IoT challenges

State of the art

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LIGM/ESIEE Paris

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- 1. Introduction

- 1. Context

- 1. Introduction

- 1. Context



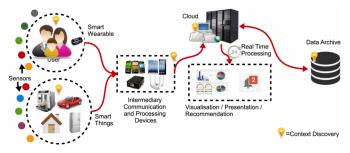


Figure 1: The IoT Platform

- Connect sensors to the gateway.[1]
- Connect the gateway to the infrastructure. 1
- Store & Analyze sensors data.²

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¹ jhjh

²P. Thubert, M. R. Palattella, and T. Engel, "6TISCH Centralized Scheduling: When SDN Meet IoT," in 2015 IEEE Conference on Standards for Communications and Networking (CSCN), 00033, Tokyo, Japan: IEEE Oct. 2015, no. 42–47.

Problematic

Introduction



Figure 2: The IoT problematics

- How to communicate sensors efficiently
 - → IEEE 802.15.4, 6LowPAN
 - Throughput, Delay, Jitter, Loss rate and Availability.
- How to communicate sensors with the infrastructure efficiently
 - → LPWAN, LoraWan
 - Heterogeneity?
- How to extract knowledge from sensors data.
 - Data mining: Classification, Clustering
 - Deep learning: Machine learning

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Problematic

Introduction



Figure 2: The IoT problematics

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 - → IEEE 802.15.4, 6LowPAN
 - Throughput, Delay, Jitter, Loss rate and Availability.
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 - Data mining: Classification, Clustering
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Motivations

Introduction

- First Motivation
 - First Motivation
 - * First Motivation
 - * Second Motivation
 - Second Motivation
- Second Motivation
- First Motivation
 - Second Motivation
- Third Motivation
 - → First Motivation
 - Second Motivation
- Fourth Motivation
 - First Motivation
 - Second Motivation

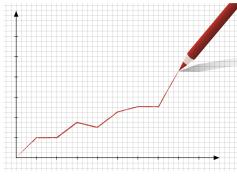


Figure 3

Goals

- First goal
 - First goal
 - First goal
 - * Second goal
 - Second goal
- Second goal
 - First goal
 - Second goal
 - Third goal
 - First goal
 - Second goal
 - Fourth goal
 - → First goal
 - Second goal



Figure 4

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Challenges

Introduction

- First Challenge
 - → L'objectif est de réduire le taux de mortalité
 - → L'objectif est de rendre nos route plus sure
- Second Challenge
 - Connecter les pietons et le vehicule
 - augmenter la présision GPS
 - réduire la latence
- Third Challenge
 - Connecter les pietons et le vehicule
 - → augmenter la présision GPS
 - → réduire la latence

1. Introduction | 6. Challenges 5/30

Contributions

Introduction

- First contribution
 - → Privacy settings
 - → Information propagation

-

- Second contribution
 - → Privacy settings
 - .
- Third contribution
 - Privacy settings
 - **→** [

- 1. Introduction
- 2. State of the art
- 3. First contribution

1. Context

- 4. Second contribution
- 5. Conclusion

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State of the art

Standardization

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Conclusion

2. State of the art 8/30

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- 4. Second contribution
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- 1. Related work
- 2. Contagion process
- 3. Experimentation
- 4. Results exploitation
- 5. Conclusion

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- 1. Related work
- 2. Contagion process
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- Results exploitation
- 5. Conclusion

Related work

Comparison

Paper	A1	A2	A3	A4

Table 1: An example table.

Related work

Comparison

Paper	A1	A2	A3	A4

Table 2: An example table.

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```
... (step 1)
Methods
```

- Privacy threats
 - Privacy settings
 - → Information propagation
- Privacy protection
 - Privacy settings
 - -

... (step 2) Methods

- Privacy threats
 - Privacy settings
 - → Information propagation
- Privacy protection
 - Privacy settings
 - -

```
... (step 3)
Methods
```

- Privacy threats
 - Privacy settings
 - → Information propagation
 - .
- Privacy protection
 - Privacy settings
 - -

```
... (step 4)
Methods
```

- Privacy threats
 - → Privacy settings
 - → Information propagation
- Privacy protection
 - Privacy settings
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Experimentation

Experimentation

- Privacy threats
 - → Privacy settings
 - Information propagation
 - .
- Privacy protection
 - → Privacy settings
 - -

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Results

Comparison

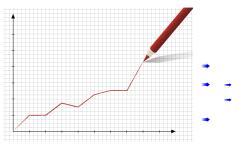


Figure 5

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Conclusion



Figure 6: Cag.



Figure 7: Cag.



Figure 8: Cag.



Figure 9: Cag.

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Challenges

Conclusion

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 - → Information propagation
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- Privacy protection
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Related work

Comparison

Paper	A1	A2	A3	A4

Table 3: An example table.

Related work

Comparison

A2	A3	A4
	A2	A2 A3

Table 4: An example table.

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Methods

- Privacy threats
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... (step 2) Methods

- Privacy threats
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- Privacy protection
 - Privacy settings
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Methods

- Privacy threats
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```
... (step 4)
Methods
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- Privacy threats
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 - → Information propagation
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- Introduction
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- Related work
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- Related work
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- 3. Experimentation
- 4. Results exploitation
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Results

Comparison

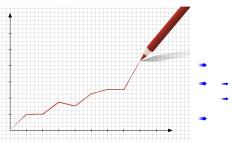


Figure 10

- 1. Introduction
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Conclusion



Figure 11: Cag.



Figure 12: Cag.



Figure 13: Cag.



Figure 14: Cag.

Challenges

Conclusion

- Privacy threats
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- 5. Conclusion

Conclusion

Routing protocol	Control Cost	Link Cost	Node Cost
OSPF/IS-IS	Х	✓	X
OLSRv2	?	1	1
RIP	✓	?	X
DSR	✓	X	X
RPL	1	1	1

Table 5: Routing protocols comparison _rpl2_

Application protocol	Rest- Full	Trans- port	Pub- lish/Sub- scribe	Request/Re- sponse	Secu- rity	QoS	Header size (Byte)
COAP	✓	UDP	✓	✓	DTLS	✓	4
MQTT	Х	TCP	✓	X	SSL	1	2
MQTT-SN	Х	TCP	✓	X	SSL	1	2
XMPP	Х	TCP	✓	✓	SSL	X	-
AMQP	Х	TCP	✓	X	SSL	1	8
DDS	Х	UDP	✓	X	SSL	1	-
		TCP			DTLS		
HTTP	✓	TCP	X	✓	SSL	X	-

Table 6: Application protocols comparison

Conclusion

Routing protocol	Control Cost	Link Cost	Node Cost
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MQTT-SN	Х	TCP	✓	X	SSL	1	2
XMPP	Х	TCP	✓	✓	SSL	Х	-
AMQP	Х	TCP	✓	X	SSL	1	8
DDS	Х	UDP	✓	X	SSL	✓	-
		TCP			DTLS		
HTTP	✓	TCP	X	✓	SSL	X	-

Table 6: Application protocols comparison

Thank you!

Challenges

Conclusion

- Privacy threats
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Challenges

Conclusion

- Privacy threats
 - Privacy settings
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- Privacy protection
 - Privacy settings
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Thank you!

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P. Thubert, M. R. Palattella, and T. Engel, * IEEE, Oct. 2015, pp. 42–47 (p. 4).	$\textbf{6TISCH Centralized Scheduling: When SDN Meet IoT.}^{\bullet} \ in \ 2015 \ \textit{IEEE Conference on Standards for Communications and Networking (CSCN)}. \ 00033, Tokyo, Japan: \\ \textbf{1} \ \textbf{1} $

References

[1]