What is Anomaly Sign Detection?? → Picking abnormal up
Anomaly Sign Detection is necessary for safety and soundness of industry.

- Fraud
- in Banking
- in e-commerce deal
- in Game

- IOT / Robot
- Security

Anomaly Sign Detection

- Disaster prevention
- Safety insure
- Environments pollution prevention

- Health care
- Public sanitation

Neural Stream-FDS

NeuralStream-FDS is a solution made with unique and keen tech of BICube™ for detecting of anomaly banking transaction. The system constantly compares "long-term" profile with the recent behavior of bank's users and offer ML components for higher accuracy ratio.

NeuralStream Structure

Neural Steam is a unique and keen structure of **BICube™**
It makes FDS process complex and high volume of data in real time. Neural Stream was invented from mechanism of neuron of a cranial nerve.
The designer of FDS can form many type of topology of neuron for the purpose.

[neuron in Neural Stream]

atomic unit that get input from output of any other's neuron and calculate and store temporary result.

NeuralStream's unique features

[fast stream process]

neuron – can process max **2 million messages per sec.**

[forming topologies of neuron]

→ no programing language coding

→ the designer can realize many kinds of topologies.

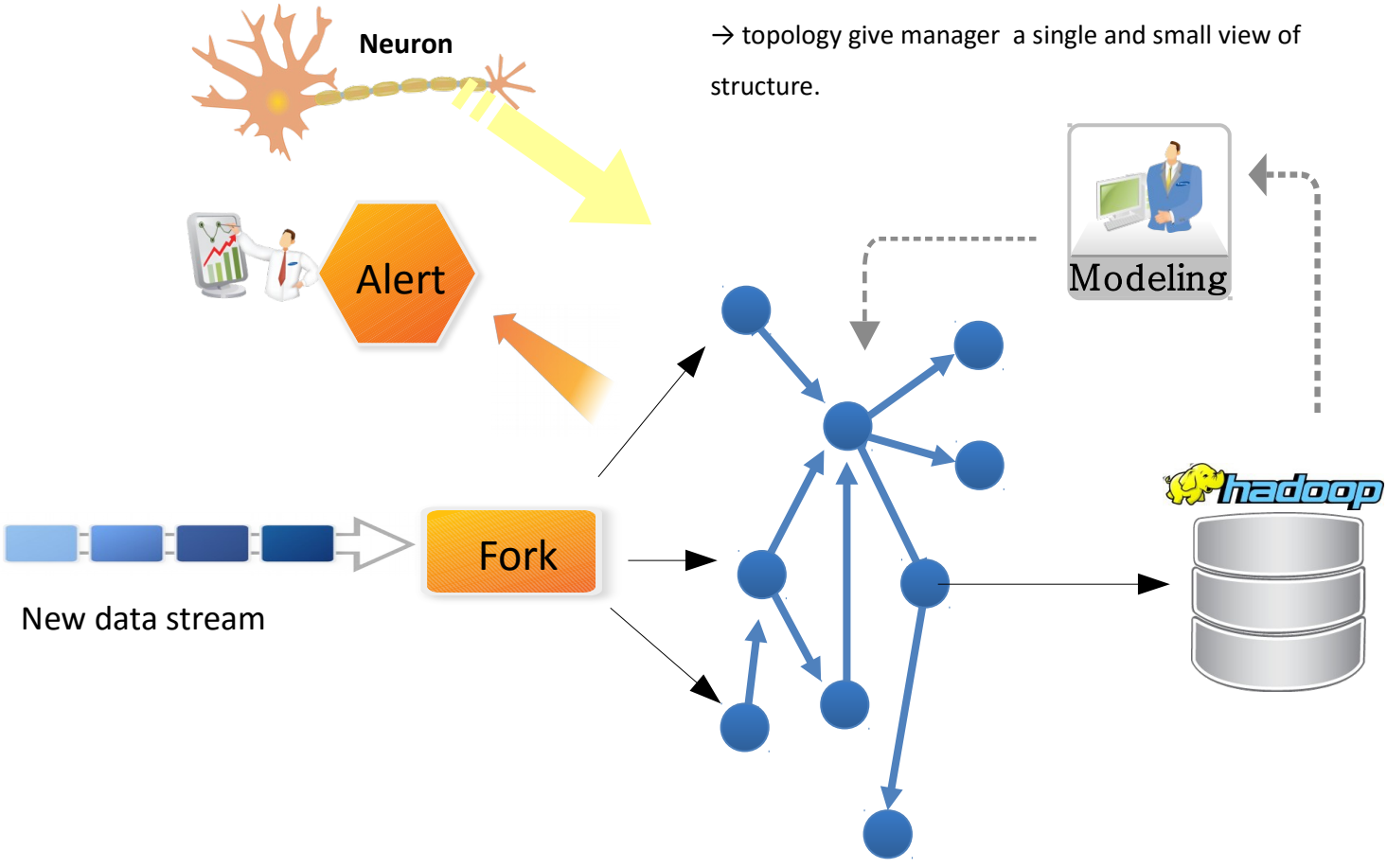
→ can insert CQL(continuous query language) in neuron

[distribution process]

→ clone a cortex(a functional group of neuron)

[high readability]

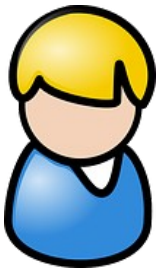
→ topology give manager a single and small view of structure.



Forming user profiles

analyze and check all user's transaction **profile**, attributes **profile** and devices's **profile** in real time. Profiles are updated with every sigle transaction, so the system constantly adopts to (slow and small) changes in bank user's behavir.


customer A


customer B


customer C

keep user's profiles in the memory

Forming trend profiles

There are specific patterns of transaction in special season and time term. FDS system form trend profiles and use that profile for higher accuracy ratio.


baseball season


boxing day


holiday season

example)

Sam(bank customer) withdraw large amount money many times in 26's December.

: Based on Sam's usual pattern. It could be fraud transaction. But it's boxing day

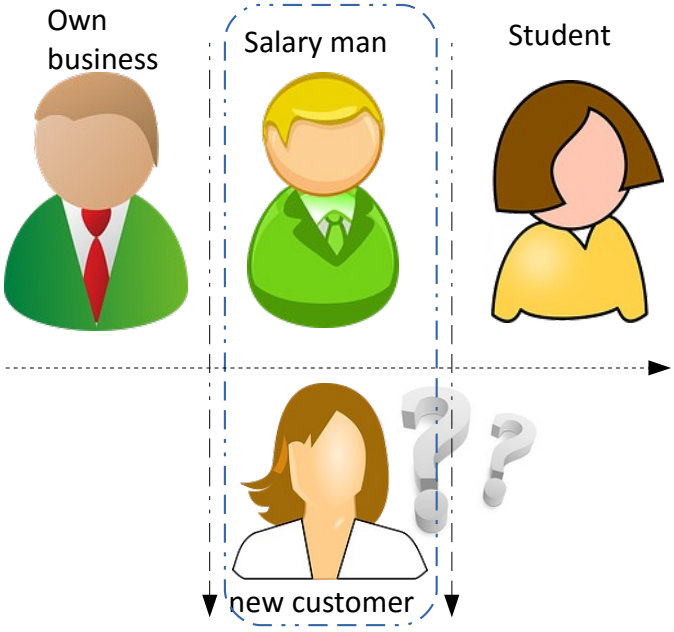
→ It lower False Positive. Higher Accuracy ratio

Customer group profiles

FDS system form association customer profiles and use that profile for higher accuracy ratio when new customer come in or idle user use banking service. (The users of same job group might have similar pattern)

[job's association profiling]

Job	Feature of deal pattern
Own	Frequent deal at month closing
Salary	frequent deal at lunch time by mobile
Student	High potion of little money



no historical records

[pattern of association profiling]

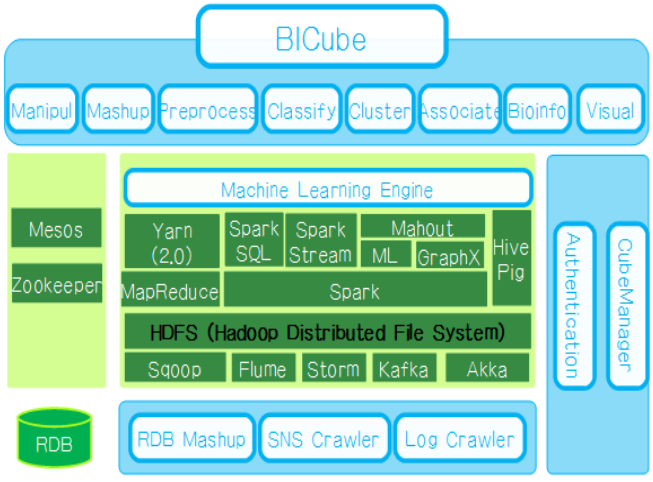
Classify	Deal group pattern
Fraud	Fraud group pattern
	Normal group pattern
Deal amount	Little money dealing group pattern
	Large dealing group pattern

False Positive / False Negative

Classification	Type	Result
False Positive	Normal → Fraud	Higher customer's complain
False Negative	Fraud → Normal	Bank's incidents

Bigdata ML Platform - BICube™

BICube™ is a unique and keen bigdata machine learning platform. Neural Stream FDS was developed on top of **BICube™**. ML components of **BICube™** make a designer form diverse types of topology higher accuracy than non-machine learning FDS.



Tech for lower FP

[Danger Zone]

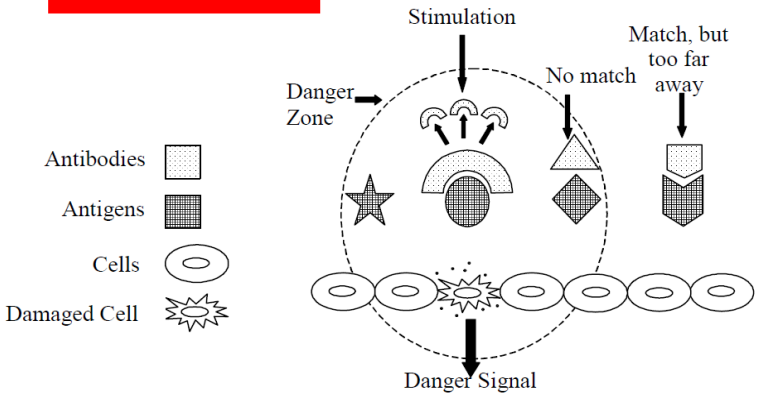
Danger Zone is a term used in Danger Theory of AIS(Artificial Immune System)

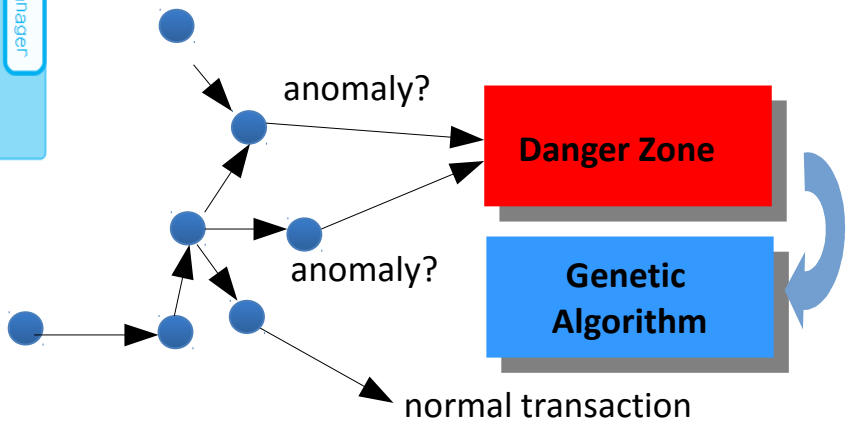
Danger Theory is a mechanism that immune system kill the antigen or invader cause danger situation. It makes accurate ratio higher to do double-check suspicious transaction in Danger Zone.

[AIS(Artificial Immune System)]

artificial immune systems (AIS) are a class of computationally intelligent systems inspired by the principles and processes of the vertebrate immune system.

Danger Theory



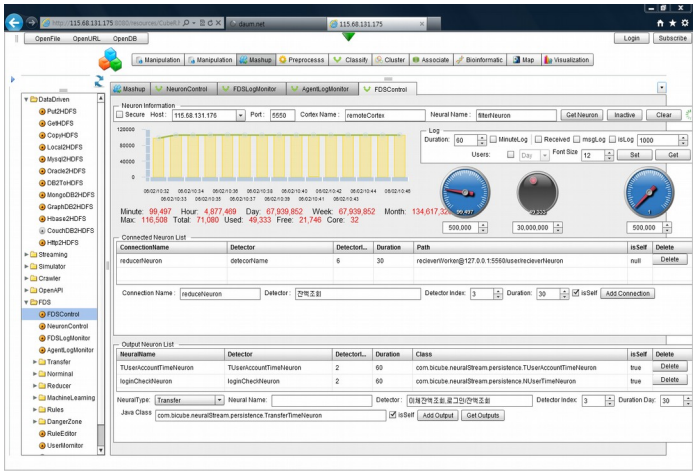


As-Is FDS vs Neural Stream

	As-Is FDS	NeuralStream FDS
Batch Process	O	O
Real time Stream	△	O
Low Latency	X	O
Online Learning	X	O
ML	X	O
Distribution	△	O
Scale Out (physical)	X	O
Scale Out (functional)	X	O

Integrated GUI Environment

System engineer does All operation in a GUI environment : Configuration, control, monitoring, logging, edit, link. Integrated GUI environment offer extremely convenience to system manager.

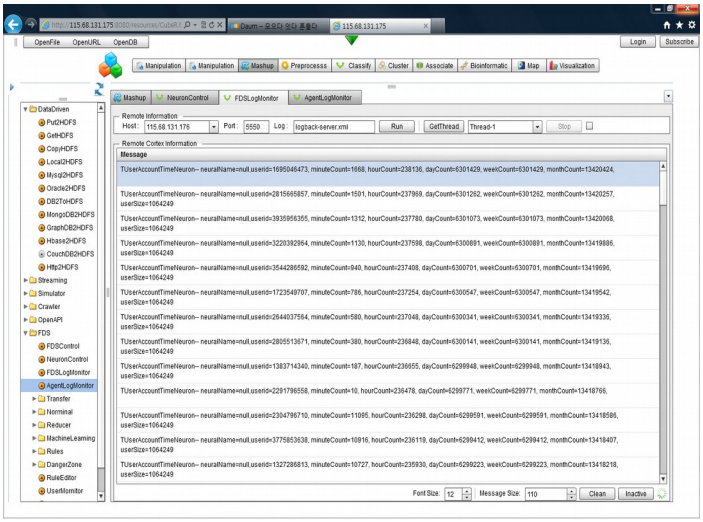


Integrated Neuron control window

Master control for distribution process

Neural Stream-FDS System has architecture that Master node control all remote node. Also master node does monitoring and logging every other node of Neural Stream in master node. System manager no need to log on every each node for logging or monitoring.

As a result, Integrated GUI Environment and Master control give system manager easy and convenience of Application Lyfecycle Management.



remote neuron monitoring in distribution ENV

For more Infomation

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