

PATH – PAssive Tracking of people and things for physical BeHavior analysis

Stefania Bartoletti



**UNIVERSITY
OF FERRARA**
- EX LABORE FRUCTUS -



**European
Commission**

PATH – Marie Skłodowska-Curie actions



Outline

- Introduction to my research area
- Timeline
- Mind Map
- Summary of Tips and Tricks

Research Area

Components of ICT

The term information and communications technology (ICT) is generally accepted to mean all technologies that, combined, allow people and organizations to interact in the digital world.



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Localization Systems

GNSS-denied

navigation



logistic



rescue



Active vs. Passive Target

active target

GNSS-denied

navigation



logistic



rescue



passive target

Active vs Passive

active target

signals of opportunity



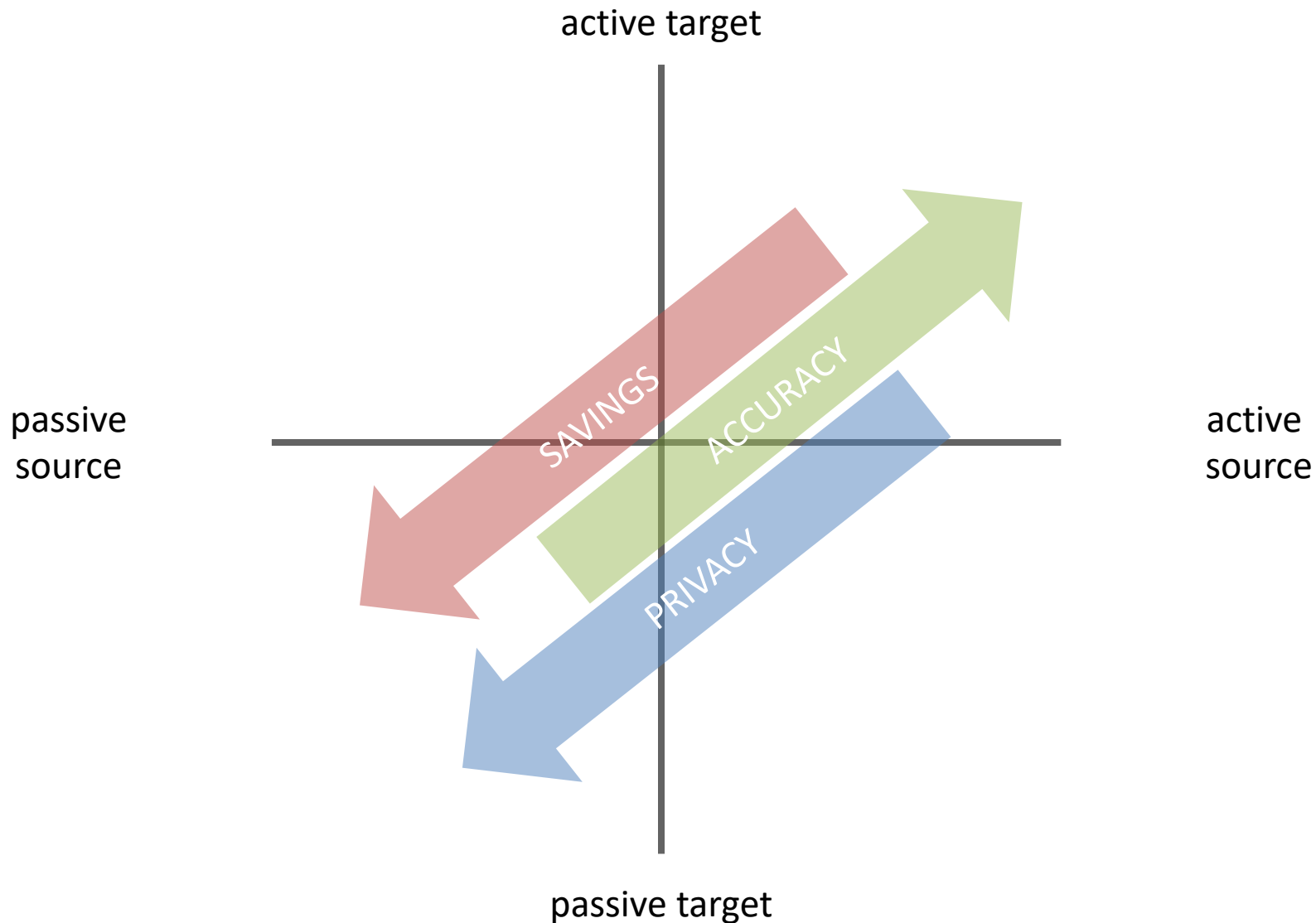
passive
source

active
source

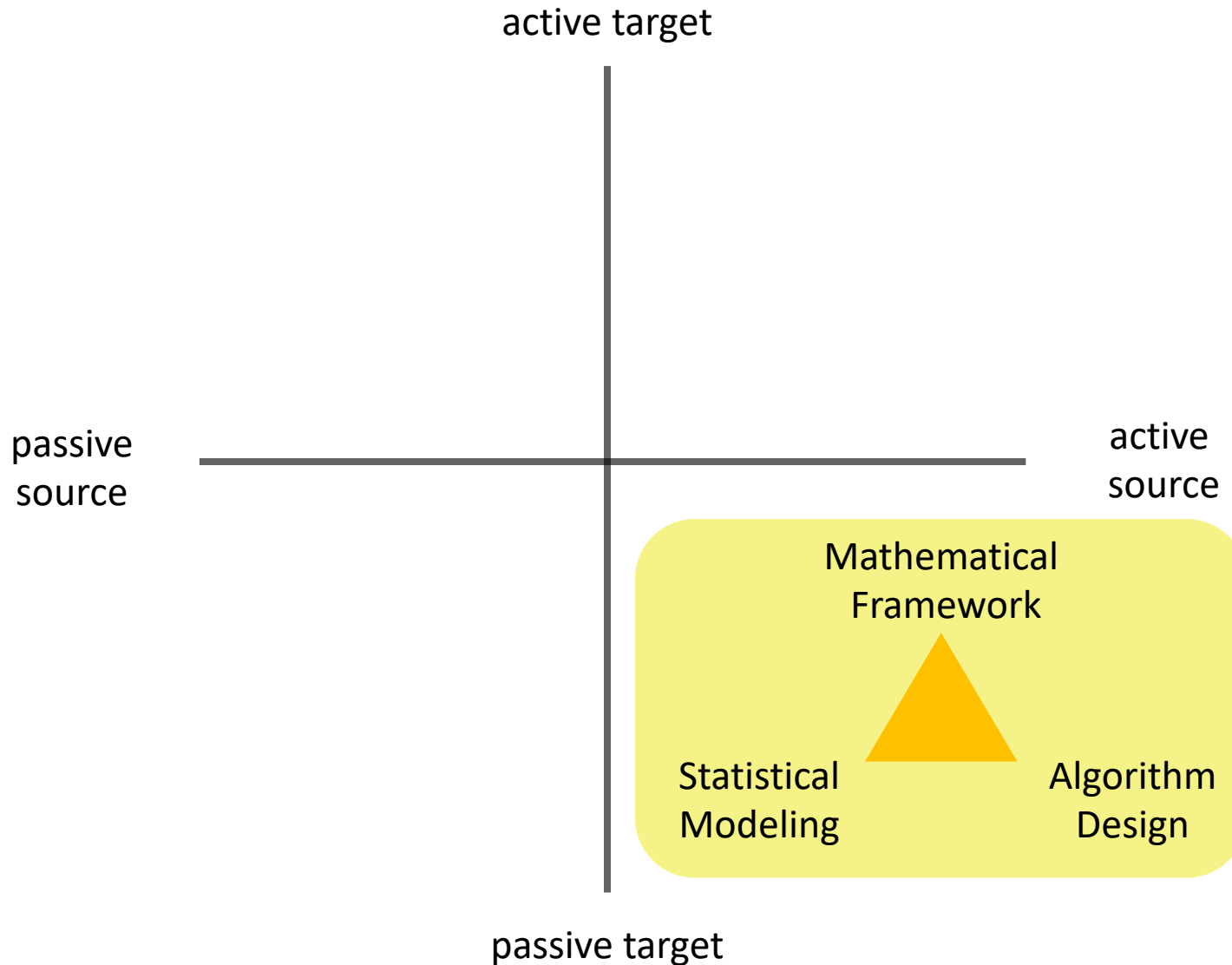
Digital Ethereal Project

passive target

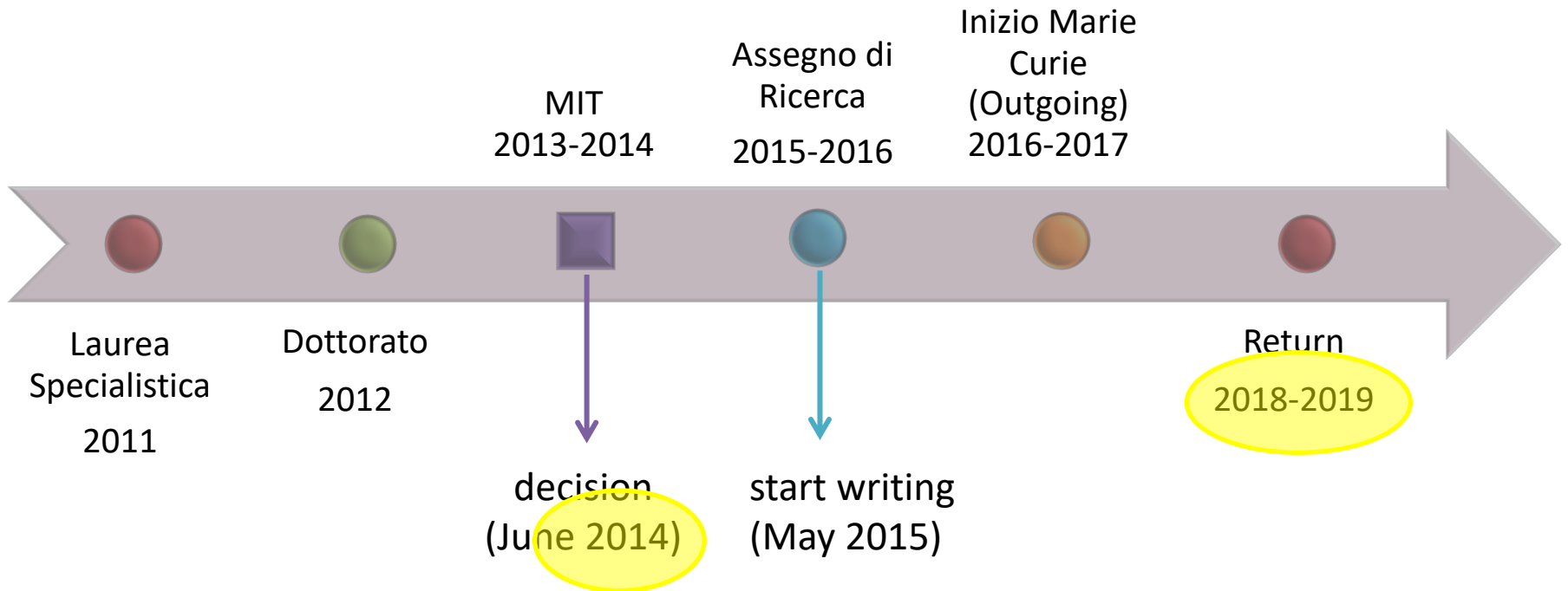
Active vs Passive



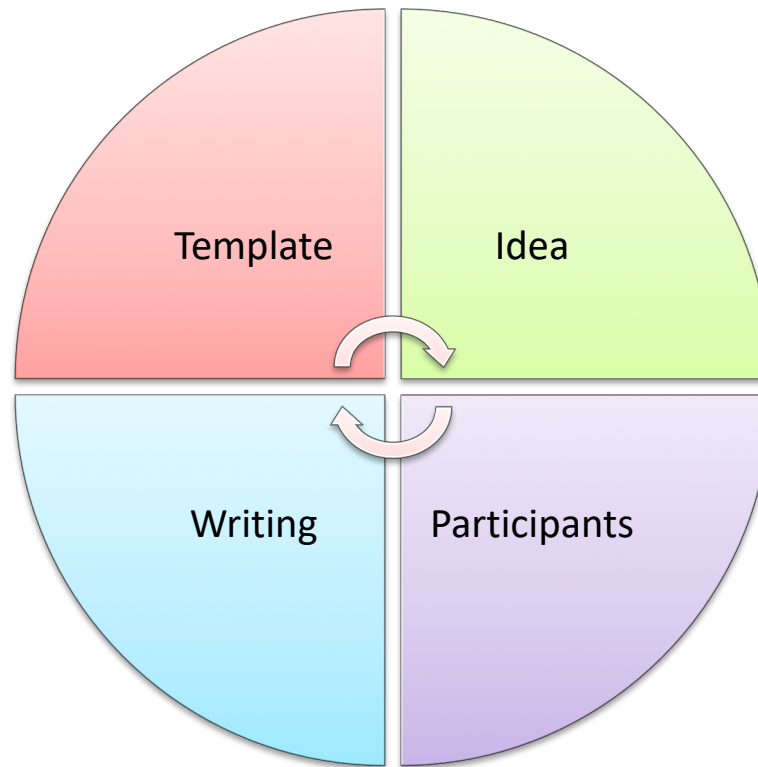
My Background



My Timeline



Mind Map



Template

① EXCELLENCE

1. Quality, innovative aspects and credibility of the research
 1. Introduction and State-of-the-art
 2. Overview of the Action: Objectives, Methodology, and Innovative Aspects
2. Clarity and quality of **transfer of knowledge/training** for the development of the experienced researcher (ER) in light of the research objectives
3. Quality of the supervision and the hosting arrangements
4. Capacity of the ER to reach and re-enforce a position of professional maturity in research

② IMPACT

1. Enhancing research- and innovation-related human resources, skills, and working conditions to realise the potential of individuals and to provide new career perspectives
2. Effectiveness of the proposed measures for communication and results dissemination
 1. Exploitation of results and **intellectual property rights**

③ IMPLEMENTATION

1. Overall coherence and effectiveness of the work plan
2. Appropriateness of the management structure and procedures, including **quality management and risk management**
3. Appropriateness of the institutional environment (infrastructure)
4. Competences, experience and complementarity of the participating organisations and institutional commitment

My first project

- Training-through-research
- Management of IPR
- Project management
- Inter-sectoral or interdisciplinary
- Communication and dissemination
- Gantt Chart

Idea and Objectives

Credibility

- Topic

Enlarge the horizon

Biomedical Science

- Time

Not a Paper

Time Machine

- Contribution

Hot topic

Machine Learning with Big
Data in IoT

Idea

Applications: business intelligence, smart buildings, safety, and security.

Use Case 1: Counting people in a public mall/airport, for smart lighting/heating or providing information about peak hours.

Use Case 2: Determining the number or cars/people in a public road, for crowd counting, public security, and measuring events' success.

Showing Dwell Time During A Marketing Campaign								
Time Range	Visitors Count	Dwell time range (minutes)						
		1-5	5-10	10-20	20-40	40-60	>60	>120
Day 1	283	■	■	■	■	■	■	■
Day 2	182	■	■	■	■	■	■	■
Day 3	292	■	■	■	■	■	■	■



Behavior Analysis Systems

- **Solutions:**

- *Image-based*

- Privacy issues
- Resource-intensive
- Obstructed LOS

- *Radio-based*

- Privacy issues if based on personal devices
- Cost issues if based on dedicated devices



How Shops Track You Using Your Smartphone

Written by Philip Bates
May 5, 2016

Privacy Concerns Raised Over i

The Promenade is reportedly tracking customer's cellphones
By North County Times

SEARCH The New York Times

BUSINESS DAY

Attention, Shoppers: Store Is Tracking Your Cell

By STEPHANIE CLIFFORD and QUENTIN HARDY JULY 14, 2013

Big Data Hits Real Life
By Erica Bernstein

THE WALL STREET JOURNAL.

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WHAT THEY KNOW

Judges Weigh Phone Tracking

IN THE FUTURE

By 202

Big Brother malls trigger privacy row after installing equipment to spy on shoppers via their mobiles

- Technology installed at ten of UK's biggest malls
- Will track movement but not personal information, developers insist
- Tiny yellow sign only warning of 'FootPath' scanners

By Sean Poulter For The Daily Mail
UPDATED: 07:03 EST, 5 January 2012

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Shopping centres have triggered a Big Brother row after installing equipment that allows them to track customers using their mobile phone signals.

Device-free Behavior Analysis

- **Type of System:**

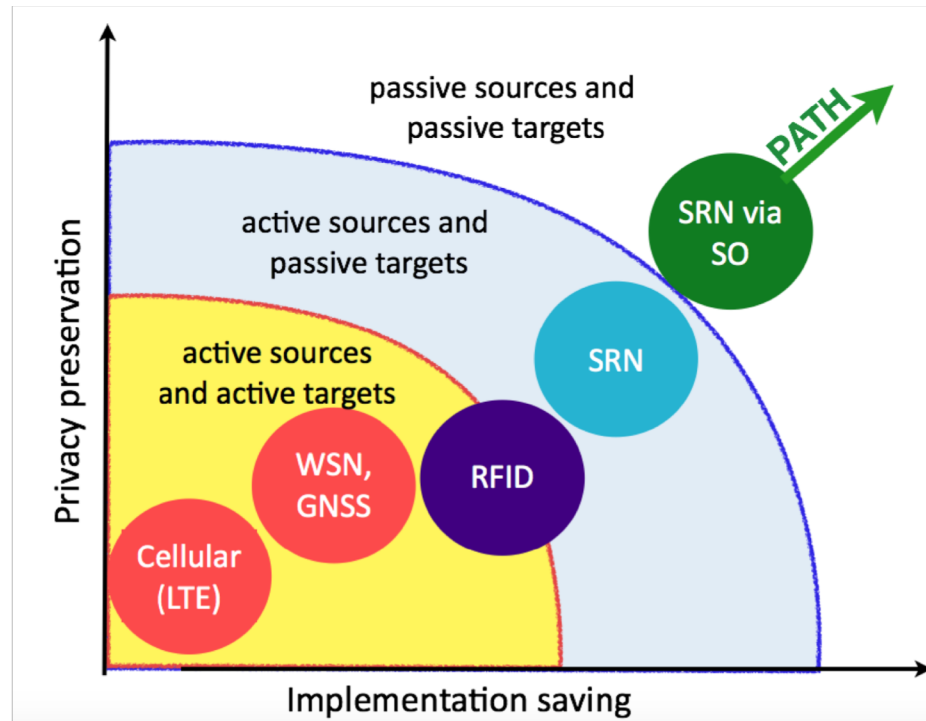
- *“Active” Sensor Radars*: a dedicated network of sensor radars
- *Sensor Radar via Signals of Opportunity*: network of receiving-only sensors that exploit signals of opportunity

- **Approaches:**

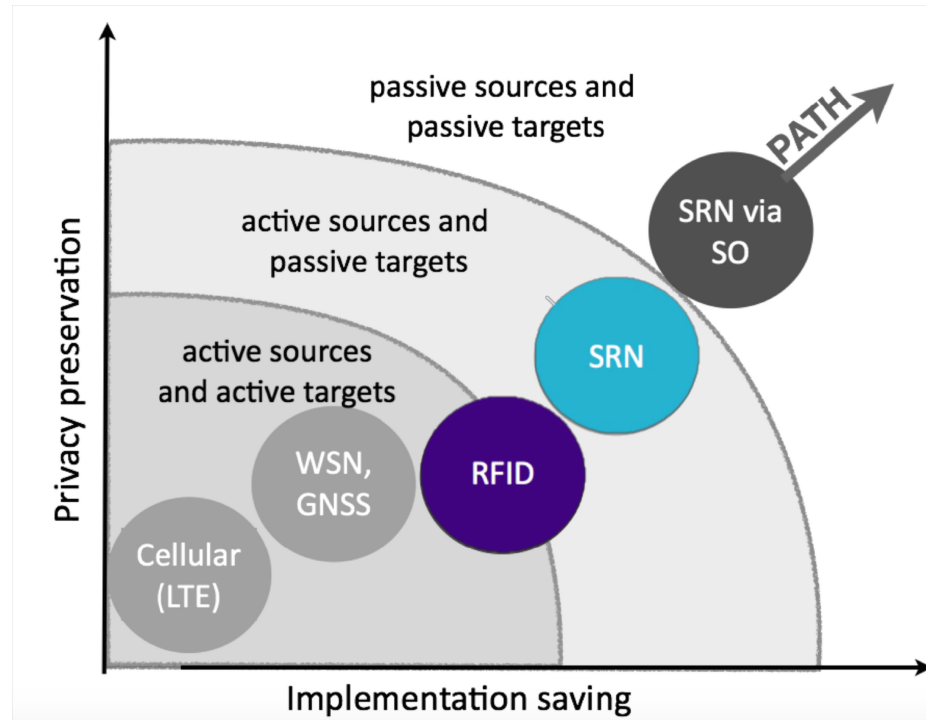
- *Individual-centric*: detect people in the scene, track them over time, count the number of tracks (counting + data association)
- *Crowd-centric*: low-level features extracted from data

PATH

Passive tracking of people and things for physical behavior analysis (PATH) refers to the detection, localization, and tracking of passive targets via passive sources for applications in behavior analysis.



Background



Participants

- The Beneficiary and the Host Institution:
Popularity and credibility



MIT INSTITUTE FOR DATA,
SYSTEMS, AND SOCIETY

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Data, Systems, and Society: Video about IDSS

Data is everywhere in our daily lives—and it can tell us a lot about society's most complex problems. Munther Dahleh describes the vision for IDSS. [READ MORE](#)

MIT School of Engineering

Institute for Data, Systems, and Society (IDSS) is committed to addressing complex societal challenges by advancing education and research at the intersection of statistics, data science, information and decision systems, and social sciences.

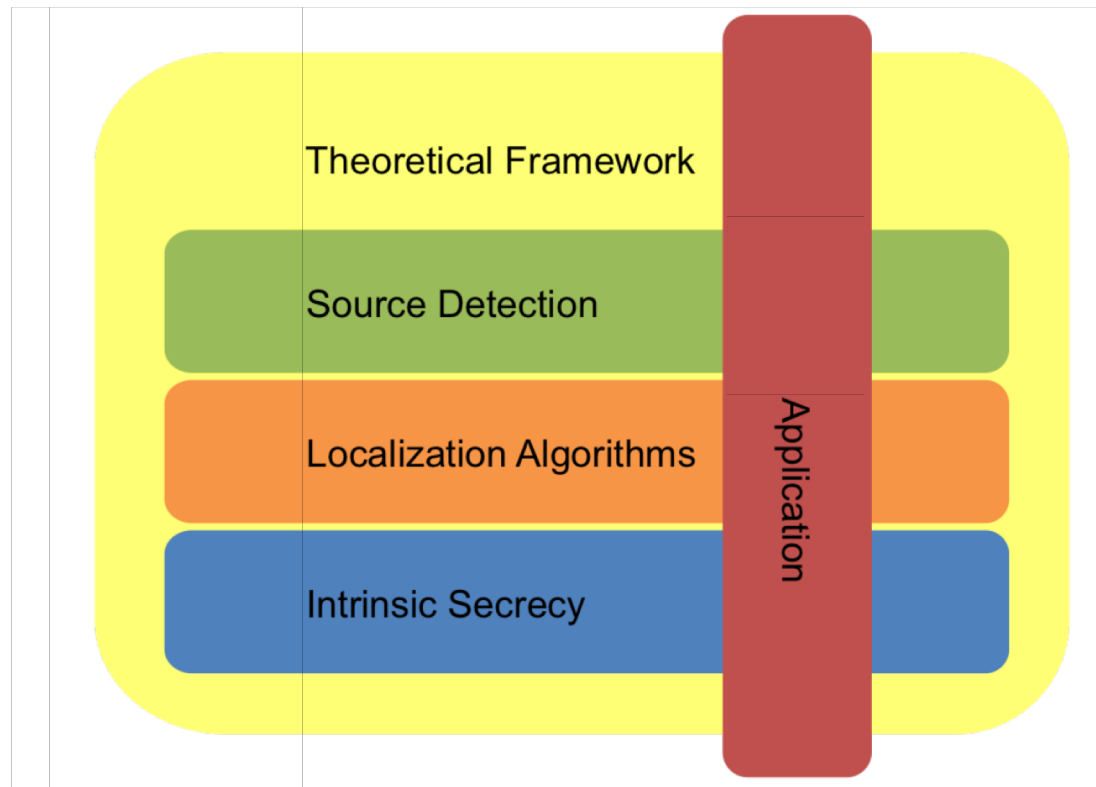
[MORE](#)

Participants

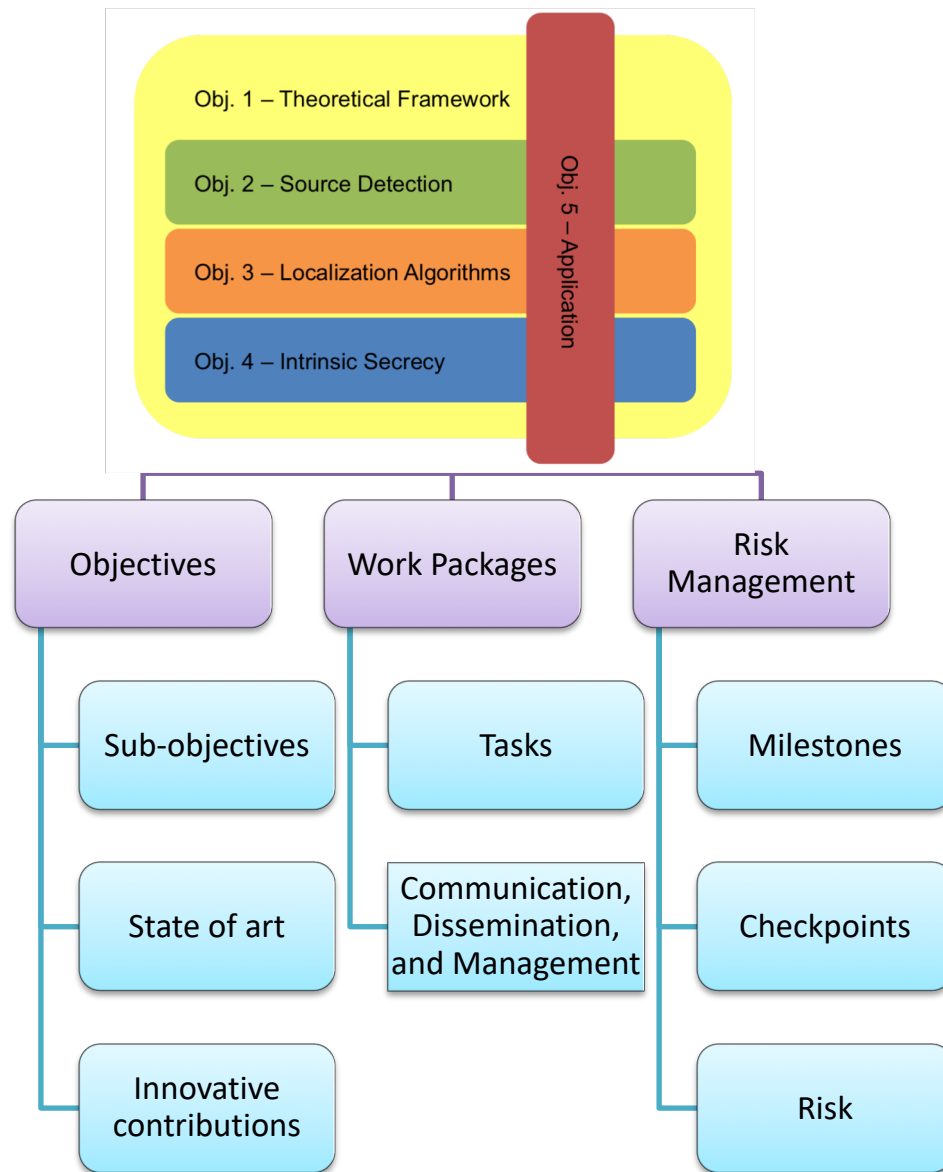
- The Beneficiary and the Host Institution:
Popularity and credibility
- Check if the host has related initiatives
- Global Fellowships can also include a **secondment period** of up to 3 or 6 months in another organisation in Europe, where this would boost the impact of the fellowship
- Short visits and SME: **Wi4B S.r.l.**
- Check the rules! MIT requires the proposal in advance

Writing

Wear the reviewer's shoes



Writing



Strengths and Weaknesses

- My background was strongly related
- The idea was new
- Credibility in time
- Possible application and impact

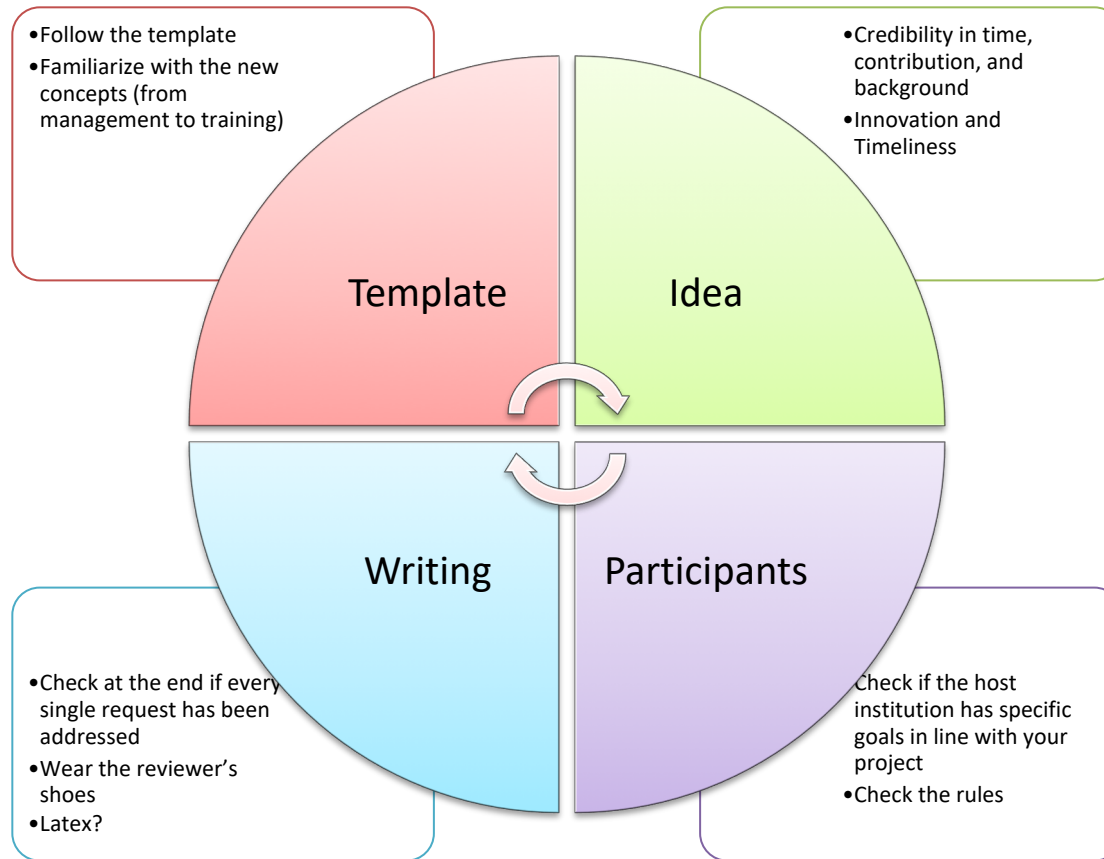
What I worked on – from weakness to strength

- My young CV
- Lack of leadership

What I did not work on and has been raised by the reviewers

- The proposal is unclear about the reintegration of the experienced researcher during the incoming phase
- The work plan does not sufficiently illustrate the activities that will be carried out during the secondment period

Summary



Thank you for your attention!

