

Journée Mondiale de la Normalisation

Programme de recherche ILNAS/SnT et programme
éducatif ILNAS/FSTC à la normalisation

Prof. Pascal BOUVRY
Chargé de Mission auprès du Recteur
University of Luxembourg

October 2019

History

Partnership (ILNAS/UL)



Strengthening ILNAS's relations with academic partners with the aim of structuring education about standardization and ad-hoc research in the Grand Duchy of Luxembourg

– Origin:

- Pilot project conducted between September 2015 and September 2016: "Smart ICT for Business Innovation" university certificate in partnership with the University of Luxembourg
- Second promotion: February 2018 to February 2019

– Objective: **University Master on Smart ICT, technical innovation, technical standardization and digital trust (horizon 2020)**

- Will answer national priorities related to "Smart Secure ICT" topics, providing a smart way to link technology, standards and the business world, while creating an additional means of innovation at the national level

SUPPORTING ORGANISATIONS:



DIAMOND PARTNER - CLASS OF 2015 OFFICIAL SPONSOR:

FUJITSU

GOLD PARTNERS:

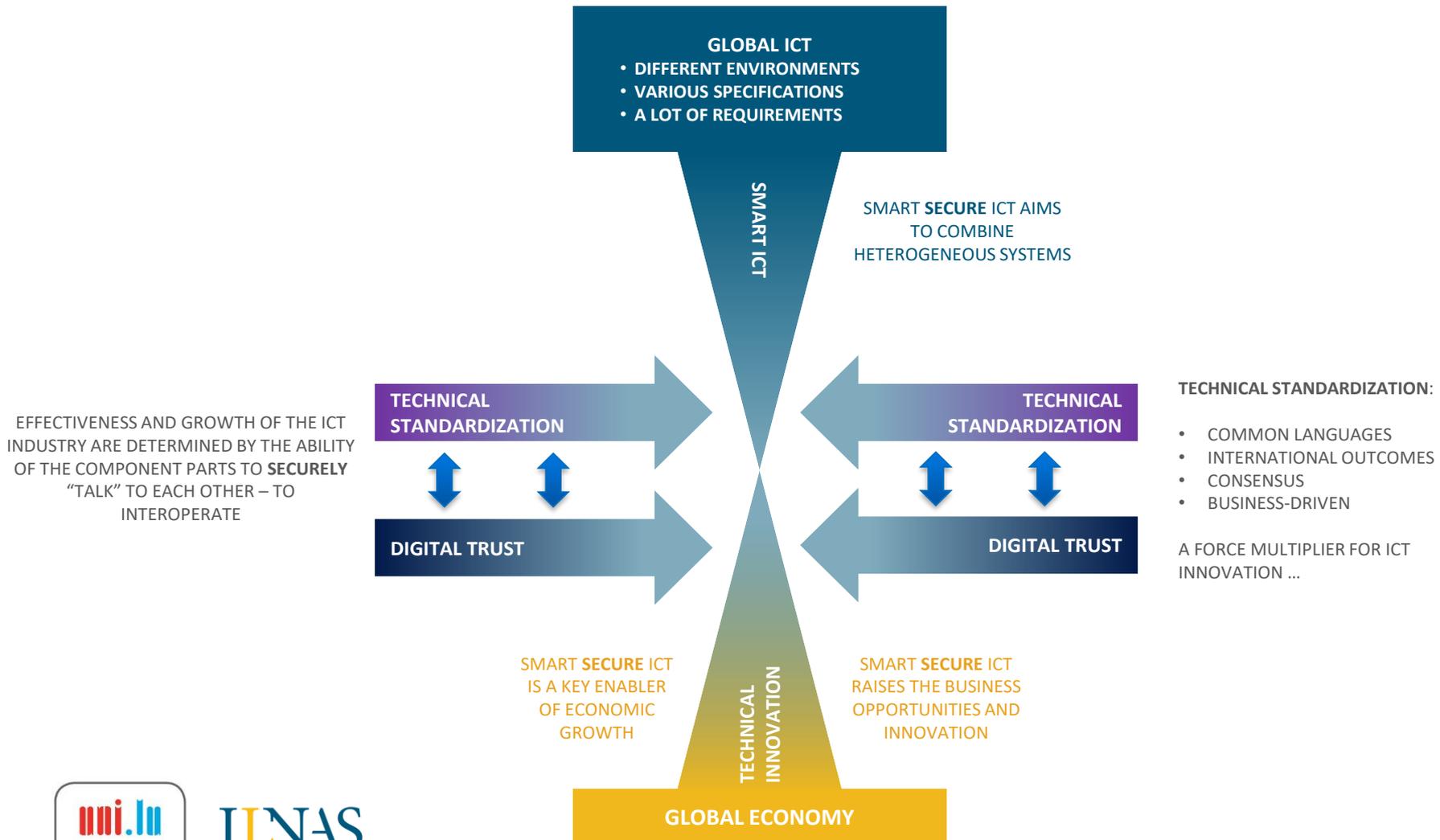


SILVER PARTNERS:



Master in Technopreneurship: Mastering Smart ICT, Standardisation and Digital Trust for Enabling Next Generation of ICT Solutions

– Smart ICT, Standardisation & Digital Trust Enabling Next Generation Solutions for Economy



Master in Technopreneurship: Mastering Smart ICT, Standardisation and Digital Trust for Enabling Next Generation of ICT Solutions

Blocks and Modules	ECTS
STANDARDISATION	
1. Smart Secure ICT and Innovation	1
2. Technical Standardisation	3
	
SMART ICT	
3. Smart ICT Technologies I	5
4. Smart ICT Technologies II	5
	
DIGITAL TRUST FOR SMART ICT	
5. Security for Smart ICT I	2
6. Security for Smart ICT II	3
7. Trust Architectures for Smart ICT	4
TECHNOPRENEURSHIP	
8. Management of Business and Technical Innovation	3
9. Digital Intelligence	2
10. Legal Aspects	2
	
MASTER THESIS	
12. Master Thesis	30
	
Total	60



Strengthening CEN/CENLEC+ETSI relations with UL with the aim of structuring education about standardization and ad-hoc research in the Grand Duchy of Luxembourg

Validation	Deadlines
Starting Date	Sep 2020
Board of Governance validation	06/12/19
University council validation	20/11/19
Rectorate validation	In progress
Faculty Council validation	✓
Research Unit Validation	✓

Research Programme: The Smart-ICT Team



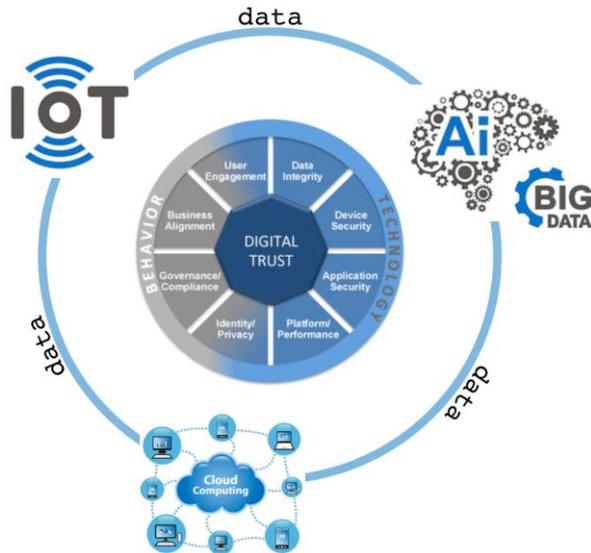
Mr. Nader Samir

- PhD Candidate
- Industrial experience in UAVs
- Internet-Of-Things
- Distributed UAV Traffic Management



Prof. Pascal Bouvry

- Principal Investigator
- Project coordination
- PhD supervision



Ms. Saharnaz Dilmaghani

- PhD Candidate
- Standardization experience
- Artificial Intelligence and Big Data
- Network-based Clustering Algorithms



Mr. Chao Liu

- PhD Candidate
- Cloud Computing
- Optimal Pricing in Cloud Computing



Dr. Matthias Brust

- Postdoc
- Project support
- Research & standardization

IoT: Optimization Problem Description

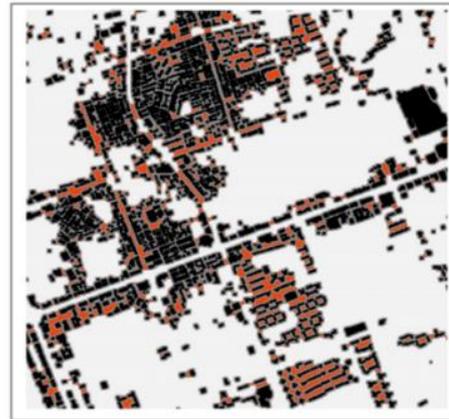
Objectives

- Minimize total average travel time
- Minimize total average energy

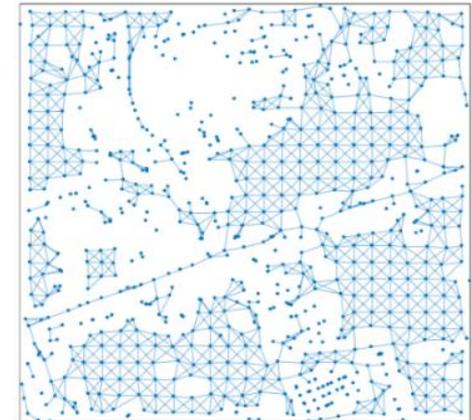
Constraints

- UAVs have a limited battery life.
- Airspace segments allow different lateral velocities

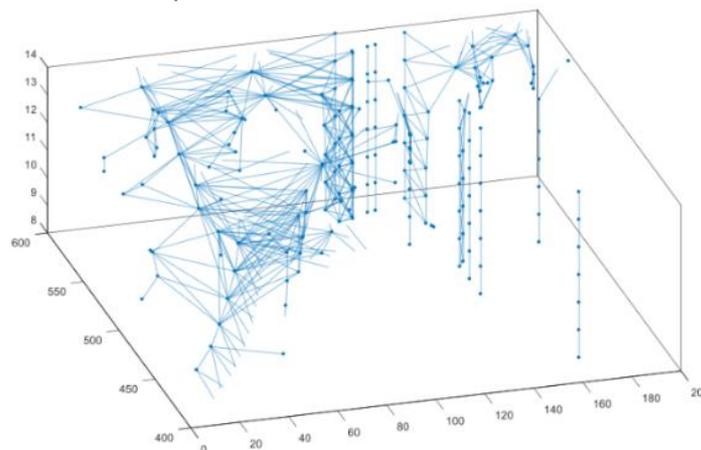
Step 1



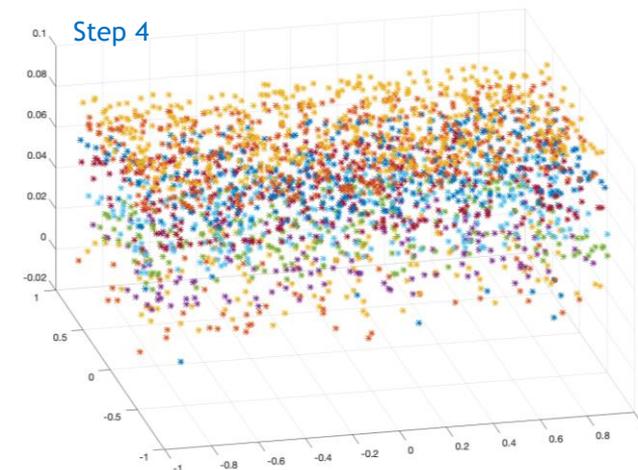
Step 2



Step 3



Step 4



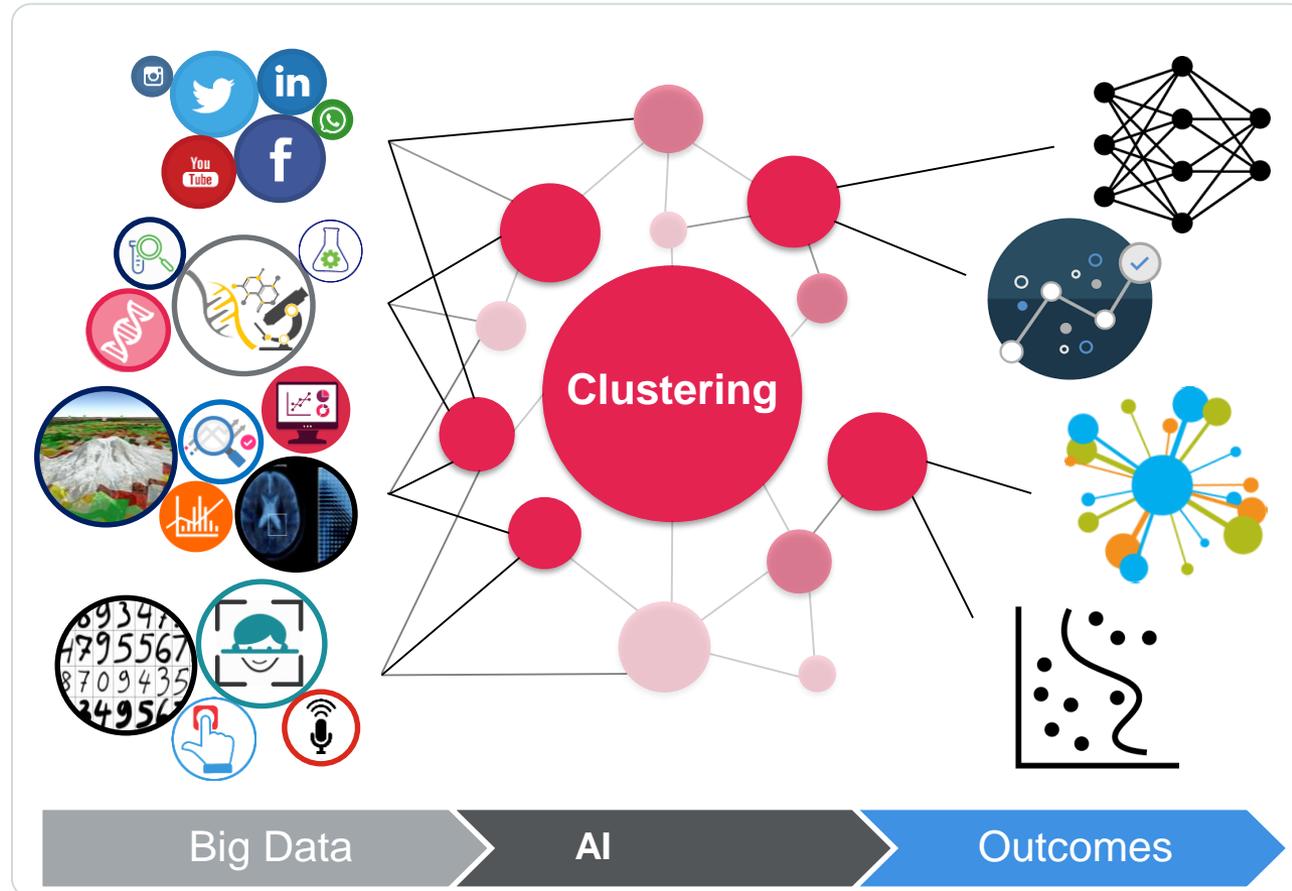
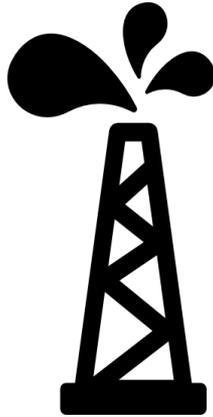
AI: Network-based Clustering Algorithm for AI and Big Data Analysis

Data is Today's Oil!

44 zettabytes,
from
4.4 zettabytes

1.7 megabytes
every second
every human

656 million tweets
per day



Cloud Computing: Bi-Level Optimization

$$\text{Max } \sum_{i \in N} X_i P_i \quad \left. \vphantom{\sum_{i \in N} X_i P_i} \right\} \text{Upper-level}$$

$$\text{s.t. } P_i \geq 0, X_i \geq 0, \text{ etc.}$$

$$\text{max } [a_i X_i - b_i X_i^2 - c(\sum_{j \in N} X_j)^2 - P_i X_i + X_i \sum_{j \neq i} g_{ij} X_j] \quad \left. \vphantom{\text{max}} \right\} \text{Lower level}$$

$$a_i \geq 0, b_i \geq 0, \text{ etc.}$$

Optimize Upper-level objective
s.t. Upper-level constraints

Optimize Lower-level objective
s.t. Lower-level constraints

Observe best response

Set decision

Concave

$$\text{min } [-a_i X_i + b_i X_i^2 + c(\sum_{j \in N} X_j)^2 + P_i X_i - X_i \sum_{j \neq i} g_{ij} X_j]$$

Convex & Continuous

Be replaced
with KKT
Conditions

Involvement in Standardization (SCs & WGs)

- Matthias Brust
 - ISO/IEC JTC 1/SC 41 – Internet of Things and related technologies
 - ISO/IEC JTC 1/SC 38 – Cloud Computing
 - ISO/IEC JTC 1/SC 42 – Artificial Intelligence
- Chao Liu
 - ISO/IEC JTC 1/SC 38 – Cloud Computing
 - ISO/IEC JTC 1/SC 27 – Information security techniques*
- Nader Samir
 - ISO/IEC JTC 1/SC 41 – Internet of Things and related technologies
 - ISO/IEC JTC 1/SC 27 – IT Security techniques
 - ISO TC 20/SC 16 – Unmanned Aircraft systems
- Saharnaz Dilmaghani
 - ISO/IEC JTC 1/SC 42 – Artificial Intelligence
 - Expert in ISO/IEC JTC 1/SC42 WG3
 - ISO/IEC JTC 1/SC 27 – IT Security techniques
- Umer Wasim
 - ISO/IEC JTC 1/SC 41 – Internet of Things and related technologies
 - ISO/IEC JTC 1/SC 38 – Cloud Computing
 - ISO/IEC JTC 1/SC 42 – Artificial Intelligence
 - ISO/IEC JTC 1/SC 27 – Information security techniques
- Valentin Plugaru
 - ISO/IEC JTC 1/SC 39 – Sustainability for and by Information Technology
 - ISO/IEC JTC 1/SC 42 – Artificial Intelligence*
 - ETP4HPC: UL contact for the WGs in WP18-20
- Abdallah Ali Z.A. Ibrahim
 - ISO/IEC JTC 1/SC 41 – Internet of Things and related technologies
 - ISO/IEC JTC 1/SC 38 – Cloud Computing
- Dr. Emmanuel Kieffer
 - ISO/IEC JTC 1/SC 42 – Artificial Intelligence
- Dr. Sebastien Varrette
 - ISO/IEC JTC 1/SC 27 – IT Security techniques
 - ISO TC 307 Blockchain and distributed ledger (WG1 and 2)
 - CLC/TC 215 WG3
- Boonyarit Changaival
 - ISO/IEC JTC 1/SC38 Cloud Computing
 - ISO/IEC JTC 1/SC42 Artificial Intelligence

- **Current work: Gap Analysis**

- Performing analysis to understand the gaps between research and standardization, and to draw a roadmap on reducing these gaps
 - Internet-Of-Things,
 - AI/Big Data
 - Cloud Computing

- **A follow-up to the current research programme will be defined in the coming months**

Contact FSTC - SnT

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