

The Ariac – Arbitrage Project

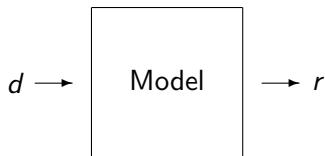
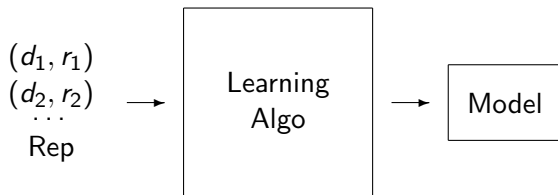
On Federated Learning

J.-M. Jacquet, I. Linden, W. Vanhoof

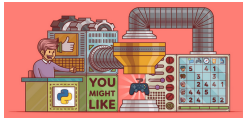
University of Namur

February 8th 2022

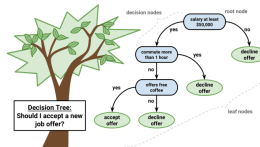
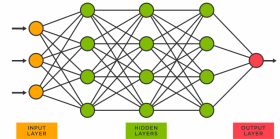
Machine learning in a picture



Typical applications



Two kinds of representation



Inductive logic programming

- Given background knowledge

```
parent(ann,mary).      female(ann).  
parent(ann,tom).       female(mary).  
parent(tom,eve).       female(eve).
```

- Given positive and negative information

```
+ daughter(mary,ann).    - daughter(tom,ann).  
+ daughter(eve,tom).     - daughter(tom,eve).
```

- Induce relations

```
daughter(X,Y) :- parent(Y,X), female(X).
```

Inductive logic programming

- Given background knowledge

```
parent(ann,mary).      female(ann).  
parent(ann,tom).       female(mary).  
parent(tom,eve).       female(eve).
```

- Given positive and negative information

```
+ daughter(mary,ann).    - daughter(tom,ann).  
+ daughter(eve,tom).     - daughter(tom,eve).
```

- Induce relations

```
daughter(X,Y) :- parent(Y,X), female(X).
```

- Given background knowledge

```
parent(ann,mary).      female(ann).  
parent(ann,tom).       female(mary).  
parent(tom,eve).       female(eve).
```

- Given positive and negative information

```
+ daughter(mary,ann).    - daughter(tom,ann).  
+ daughter(eve,tom).     - daughter(tom,eve).
```

- Induce relations

```
daughter(X,Y) :- parent(Y,X), female(X).
```

Inductive logic programming

- Given background knowledge

```
parent(ann,mary).      female(ann).  
parent(ann,tom).       female(mary).  
parent(tom,eve).       female(eve).
```

- Given positive and negative information

```
+ daughter(mary,ann).    - daughter(tom,ann).  
+ daughter(eve,tom).     - daughter(tom,eve).
```

- Induce relations

```
daughter(X,Y) :- parent(Y,X), female(X).
```

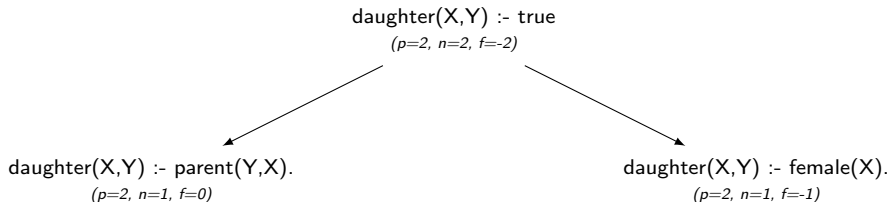

daughter(X,Y) :- true
(p=2, n=2, f=-2)

Basic strategy

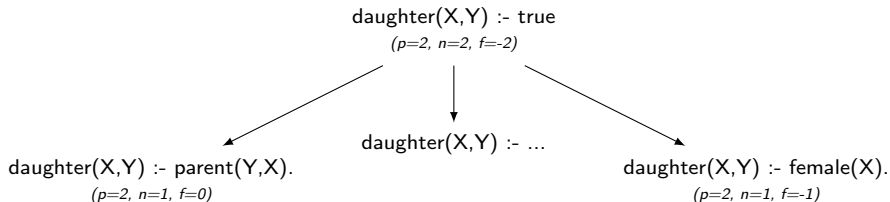
daughter(X,Y) :- true
(p=2, n=2, f=-2)



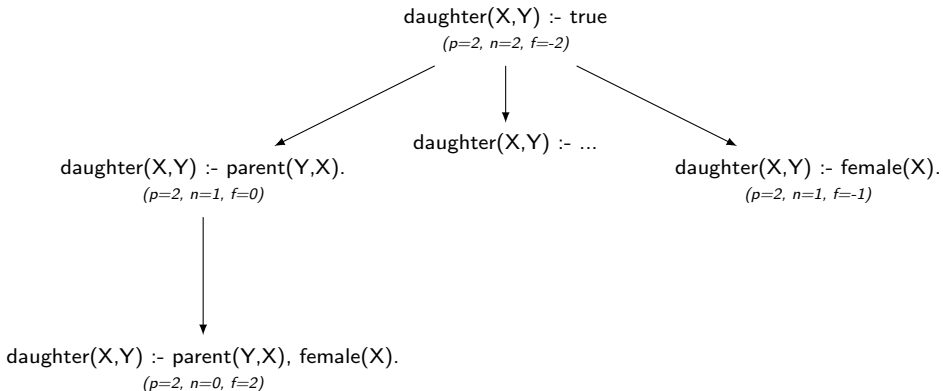
daughter(X,Y) :- parent(Y,X).
(p=2, n=1, f=0)



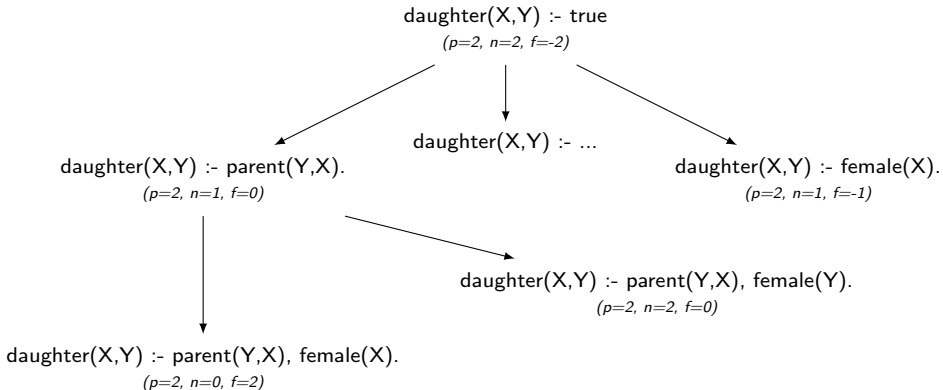
Basic strategy



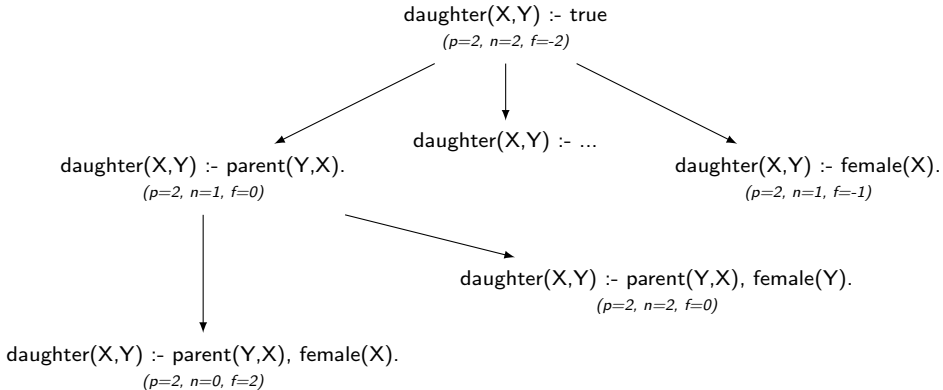
Basic strategy



Basic strategy



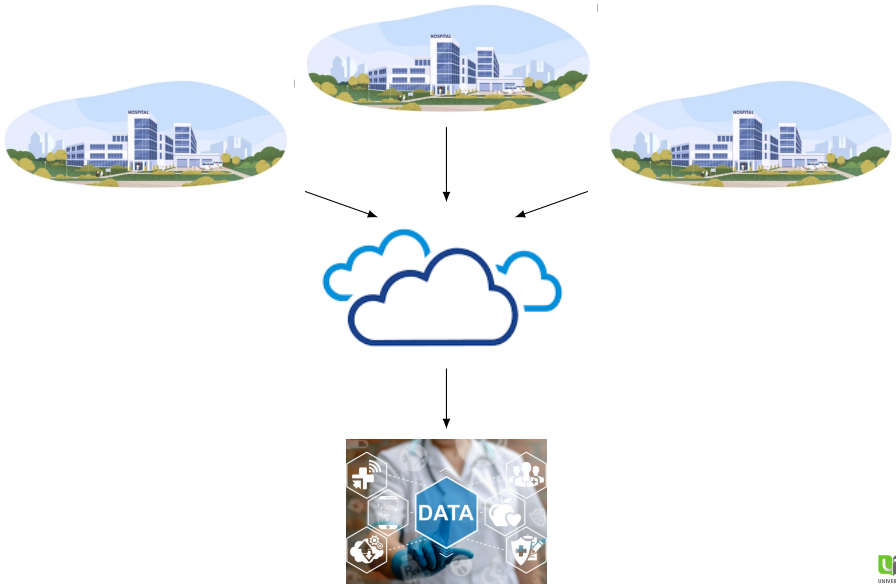
Basic strategy



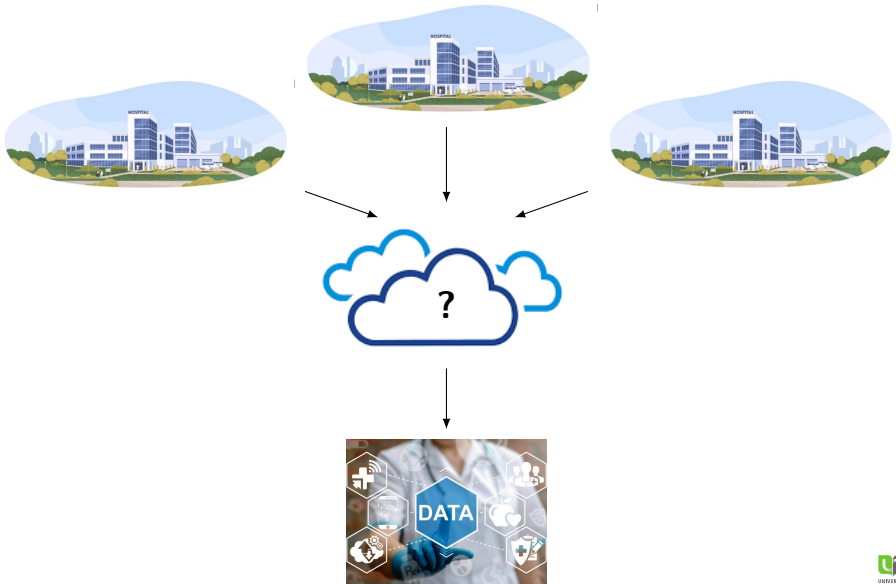
Key features

Incremental & theory-based

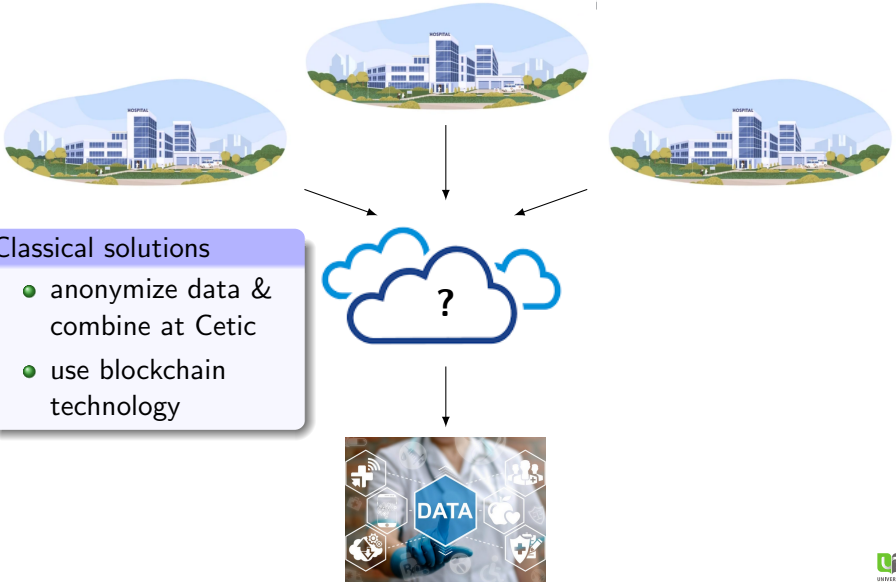
Federated learning, INAH and Challenge 3



Federated learning, INAH and Challenge 3



Federated learning, INAH and Challenge 3



Federated learning, INAH and Challenge 3

