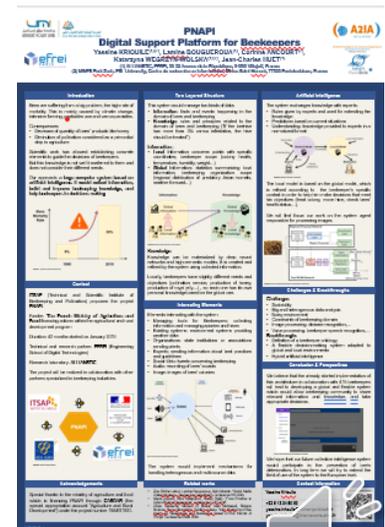


PNAPI: Digital Support Platform for Beekeepers

Yassine KRIOUILE(1)(2), Lamine BOUGUEROUA(1), Corinne AN COURT(2), Katarzyna WEGRZYN-WOLSKA(1)(2), Jean-Charles HUET(1)

(1) ALLIANSTIC, EFREI, 30-32 Avenue de la République, 94800 Villejuif, France

(2) MINES ParisTech, PSL University, Centre de recherche en informatique, 35 rue Saint Honoré, 77300 Fontainebleau, France



Context



- Funder: ministry of agriculture and food through **CASDAR**
- Project number **18ART1831**
- Duration: **42 months**



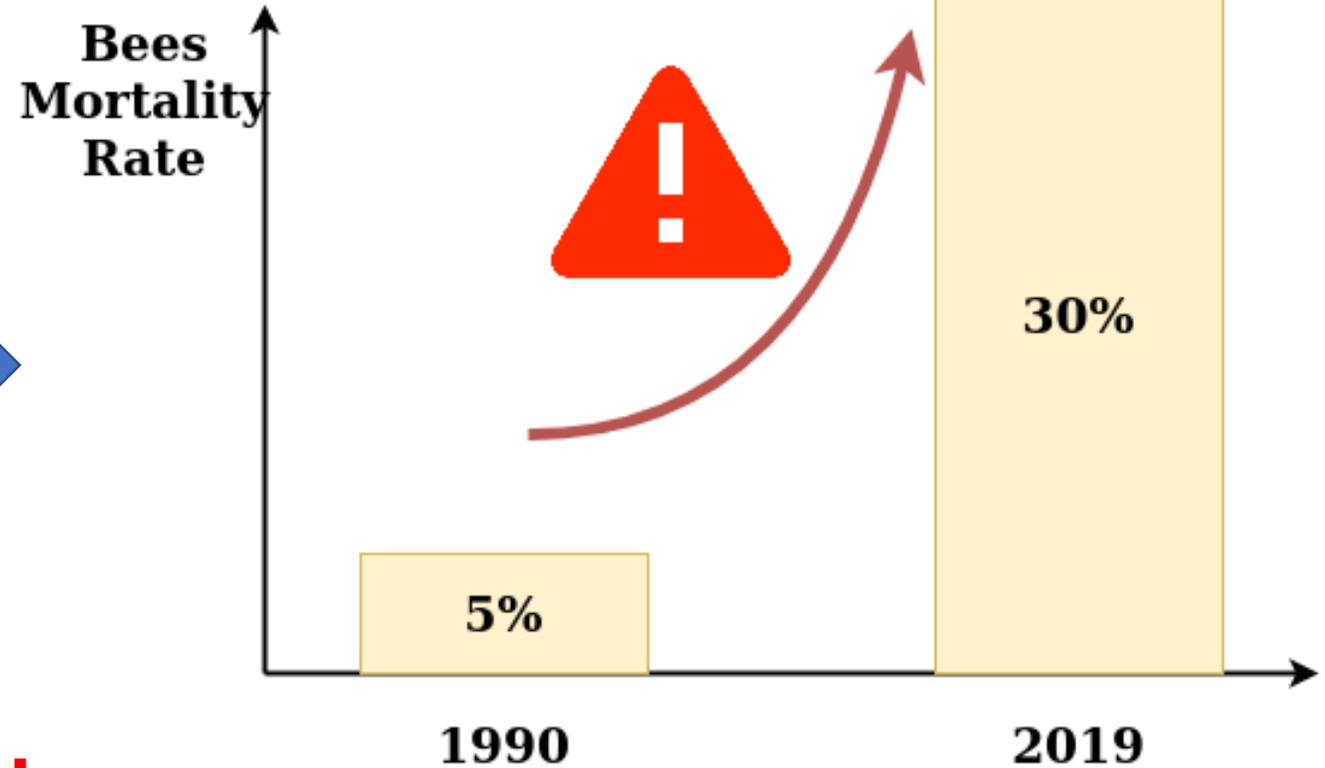
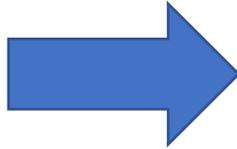
Outline

- Problematic
- Related work
- Heterogenous and multi-source data
- Information and knowledge
- Data exchange
- Challenges & Breakthroughs
- Current works



Problematic

- Climate change
- Intensive farming
- Pesticides use
- Varroa parasites



Lack of relevant knowledge transfer to beekeepers



Our approach

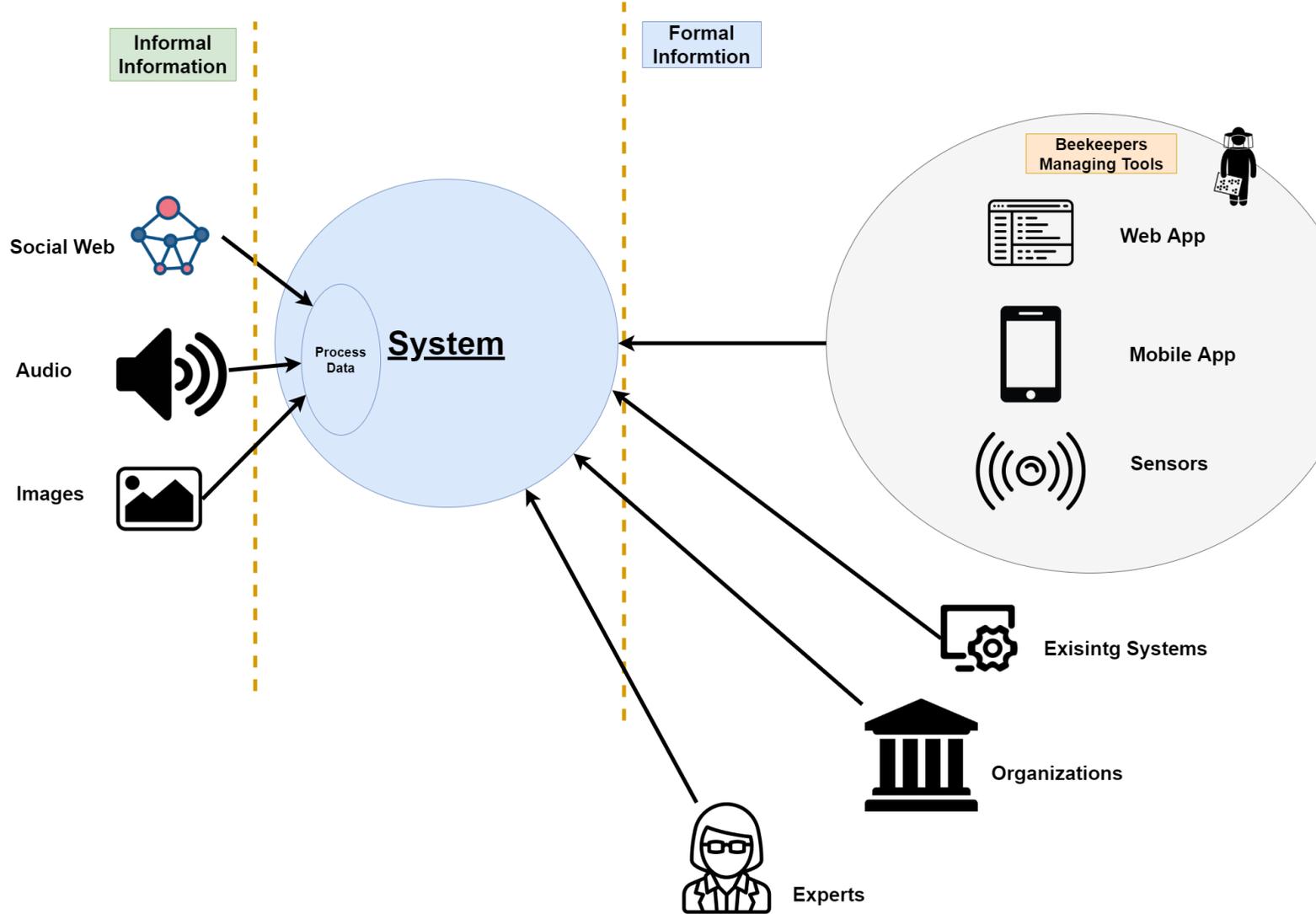
- A **large** computer system
- Based on **artificial intelligence**
- It would collect **information**
- Build and improve beekeeping **knowledge**
- Help beekeepers in **decision** making



Related work

- Zine Eddine Latioui, Lamine Bougueroua, Alain Moretto. “Social Media Chatbot System – Beekeeping Case Study”. Conference HIS 2019.
- Nikola Zogović, Mića Mladenović, Slađan Rašić. “From Primitive to Cyber-Physical Beekeeping”. Conference ICIST 2017.
- Olivier Debauche, Meryem El Moulat, Saïd Mahmoudi, Slimane Boukraa, Pierre Manneback, Frédéric Lebeau. “Web Monitoring of Bee Health for Researchers and Beekeepers Based on the Internet of Things”. Conference FAMS 2018

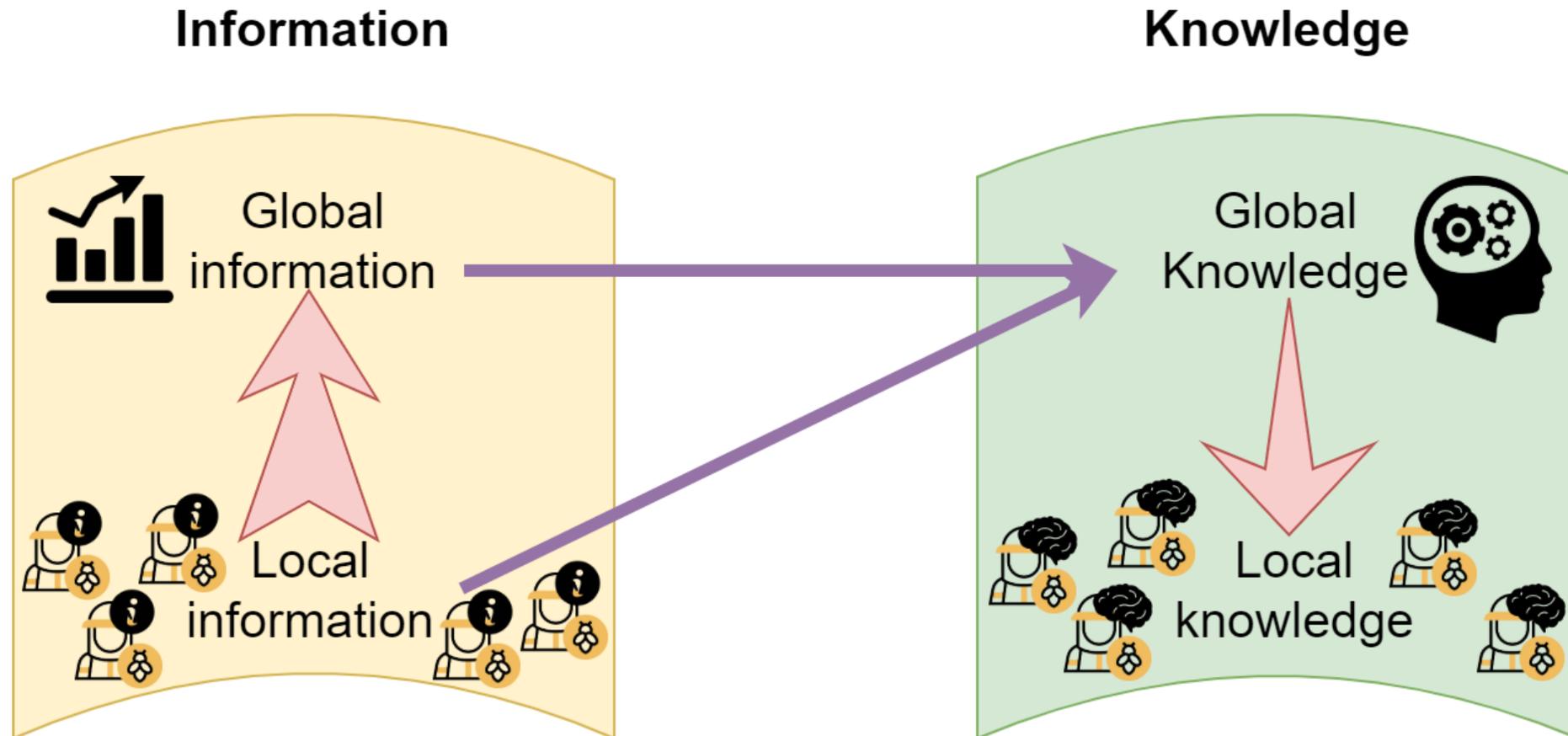




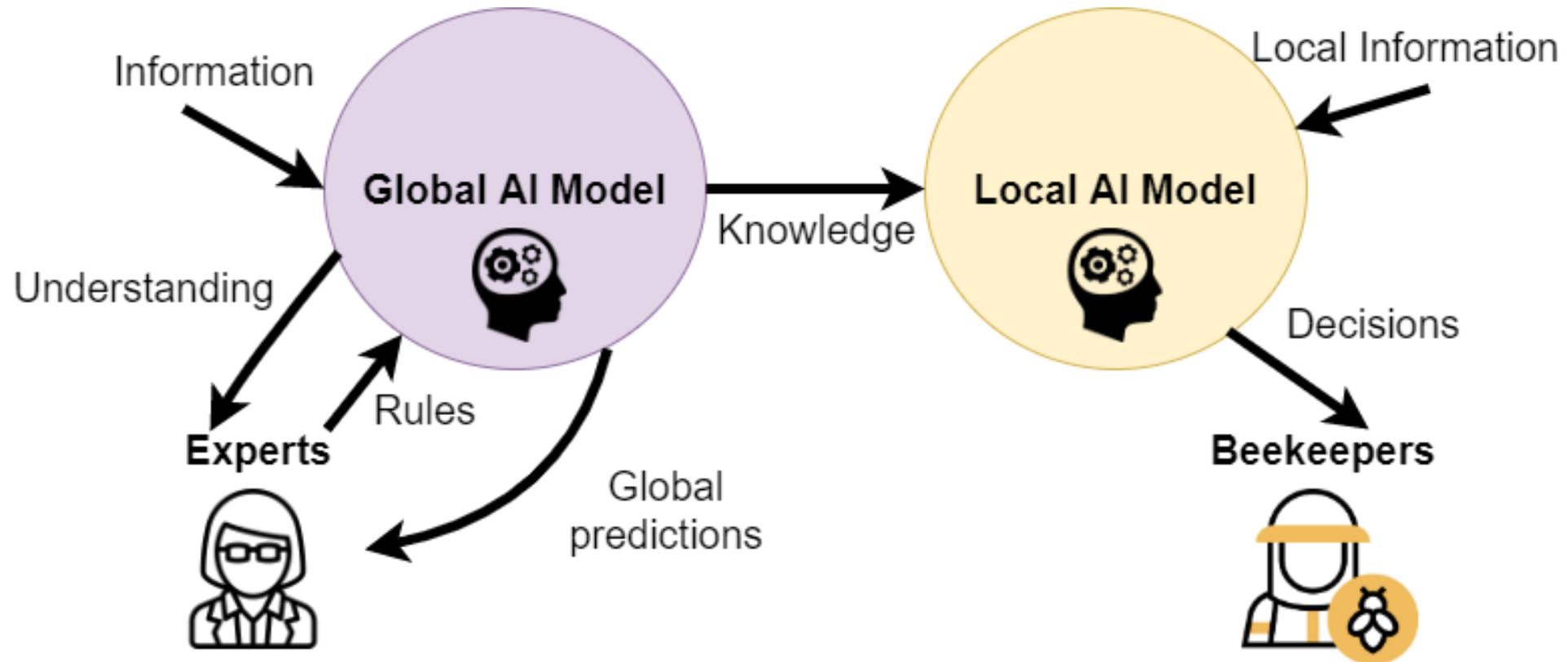
Heterogenous
and multi-
source data



Information and Knowledge



Data exchange



Challenges & Breakthroughs

- Scalability
- Big and heterogenous data analysis
- Constraints of beekeeping domain
- Image processing: disease recognition,...
- A flexible decision-making system
- Hybrid artificial intelligence

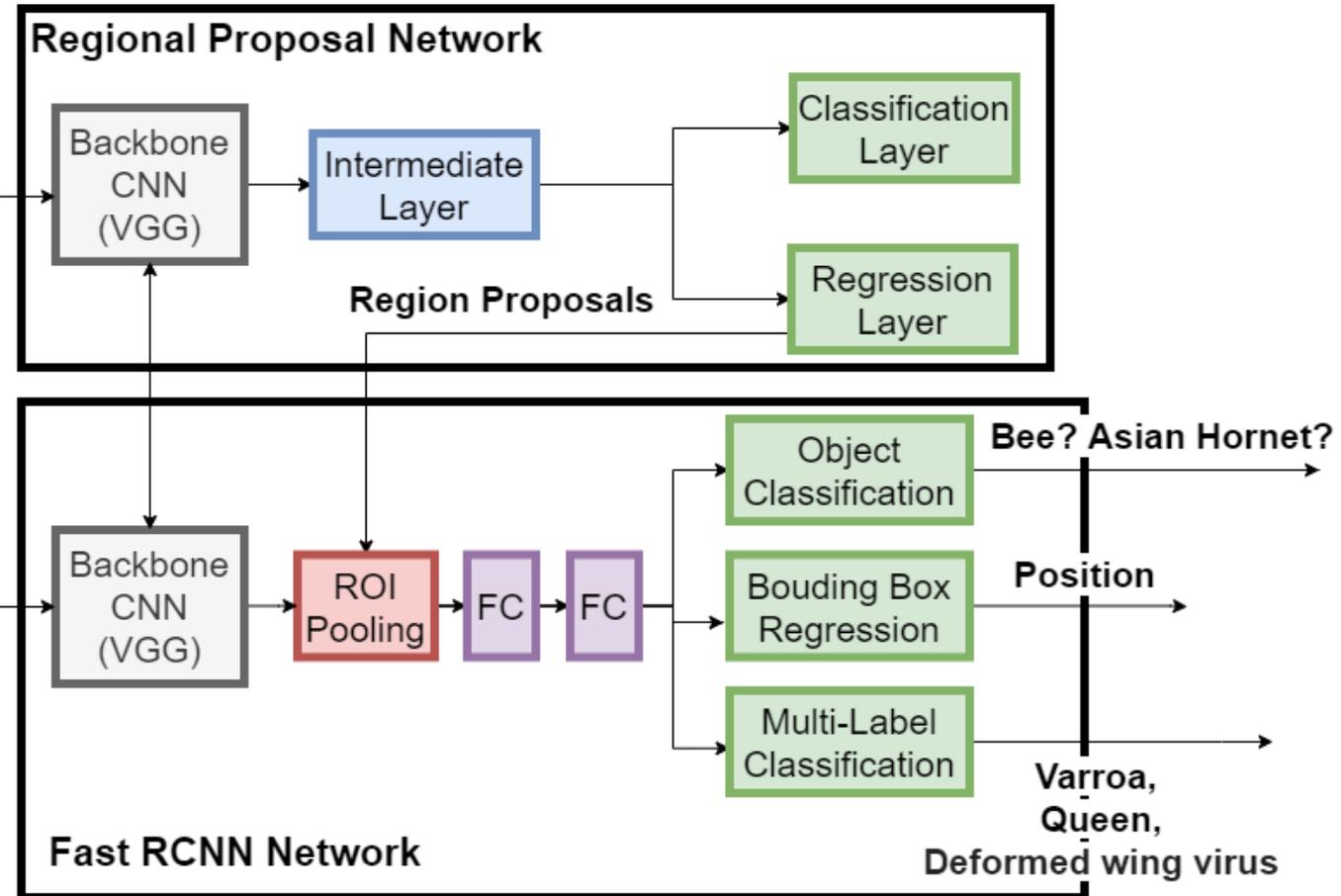


Project team current works

- **Research on “Detecting bees and varroas using artificial intelligence and neural networks”**
- Developing a “Web application for managing and monitoring beekeepers’ data”
- Research on “Frameworks for managing beekeeping architecture”
- Research on “Algorithms and models for prediction in beekeeping domain”
- Research on “Sensors for collecting bees' data”



Detecting bees and varroas



Web application

Modifier une planification

Planification

Supprimer planification

Ruchers

Utiliser une stratégie Nom

Nom	Date	Ecart (jours)	Quantité	Unité	Commentaire	Supprimer
<input type="text" value="Action 1"/>	<input type="text" value="05 / 19 / 2020"/>	<input type="text" value="4"/>	<input type="text" value="3"/>	<input type="text" value="uni"/>	<input type="text" value="comm"/>	<input type="button" value="Supprimer"/>
<input type="text" value="Action 2"/>	<input type="text" value="05 / 23 / 2020"/>	<input type="text" value="4"/>	<input type="text" value="2"/>	<input type="text" value="uni2"/>	<input type="text" value="commen"/>	<input type="button" value="Supprimer"/>



Conclusion

- Global and flexible system
- Share relevant information and knowledge
- Take appropriate decisions





Thank you for your
attention

Yassine Kriouile

kriouile.yassine@gmail.com

yassine.kriouile@mines-paristech.fr

yassine.kriouile@intervenants.efrei.fr

