

# The reliability of the service provided

Challenge : « *Over time, the composition does what it has been designed for* »

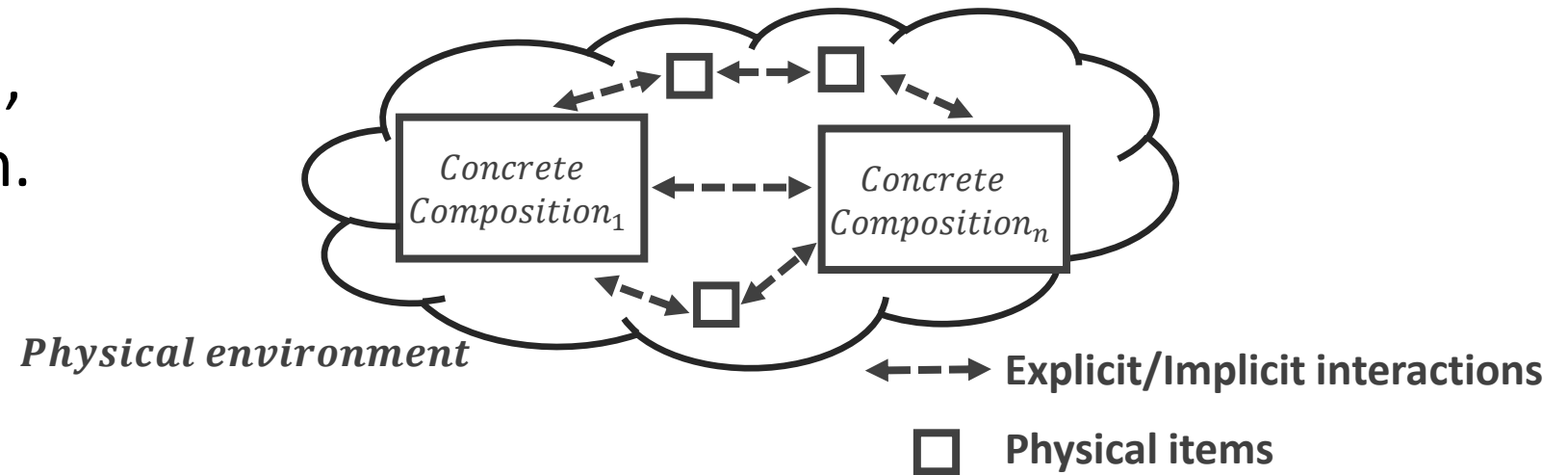
→ Gérald Rocher, PhD thesis to be started.

# The reliability of the service provided

« Over time, the composition does what it has been designed for »

- Each service in a composition interacts with the physical environment (Actuators/Sensors)...

- Explicit interaction,
- Implicit interaction.



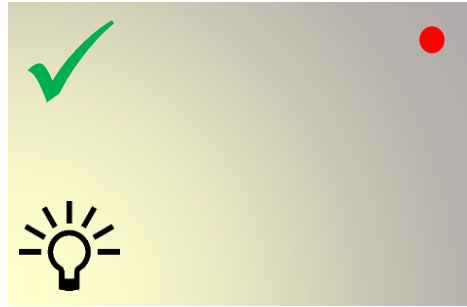
- Service-based compositions are subject to disturbances/disruptions
  - Unknown physical environment (not totally or accurately modeled),
  - Execution of unknown/non-anticipated concurrent applications...

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## ▪ Motivating examples

- Non deterministic environment...



App#1

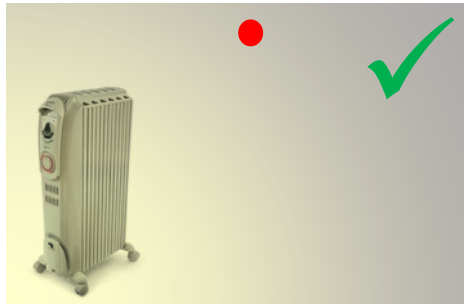
(Maintain 50 lux in the room)



App#1

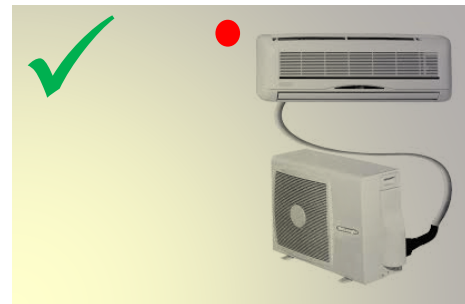
(Maintain 50 lux in the room???)

- Concurrent applications...



App#1

(Maintain 25dC in the room)



App#2

(Maintain 19dC in the room)



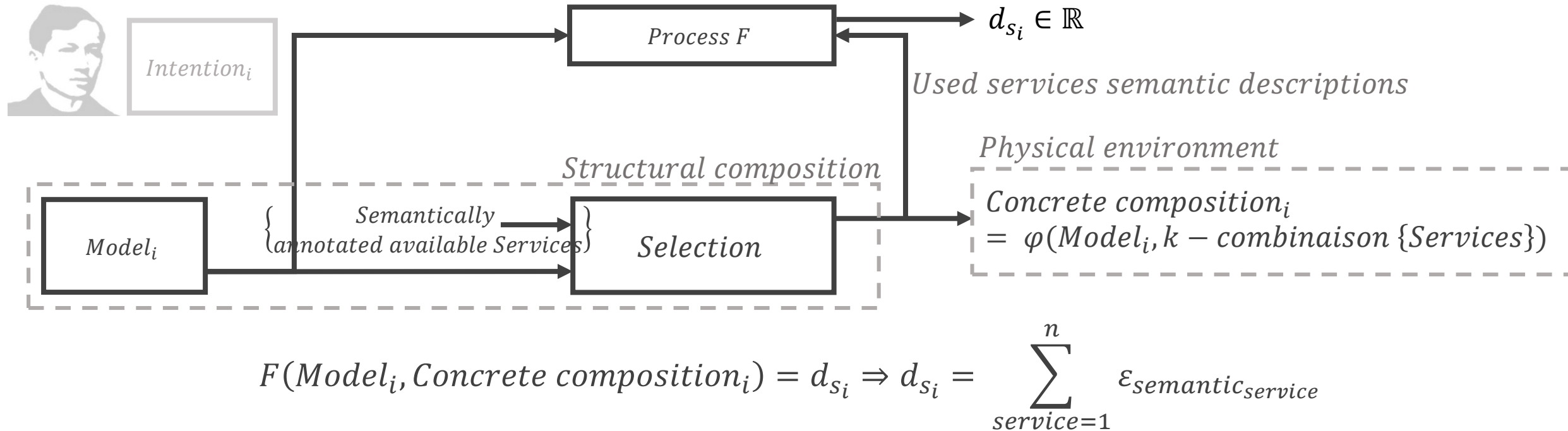
Concurrent App#1 & App#2

(Temp in the room ???)

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## ■ From feedforward approach...

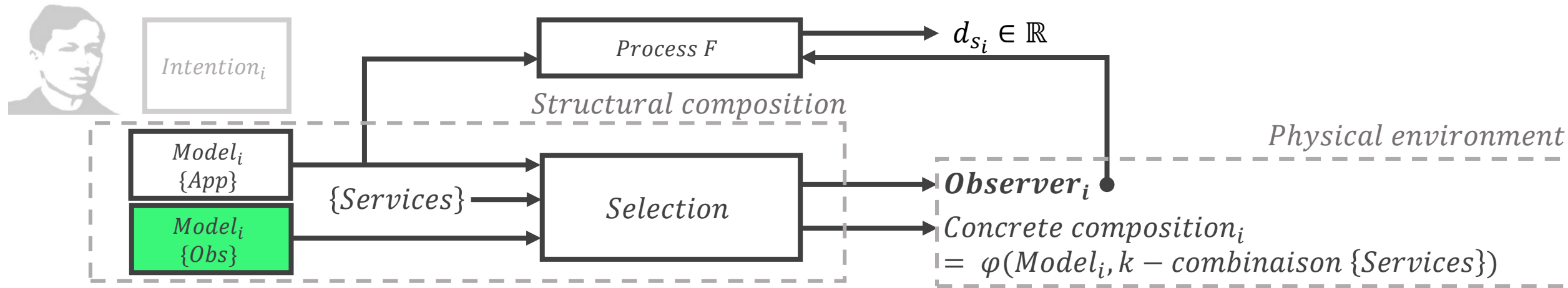


- $d_{s_i}$  may not gives the overall composition semantic gap,
- Suited for static/deterministic execution environment

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- ... to feedback approach...



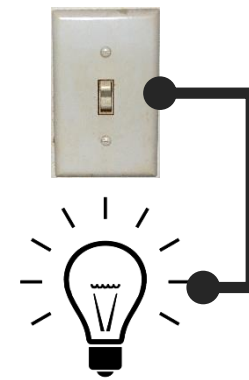
$F(\text{Model}_i, \text{Concrete composition}_i) = d_{s_i} \Rightarrow d_{s_i}$  is  $\text{Obs}_i$  dependent, gives  $\varepsilon_{sem_i} + \varepsilon_{exec_i}$

- **Stochastic models usage (Markov-based),**
- **Run-time calculation of the execution fitness to the model ( $d_{s_i} \in \mathbb{R}$ ),**
- **$d_{s_i}$  as input to the adaptive selection system.**

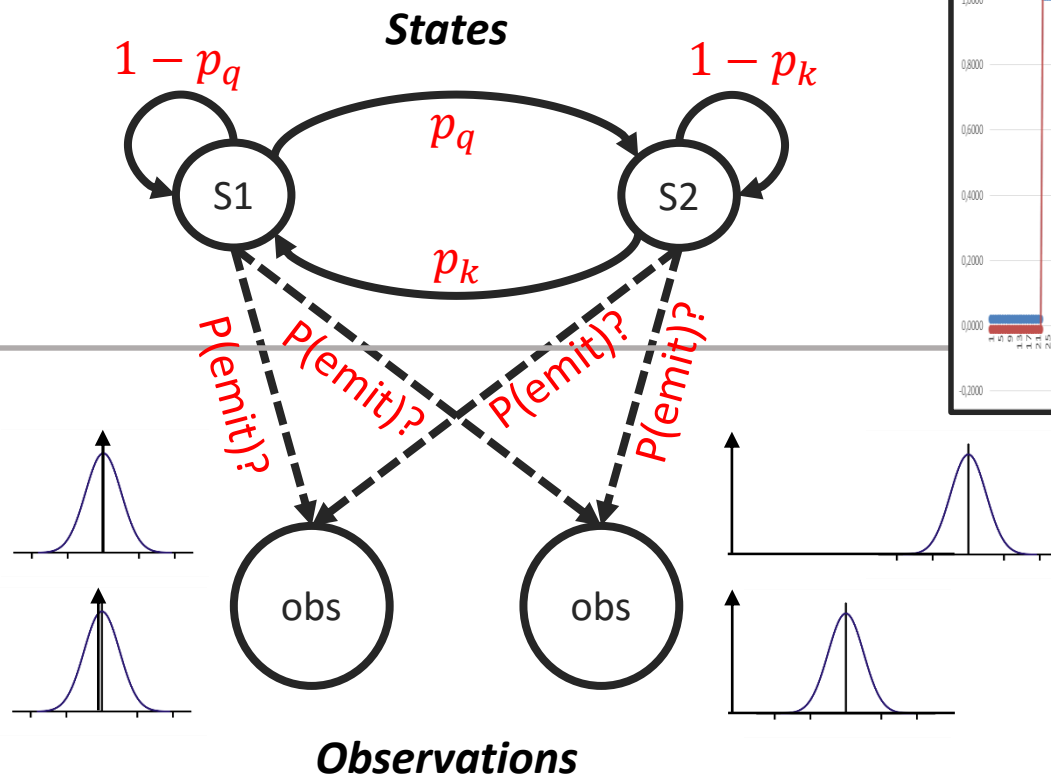
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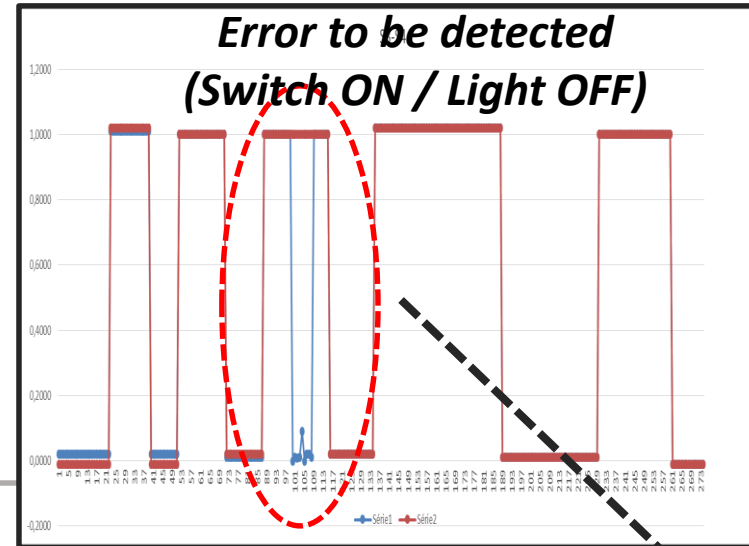
	Light	Switch
State#1 (S1)	OFF	OFF
State#2 (S2)	ON	ON
Error	ON	OFF
Error	OFF	ON



## ■ Preliminary results



Stochastic behavioral model of the composition



Publication in progress ...

