Summary

I am doing a research project in collaboration with Total Energies. I am in the process of modelling their scheduling process in a way that will allow us to optimize their operations. My main concerns in this process is how to make the project succeed with the numerous decision that I have to make but which I feel poorly equiped to make. It is my hope that an external stay at Decision Brain will help me understand what the best appraoch are to making my project succeed, both on the Ph.D. but also after my graduation. Below is a list of my main issues so far that I have failed to solve by myself.

Main Issues:

- Developing the API without a frontend to get feedback
  - I is hard to get the Stakeholders that are actually doing the work to understand the idea without developing a frontend.
- Many topics are outside the scope of my research project due to a lack of the essential skills.
  - Stakeholder management, and UX development.
- Gauging the financial vaule of the project; whether I should continue implementing or keep it academic.
  - I think that the team at Decision Brain will be able to gauge this in less than a month.

Goals of the External Stay

For me the three most significant goals of the external stay would be something like:

- Gauge whether my Ph.D. project can be implemented in practice.
- Integrate my application into a test environment at Decision Brain.
- Get competent feedback on my scheduling approach.

I have a somewhat naive belief that I have found a solid scalable approach to modelling a generic maintenance scheduling system (see section below).

My code work on backend SAP tables so I believe that there may be a possibility of integrating my code into a system at Decision Brain. Finding a way to integrate my system into a Decision Brain where the relevant team at Decision Brain would then be able to judge the potential financial value of a full implementation of my project would be the ultimate goal of the external stay.

Something similar to what is elaborated on in **?** which has a more practical orientation.

Setup of the External Stay

My initial idea of a setup with Decision Brain, would be that I stable contact for the duration of the external stay with which I can discuss my ideas and that I can rely on for help.

- First month: Determine if I could integration my application in a relevant project at Decision Brain. (Maybe a git branch)

- Second month:
- Third month:

Roadmap: Technical Parts

- ☑ Model the Scheduler stakeholder
- ☑ Model the Supervisor stakeholder
- ☑ Model the Technician stakeholder
- ☑ Determine a software architecture
- ☑ Host the API on Total Energies servers
- ☑ Read data from SAP
- ☐ Write data directly to SAP
- ☑ Test output with scheduler stakeholder
- ☐ Test output with supervisor stakeholder
- ☐ Test output with technicial stakeholder

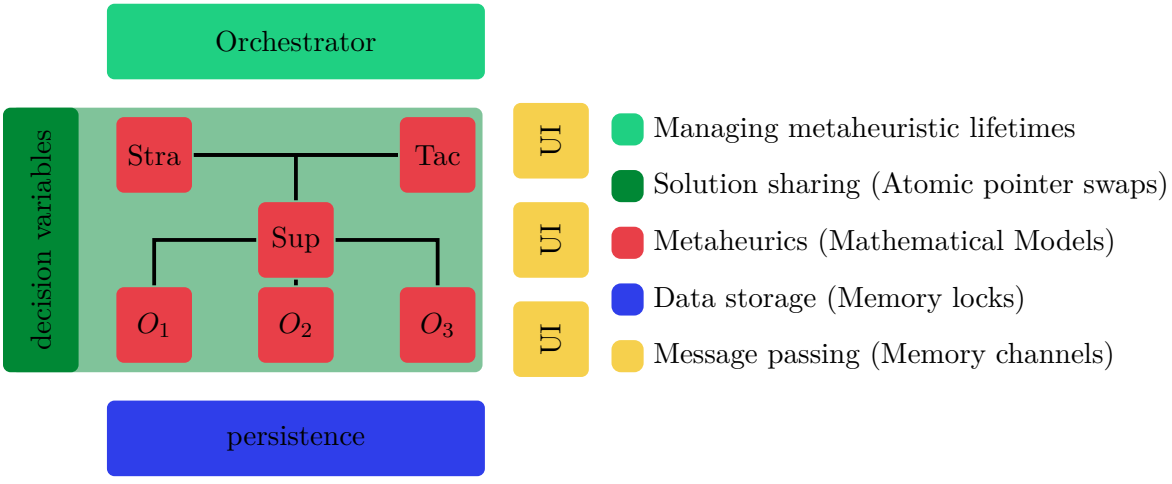
Personal

Personality Test

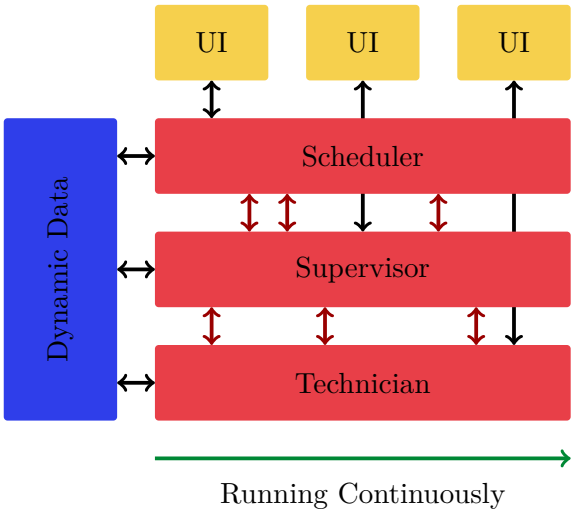
Technical

I will provide a high-level overview of what it is that the current application is doing. I believe that this will make it more clear why I need help and guidance to make the project succeed.

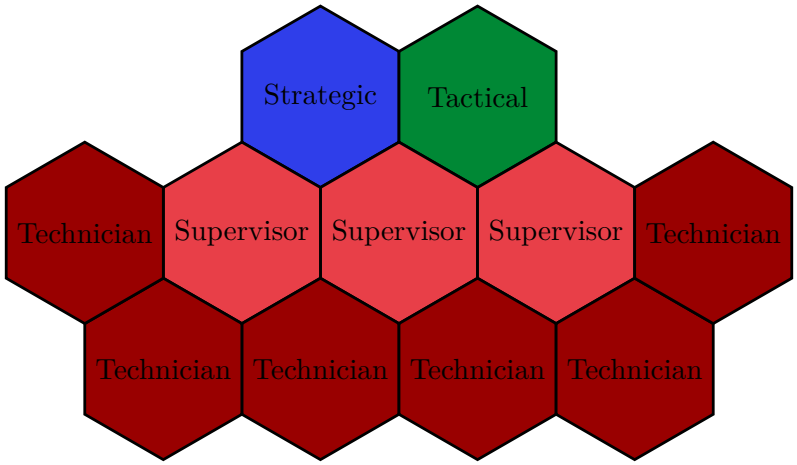
Architecture of the Scheduling System



Pertually Running Optimization



Novel **Approach**



Pseudo **Code**

Academic

Algorithm 1 Actor-based Large Neighborhood Search

Input Q = message queue
Input P = problem instance
Input X = initial schedule
Input S = SharedSolution
repeat
    $X^t = clone(X)$
    while $Q.has\_message()$ **do**
        $P.update(S, m)$
        $X^t.destruct(S, m)$
    end while
    $X^t.repair(S)$
    if accept(X^t, X) **then**
        $X.update(X^t)$
    end if
    if $c(X^t) < c(X)$ **then**
        $X.update(X^t)$
        $S.atomic\_pointer\_swap(X)$
    end if
    $Q.push(m)$
until