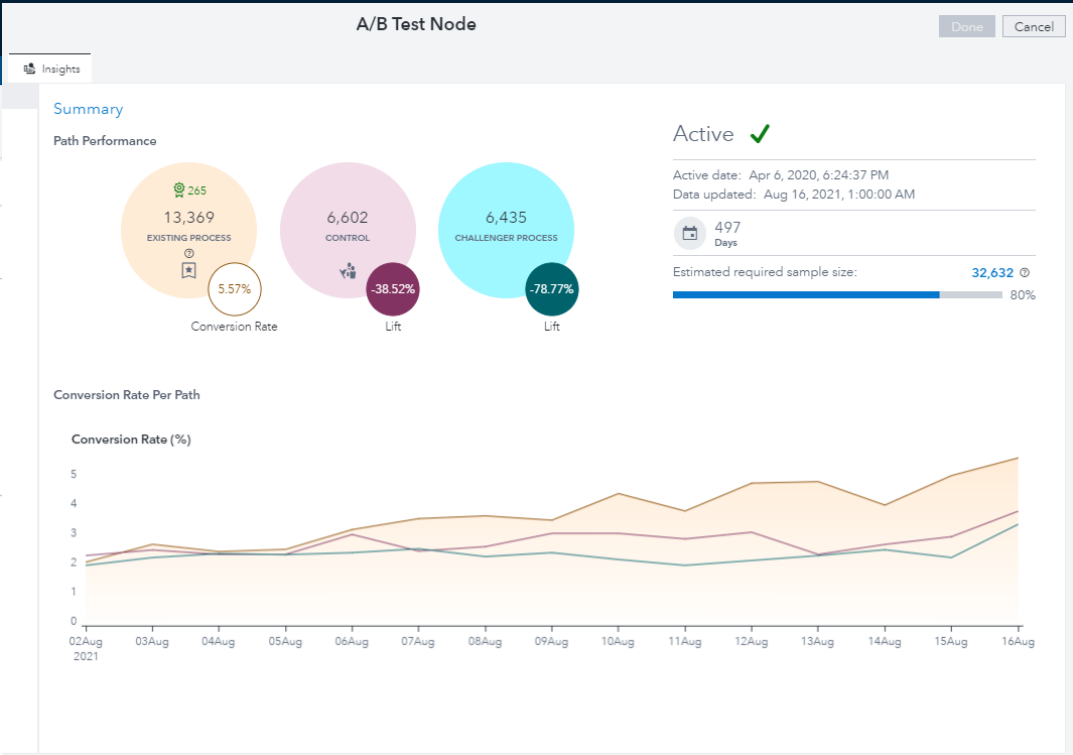
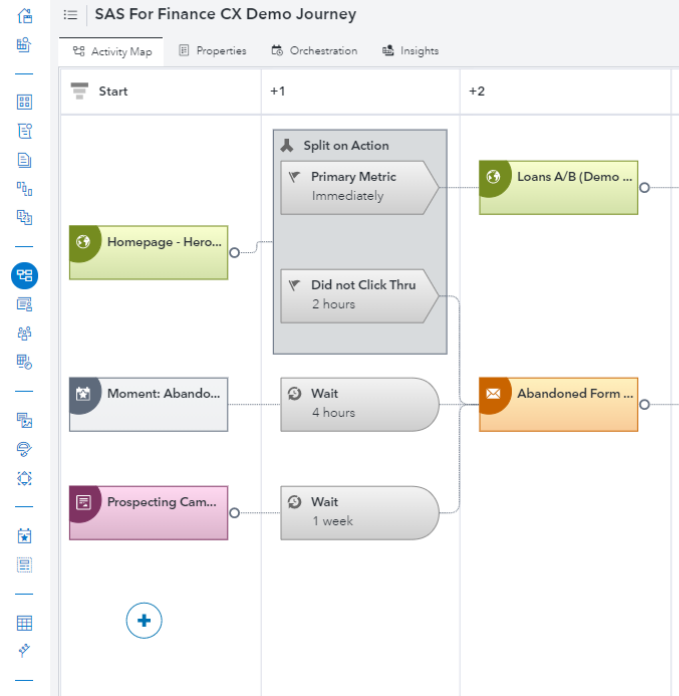
# Synopsis

*Mastering the customer journey is a crucial task across industries for the modern marketer, and a journey through the different capability levels will be shared today, including*

- *simple methods to test and learn across customer journeys, such as A/B testing of the journey;*
- *more complex analyses such as algorithmic attribution to cut through the noise and discover the successful journeys that exist*
- *more complex algorithmic approaches, driven by latest AI and ML techniques*

# Walk, Run,.....Fly?





# Signs up for Landing Page Offer

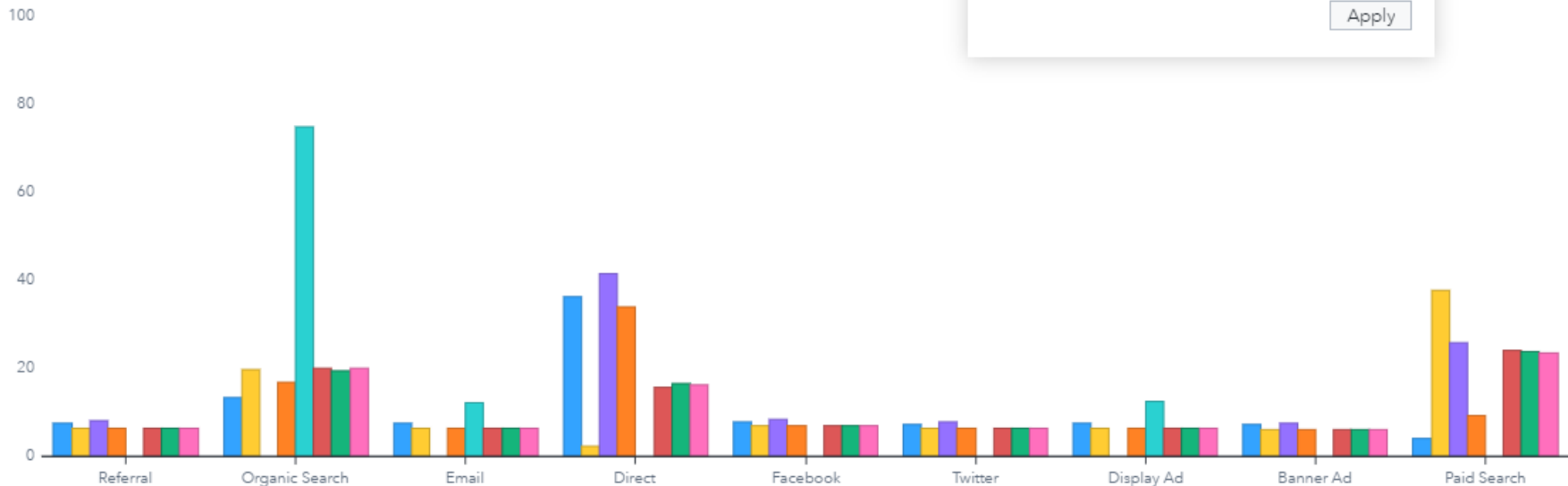
Close

Conditions | Attributes | Attribution | Orchestration

Analysis parameters: Most recent 30 days - Traffic Sources - 7 days maximum

## Overview

Traffic Source Attribution Share



Touchpoint - Jul 16, 2021 through Aug 16, 2021

■ Analytic 
 ■ First Touch 
 ■ Custom Recent with Exclusions 
 ■ Last Touch 
 ■ Custom Recent 
 ■ Linear 
 ■ Position-based 
 ■ Time Decay

- Analytic
- Custom Recent
- First Touch
- Linear
- Custom Recent with Exclusions
- Position-based
- Last Touch
- Time Decay

Filter Models

## Customer Journeys

This is a list of customer journeys that are ordered by conversion rate. Select a touchpoint node to see more detail.

Show: Percentage within path ▾

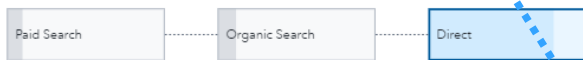
Conversion: 2.20%  
Non-conversion: 97.80%



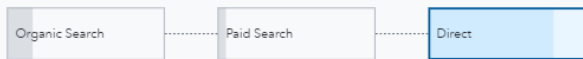
Conversion: 1.27%  
Non-conversion: 98.73%



Conversion: 2.12%  
Non-conversion: 97.88%



Conversion: 1.88%  
Non-conversion: 98.12%



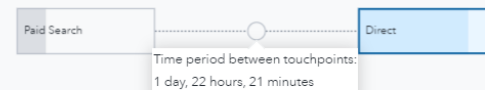
## Direct

Conversion: 2.20%  
Non-conversion: 97.80%



## Path Timing

Conversion: 8.40%  
Non-conversion: 91.60%



Conversion: 0.85%  
Non-conversion: 99.15%



Conversion: 0.13%  
Non-conversion: 99.87%



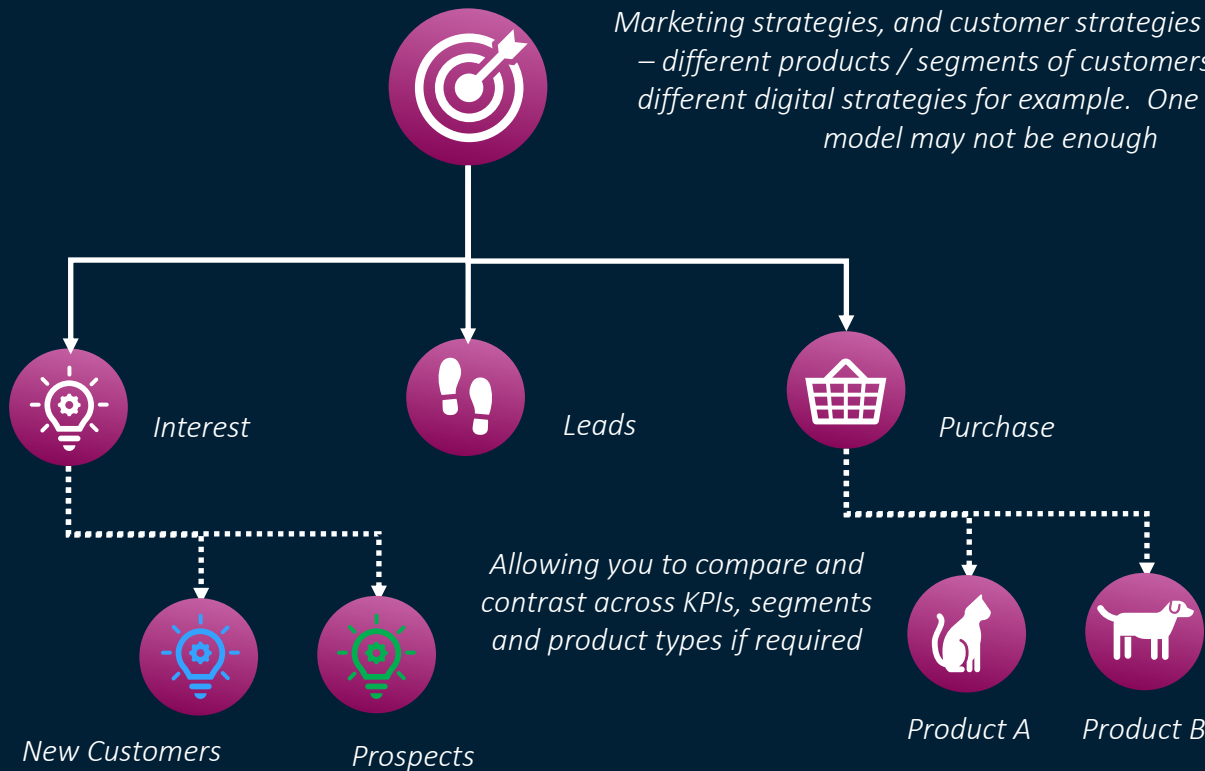
Conversion: 0.05%  
Non-conversion: 99.95%



# DETAILED INSIGHT – KPI Hierarchies

Marketing strategies, and customer strategies are nuanced – different products / segments of customers may have different digital strategies for example. One attribution model may not be enough

SAS enables multiple attribution models to be run, across different hierarchies



# How are we feeling?





# EMPOWERING VARIOUS PERSONAS

“Do-it-for-me”

“Do-it-yourself”



**Marketer**



**Analyst**



**Data Scientist**

[Forrester CAT Wave](#)

- Eligible  
Everyone
- Exclusions  
None
- Analytic Targeting**  
Active

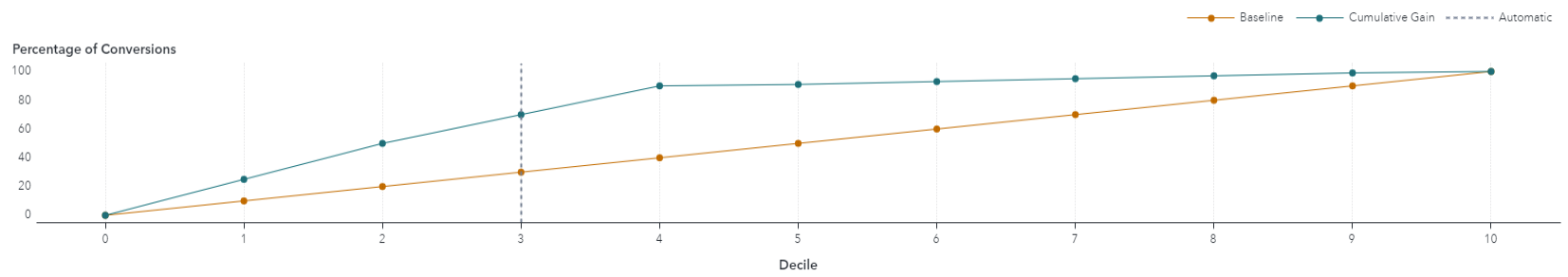
### Analytic Targeting

Enable analytics to develop a model that can be used to predict and target which users are most likely to convert. ⓘ

Enable analytic targeting *Analytic targeting activated: Jan 18, 2021, 5:00:00 AM*

Model fitness ⓘ  Target users most likely to convert ⓘ

### Cumulative Gains ⓘ



<b>6%</b> Conversion rate ⓘ	<b>72%</b> Lift ⓘ	<b>70%</b> Percentage of all conversions ⓘ	<b>5%</b> Misclassification rate ⓘ
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Select the cutoff threshold for this model. ⓘ

Automatic based on a strategy:

- Minimize the cost of delivering marketing treatments by minimizing non-conversions - (3rd decile)
- Balance the number of conversions with the ability to exclude non-converters - (5th decile)
- Maximize the difference in conversion rate between targeted and excluded groups - (4th decile)
- Maximize confidence that there is a difference in conversion rate between targeted and excluded groups - (2nd decile)

Manual:

Select a decile to preview and set the cutoff threshold for this model: 4 ▼

# EMPOWERING VARIOUS PERSONAS

“Do-it-for-me”

“Do-it-yourself”



**Marketer**



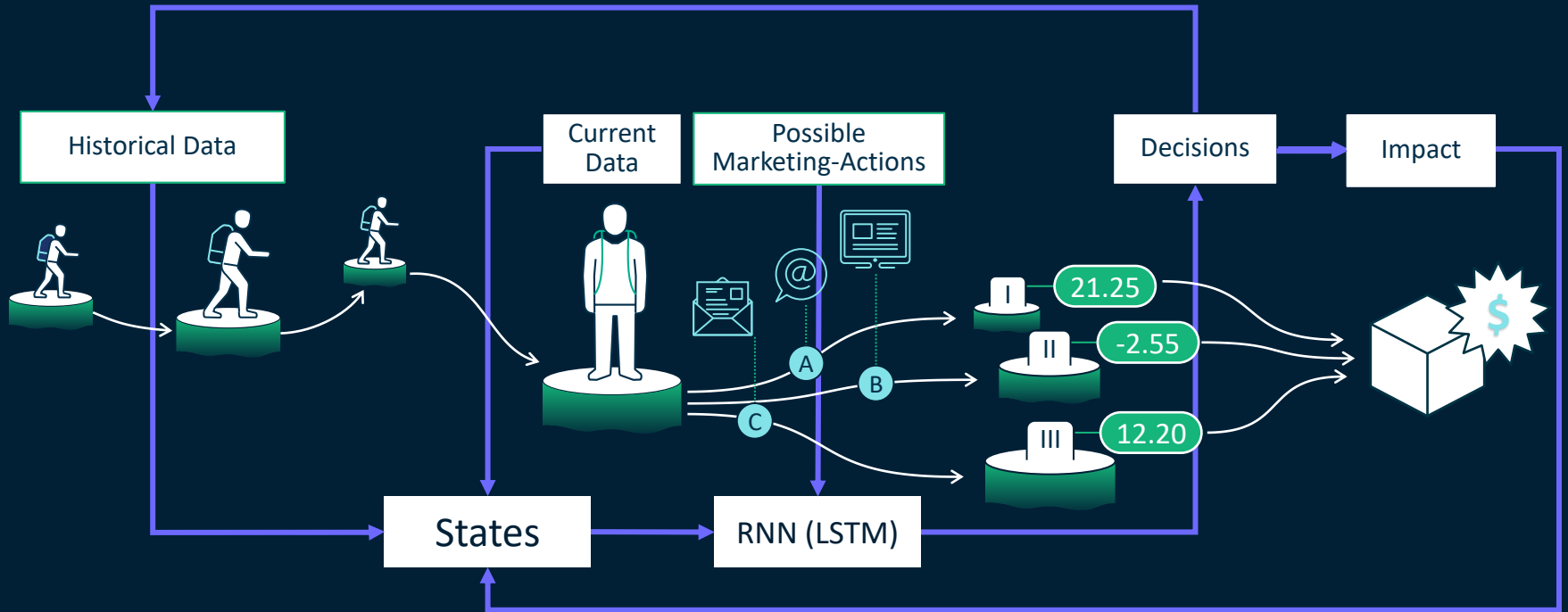
**Analyst**



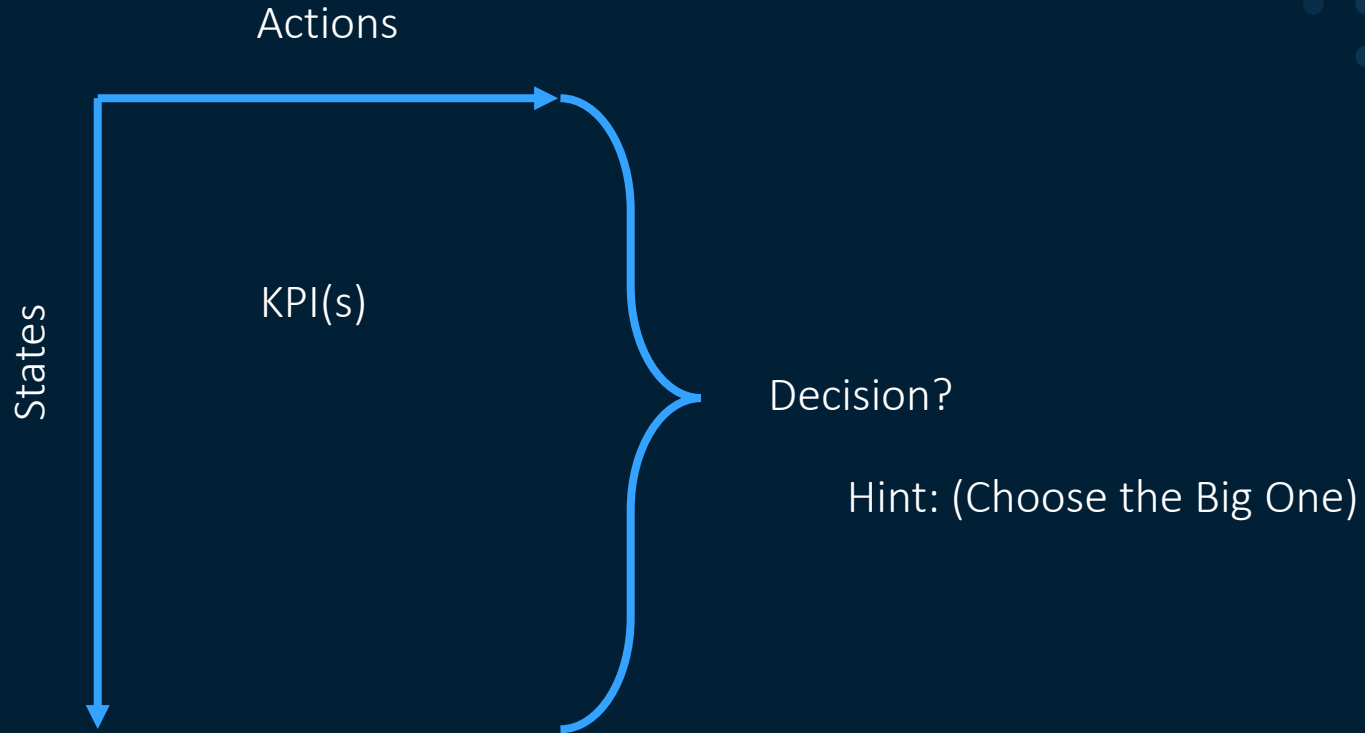
**Data Scientist**

Let's ask the first polling question!

# CUSTOMER JOURNEY OPTIMISATION



# Or, more simply.....



# Example

Story      Cookie+Milk      Pyjamas      GotoBed

- None
- Story Told
- Cookie+Milk Given
- Pyjamas on
- Gone to Bed
- Story+Cookie
- Story+Pyjamas
- Story+Bed
- Cookies+Story
- Cookies+Pyjamas
- Cookies+Bed
- Story+Cookies+PJs
- .....

- We will know the new state (i.e. actions taken, and outcome)
- For that new state, we will have the same set of options (although there may be some eligibility rules)
- Thus this matrix isn't changing, we just need to learn and discover the best action each time....
- .....which is done by assigning a value to the end action....and then the probability of that occurring helps us get a net value of previous actions.

[Or see here](#)

SAS® Visual Data Mining and Machine Learning 8.3: Deep Learning Programming Guide

What's New in SAS Deep Learning

**Deep Learning Technical Concepts**

- Convolutional Neural Networks
- Recurrent Neural Networks**
- Optimization Algorithms
- Training Deep Neural Networks
- Hyperparameter Tuning
- DataSpecs Options
- Projection Layer
- Keypoints Layer
- Object Detection
- Network Pruning
- Creating Custom Functions and Network Layers with SAS FCMP
- Computational Considerations for CNN and RNN Architectures
- Ordering Model Weights
- Deep Learning with GPUs
- SAS DLPy Python API Examples
- Deep Learning Action Sets in SAS CAS

Importing Models into SAS Deep Learning

- Deep Learning Action Set
- Deep Neural Network Action Set
- Recurrent Neural Network Action Set

Version ▾

- Using Sequence Analysis Models
- Using Generic RNN Models
- RNN Model Compatibility
- RNN on GPUs
- RNN Examples
  - RNN Text Classification Example
  - RNN dITune Example
  - RNN Text Generation Example
  - RNN Time Series Example
  - RNN Sequence Labeling Example
- Appendix: Part-of-Speech Tags (Penn Treebank Project)
- References

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## Overview of RNNs

Recurrent Neural Networks (RNNs) are specifically designed to handle sequence data, such as speech, text, time series, and so on. RNNs are called recurrent because they perform the same task for every element of a sequence. The output for each element depends on the computations of its preceding elements.

The original RNN is quite simple in architecture, but can be very hard to train when sequences get long. Two variants of RNN are popular: Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU). The SAS Deep Learning actions support all three model types (RNN, LSTM, GRU). The formulas used for the Deep Learning RNN, LSTM, and GRU algorithms are in [Empirical Evaluation of Gated Recurrent Neural Networks on Sequence Modeling](#), by Chung, J., Gulcehre, C., Cho, K., and Bengio, Y.

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## Peephole Connections in RNNs

Peephole connections were created to improve performance of Long Short-Term Memory (LSTM) networks. Peepholes connect the LSTM memory cell to non-linear gates (input, output, forget) that regulate the flow of signals in and out of the cell. This behavior allows the gates in LSTM networks to not only depend on the hidden state,  $s_{t-1}$ , but also on the previous internal state  $c_{t-1}$ . This adds an additional term to the gate equations. Peephole connections can effectively regulate long range dependencies and improve RNN training performance.

# Ready for Take Off?

Let's ask the second polling question!





# Questions?



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