



كلية العلوم ببزرت
Faculté des Sciences de Bizerte



General information

Research Laboratory: Artificial Intelligence, Data Engineering and Application (IDEA Lab)
(Faculté des sciences de Bizerte,

Université de Carthage)

Contact name : Dr. Habib Fathallah

Email address: habib.fathallah@gmail.com
fadi.kacem@fsb.ucar.tn
oumeimaghnimi29@gmail.com

Targeted topics:

HORIZON-CL4-2022-DATA-01-01

HORIZON-CL4-2022-DATA-01-05

10/02/2022



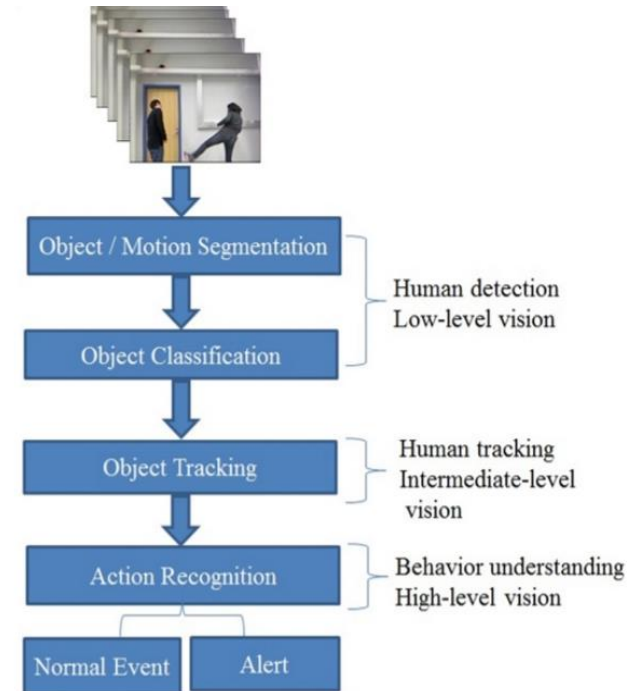
Project idea

Multi-source heterogeneous machine learning methods for real world surveillance and physical intrusion detection

Investigated modality: Infrared camera Videos

- Efficient Deep Learning model on constrained computing resources : **Trade-off between runtime, storage, memory, energy-saving, accuracy, long term dependencies.**
- Dense Computer vision tasks.
- Intrusion modeling.

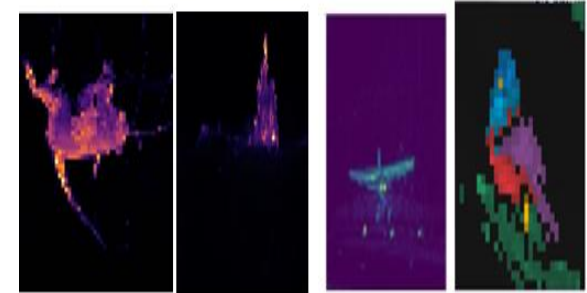
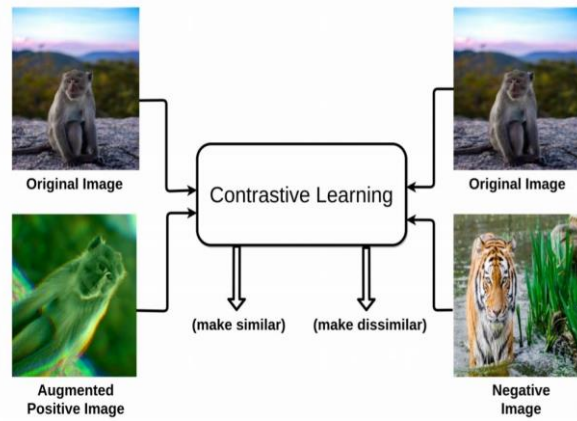
Dense Computer vision tasks



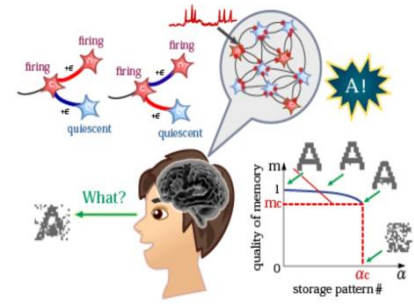
d. Self supervised Transformers for background world representation without the need of labeling training data.



DINO, BYOL, BeiT, GPT, Bert, Barlow Twins. SimCLRv2, iBoT, etc.



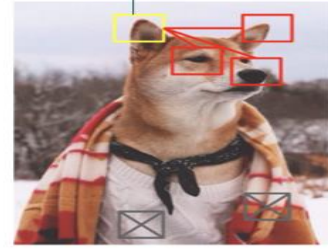
e. surrounding context



d. Brain inspired modules and neural science approaches

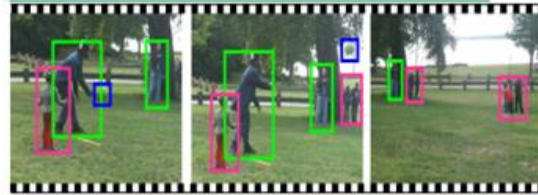
d. Grounded situation recognition.

$$y_i = \sum_j w_{ij} x_j$$



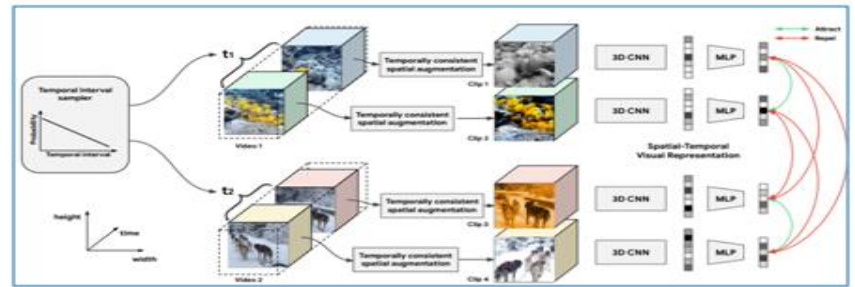
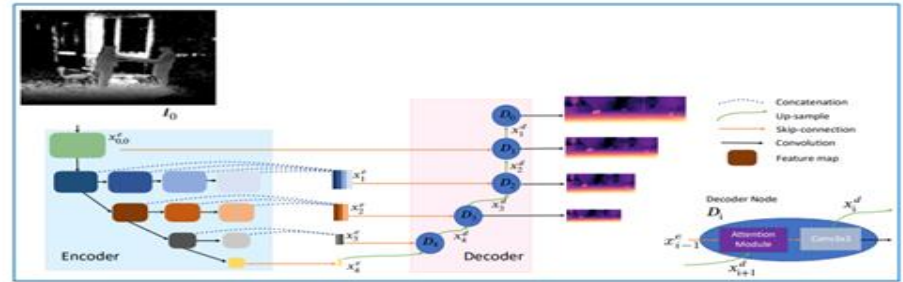
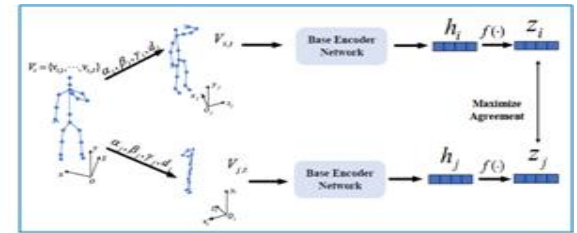
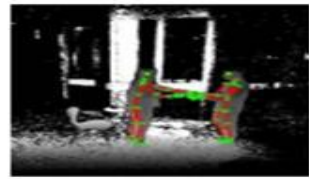
The man passes a ball to a group of kids

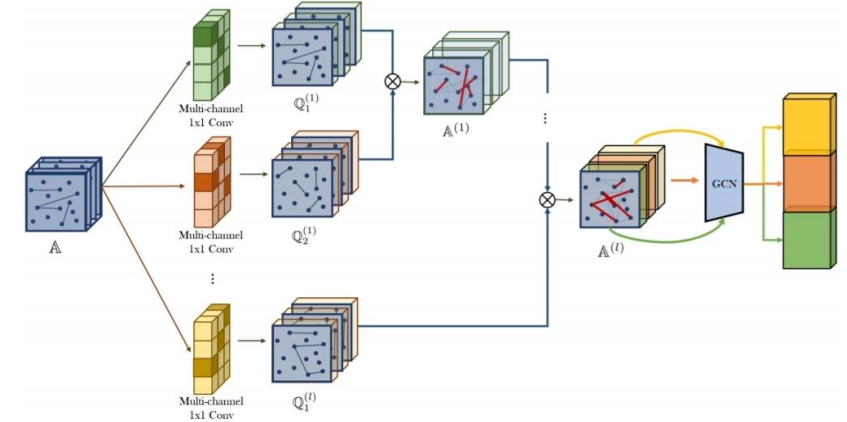
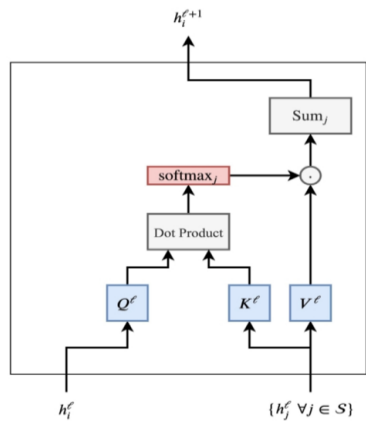
Action



Catching								Landing					
Agent	Caught Item	Tool	Place	Agent	Caught Item	Tool	Place	Agent	Destination	Place	Agent	Destination	Place
Bear	Fish	Mouth	River	Football Player	Football	Hand	Football Field	Airplane	Runway	Aircraft Carrier	Bird	Arm	Outdoors

g. multi-modal multi task general purpose model.





h. Graph neural Networks with transformer encodings.

i. Graphformers to tackle dynamic scenarios and enable general modeling capacity to be integrated into the full multi-source system.

j. Explainable AI(XAI) via knowledge graphs.

