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Trust History-based Routing Algorithm to Improve Efficiency and Security in Wireless Sensor Network

Your global future begins here

College of Engineering

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Outline

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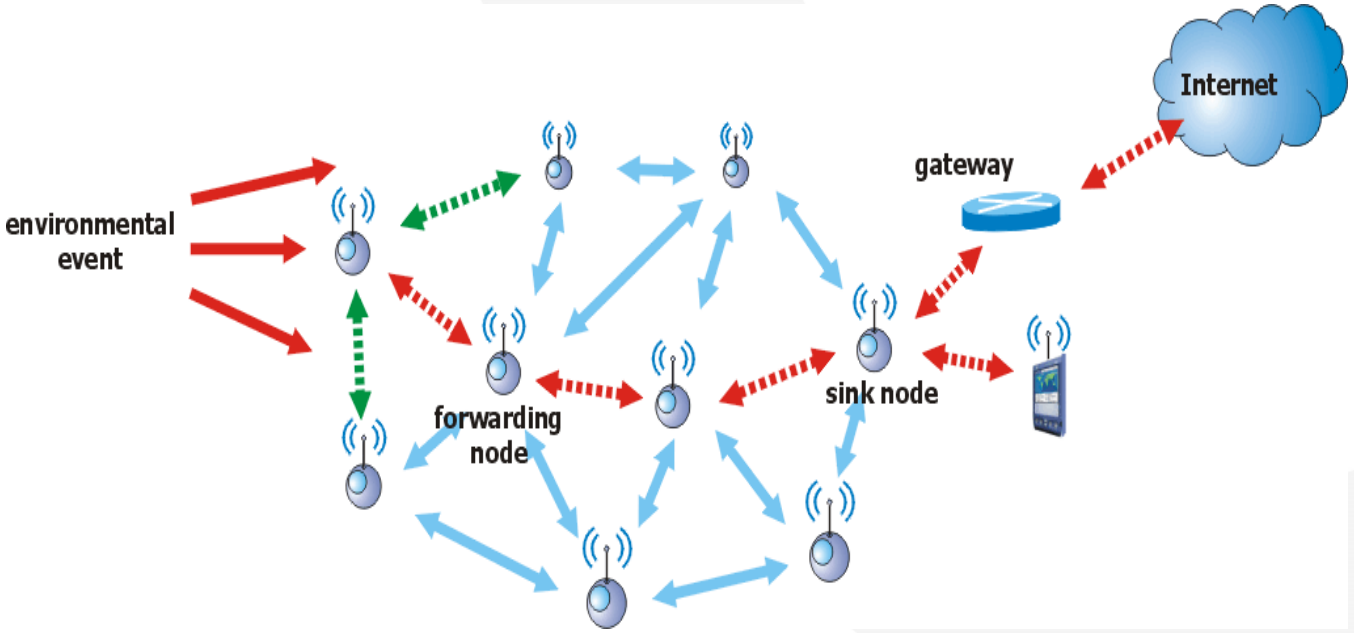
- Introduction
- Routing Algorithm in WSN
- Trust History Routing Algorithm

Introduction: Wireless sensor Network

A sensor network is composed of a large number of sensor nodes, which are densely deployed either inside the phenomenon or very close to it.

- Random deployment
- Cooperative capabilities



Introduction: Applications

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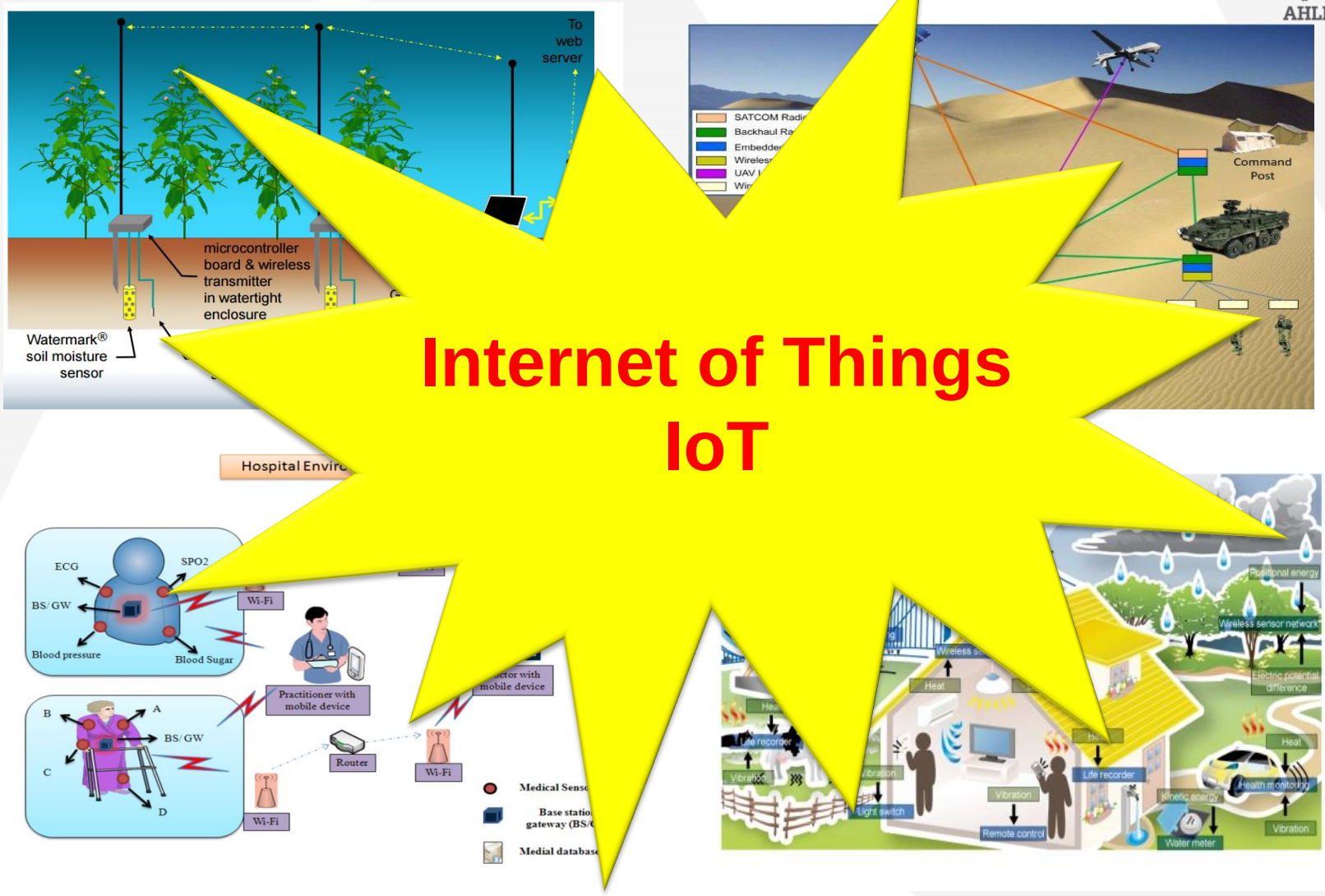
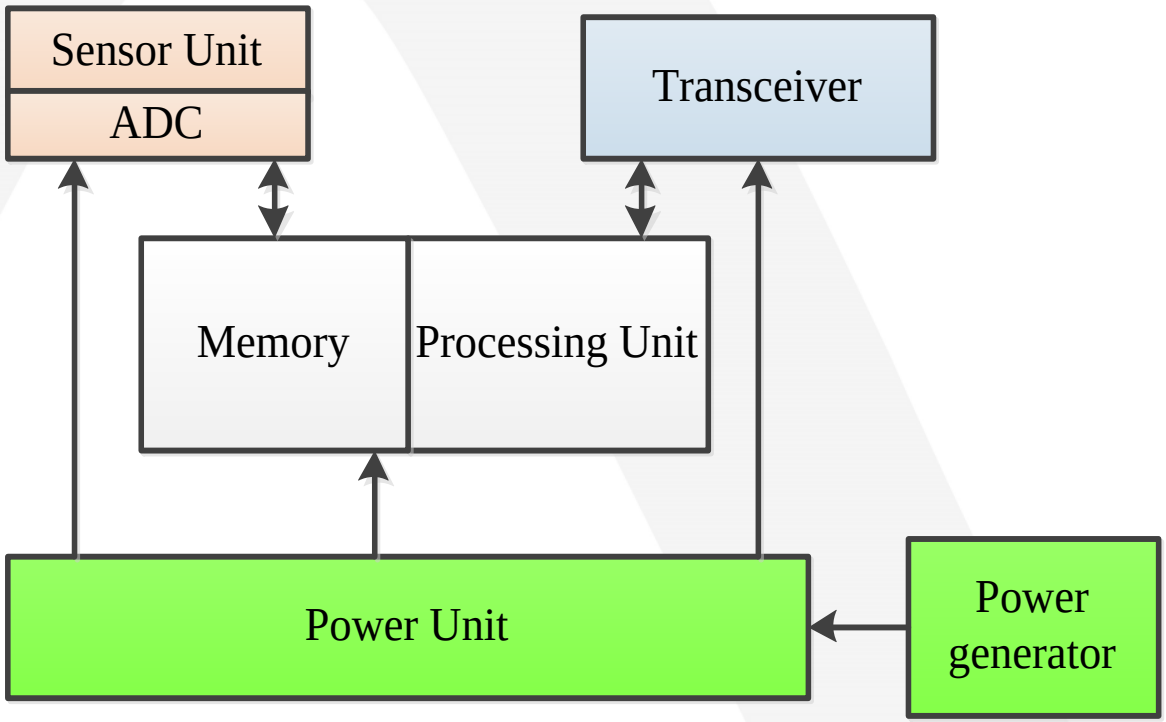


Introduction: Architecture



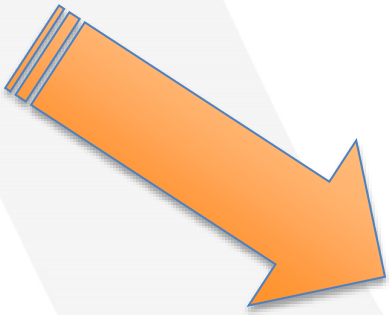
Sensors are limited by:

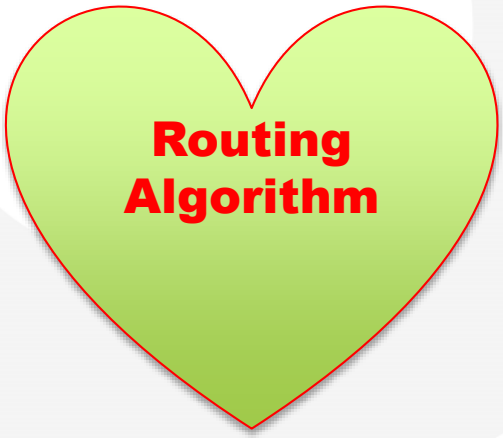
- **Energy lifetime**
- **Slow embedded processors**
- **Limited memory**

Introduction: Challenges

WSN technology confronts :

- **Energy Consumption**
- **Security**
- **Reliability**
- **Scalability**





Introduction: Contribution

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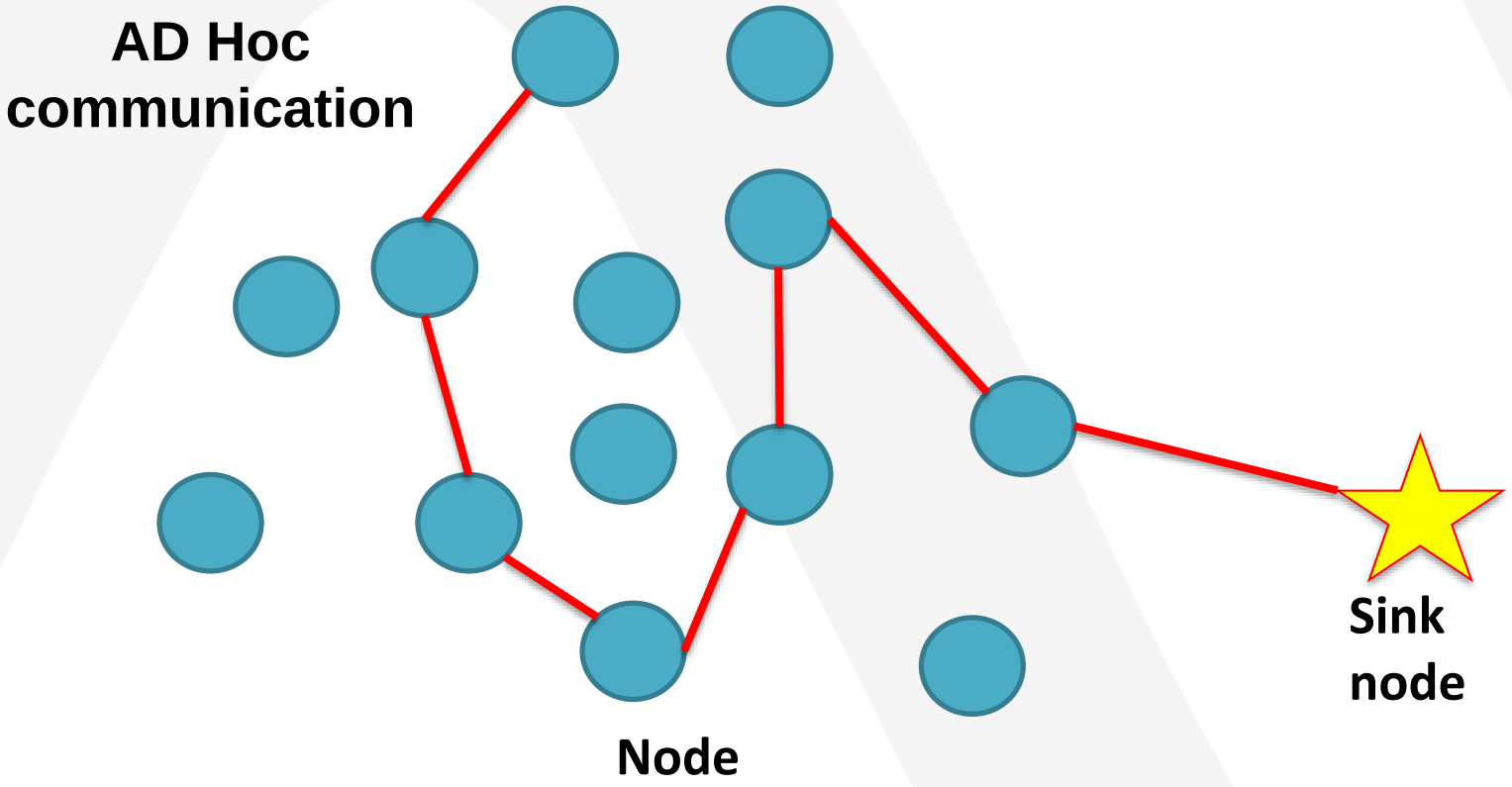
Find a new routing algorithm to offer security and efficiency of the network with the different requirements of WSN is the big challenge.

- **Efficiency**
- **Simplicity**
- **Scalability**

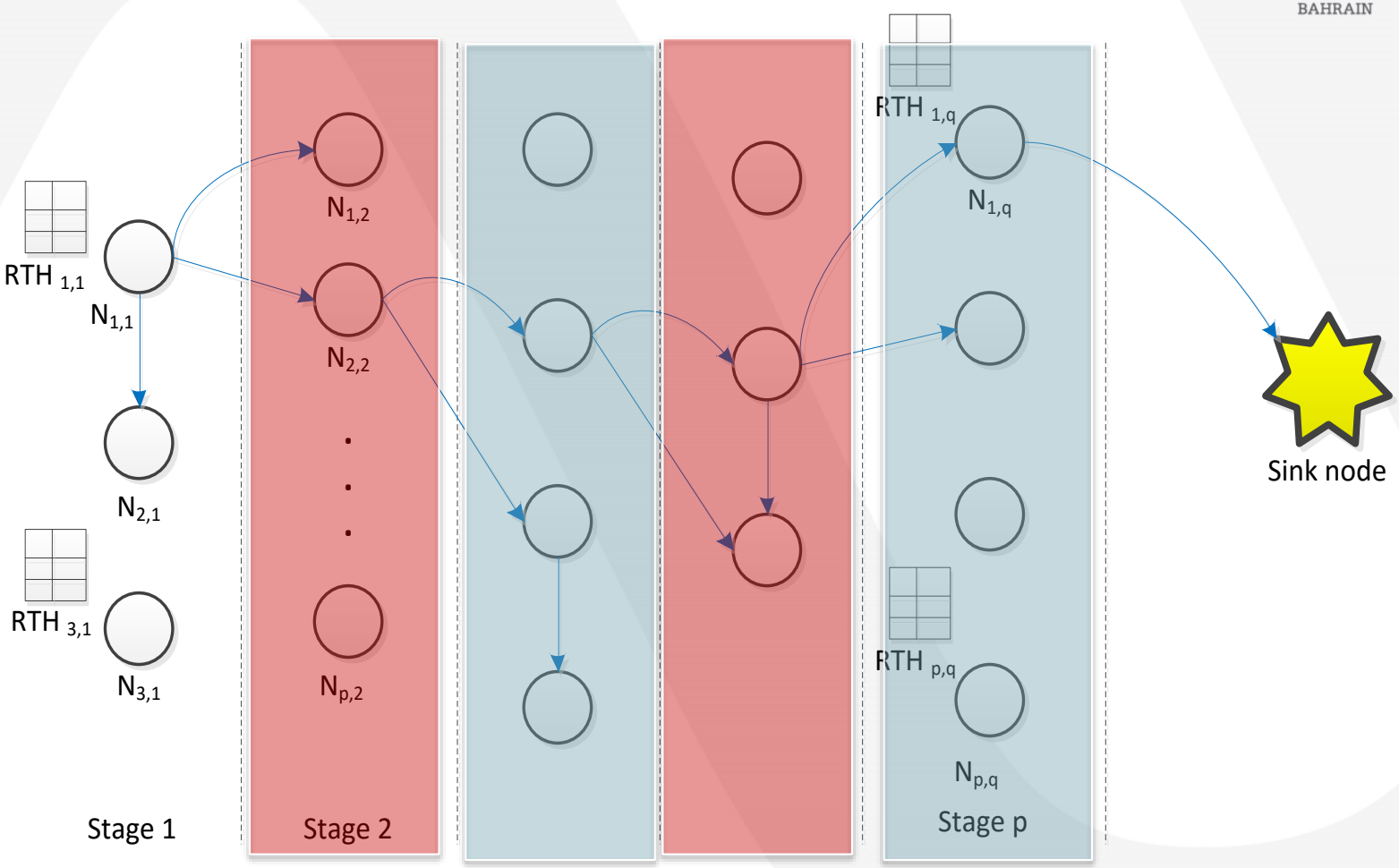
The new method is based on the **History** of the correctly connection routes

Routing Algorithm in WSN

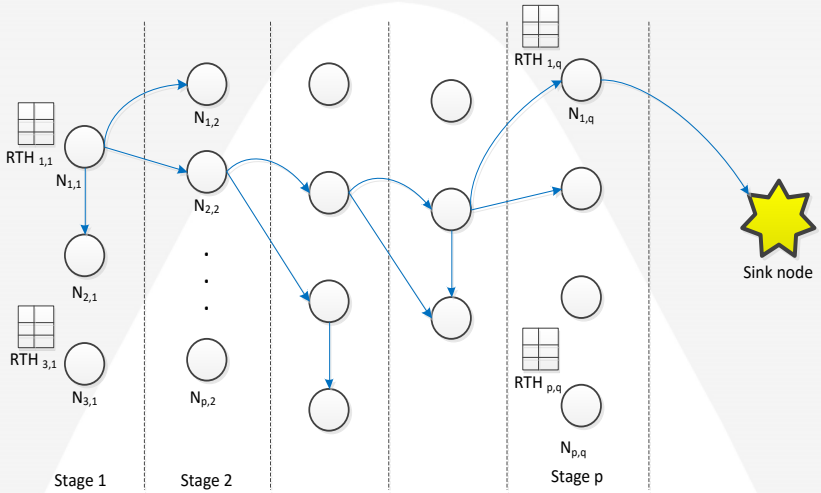


The traditional routing algorithms used in wireless communication cannot be deployed in WSN.

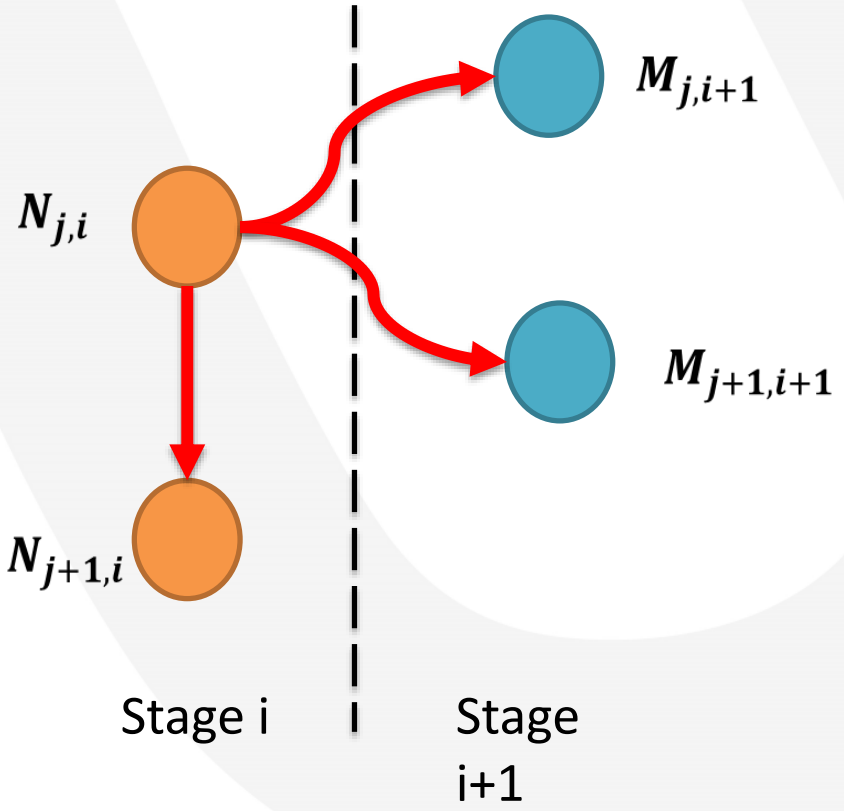
WSN : Network Model



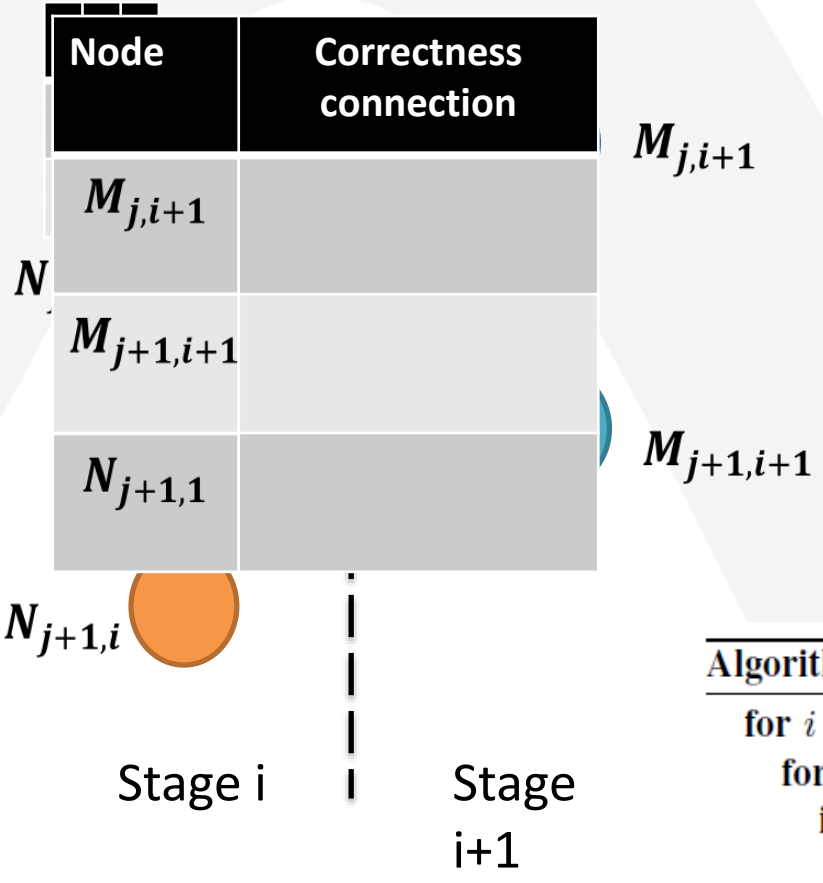
WSN : Network Model



$$f : N_{j,i} \rightarrow \begin{cases} \mathrm{M}_{j,i+1} \\ \mathrm{M}_{j+1,i+1} \\ \mathrm{N}_{j+1,i} \end{cases}$$



WSN : Trust History-based Routing Table



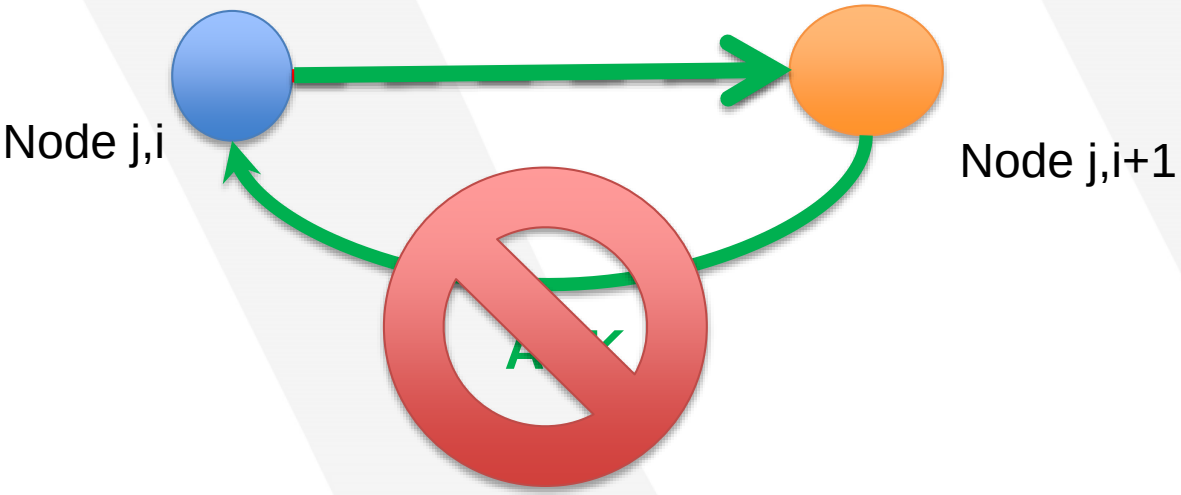
Algorithm 1 Filling RTH table

```
for i = 1  to  a do
  for j = 1  to  b do
    if Nj, I ↔ Mj, i + 1 then
      T[j] + +
    else if Nj, I ↔ Nj + 1, 1 then
      T[i] + +
    end if
  end for
end for
```

WSN : Trust History-based Routing Table

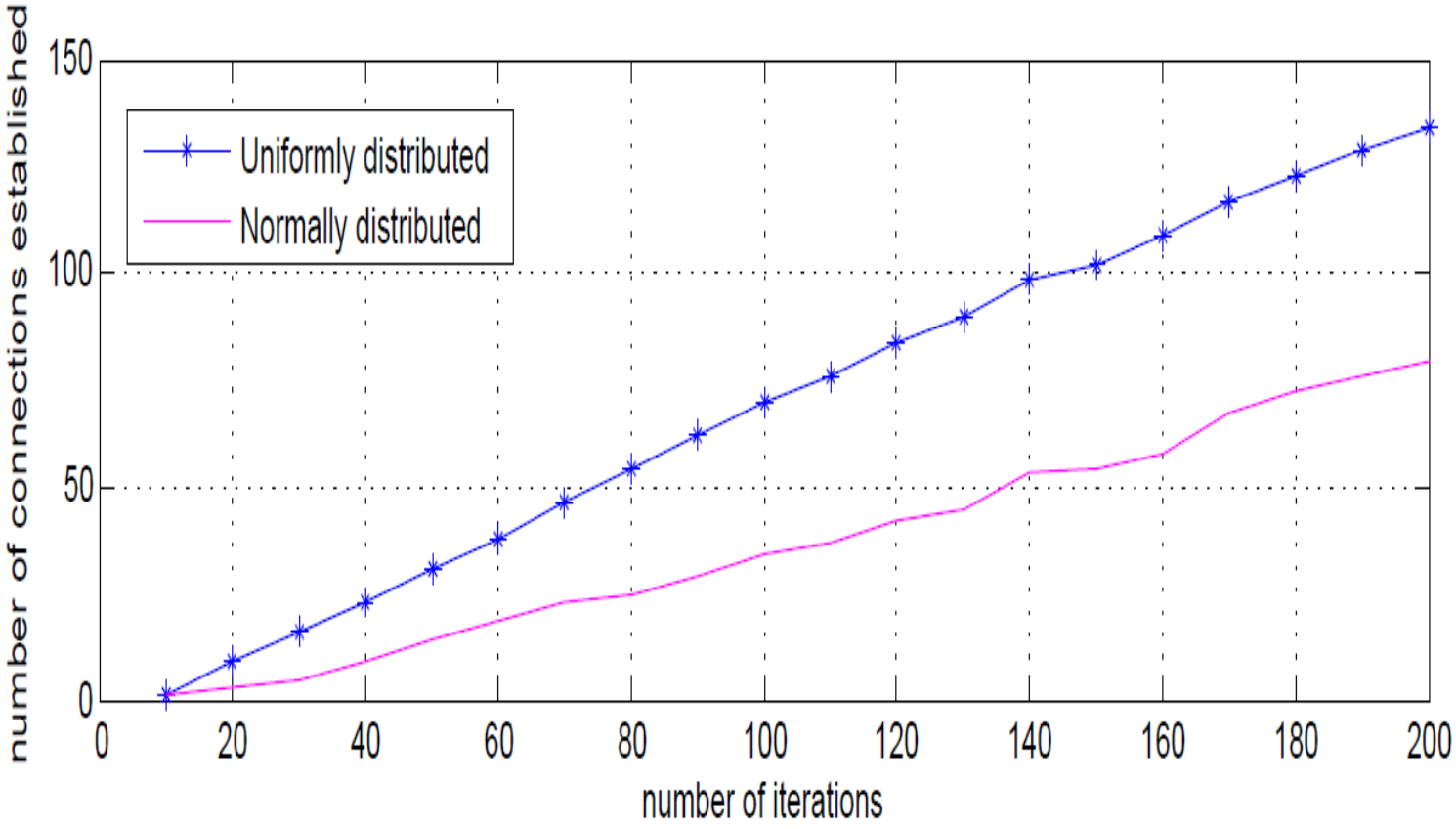
Node	Correctness connection
$M_{j,i+1}$	10
$M_{j+1,i+1}$	7
$N_{j+1,1}$	5

K : number of iteration



Energy consumption for the acknowledge setup

WSN : Trust History-based Routing Table



WSN : Trust Path Routing algorithm

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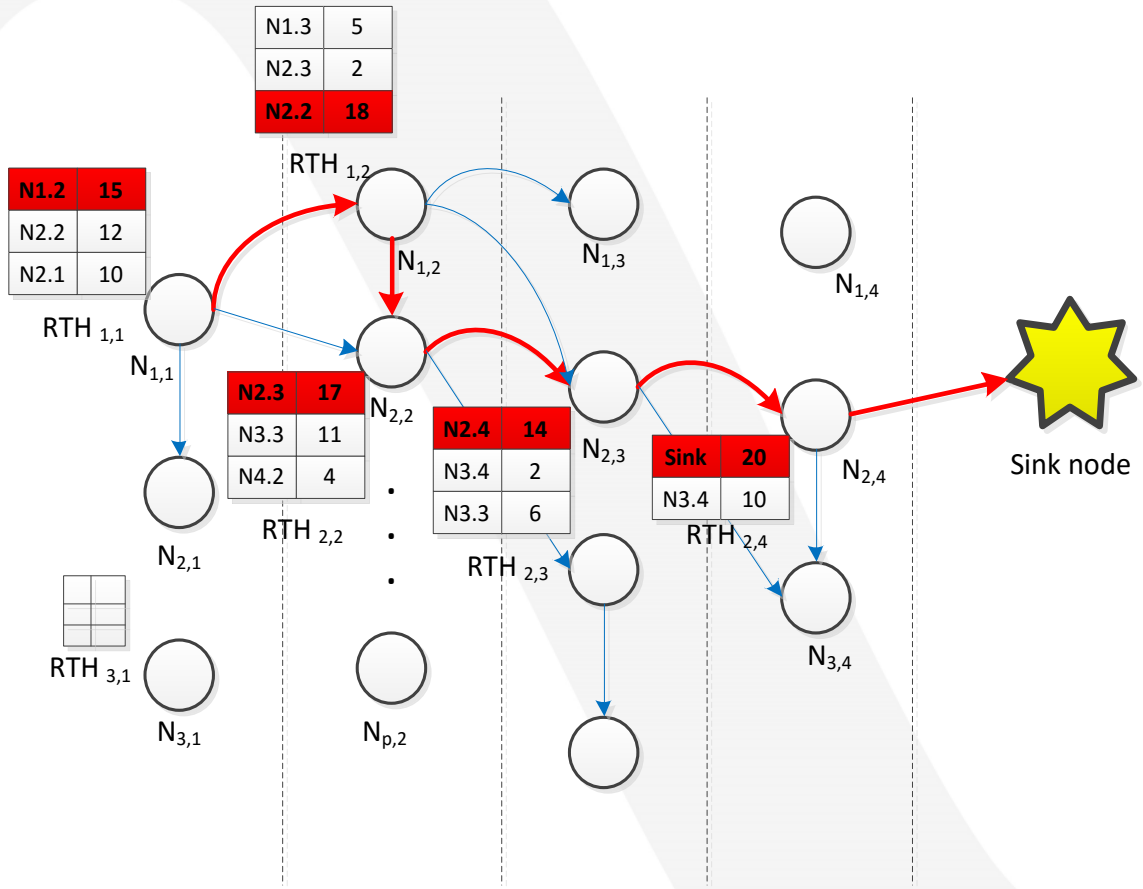
The basic idea of TPR is to build a path with the maximum **Trust Value (TV)**

TV is the sum of the trust values for **each link** that establishes the corresponding route:

$$TV = Max\left(\sum_{i=1}^{n} TV_{Li}\right)$$

WSN : Trust Path Routing algorithm



15 + 18 + 17 + 14 + 20 = 84

WSN : Trust Path Routing algorithm

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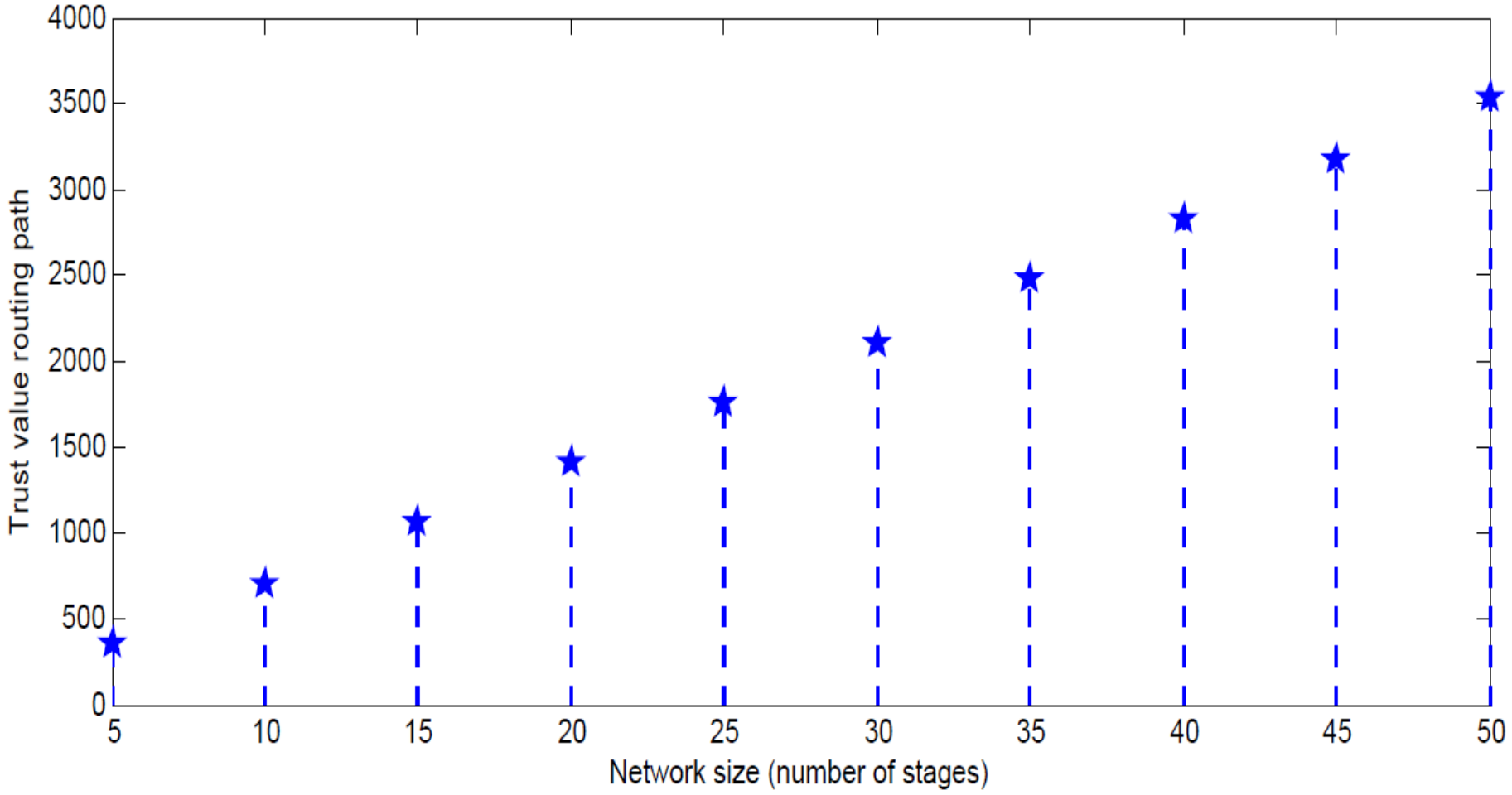

Conclusion & Future Work

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New routing algorithm based on trust history between nodes. Indeed, our method comprises of two steps:

- Trust History Routing Table
- Trust Path Routing algorithm

Study the scalability and the complexity of this method.