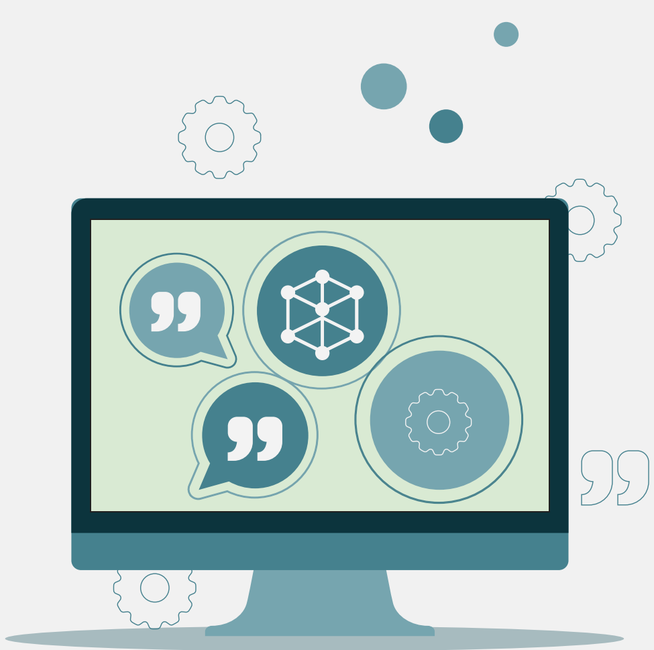
SmarTask

Bigger companies, faster scheduling



Team

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01 Context and Goals

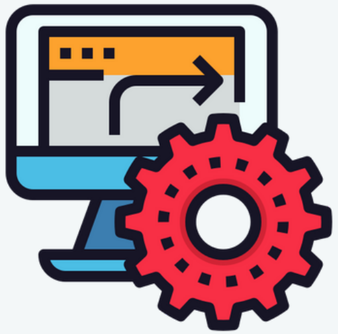
- Develop a platform that allows
- Test, develop and evaluate algorithms that generate and optimize
- Employee schedules for a year
- For the best of performance and scalability

02 State of Art - related work

	Automates compliance and optimizes labor costs	AI requires fine-tuning, and early schedules may be inaccurate	Complex setup and learning curve for managers.	Provide customized generation
	Simple interface with easy-to-use templates for scheduling	AI requires fine-tuning, and early schedules may be inaccurate	Doesn't scale well for complex long-term planning	Doesn't provide comparison between generating methods
	Strong labor law compliance and cost control for restaurants	AI predicts labor needs based on sales and demand patterns	Only suited for restaurants, limiting its flexibility	Doesn't provide comparison between generating methods

03 State of Art - company’s current solution

30%



Partially automated

+

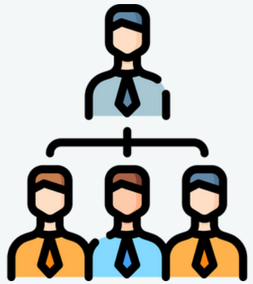
70%

Brute force

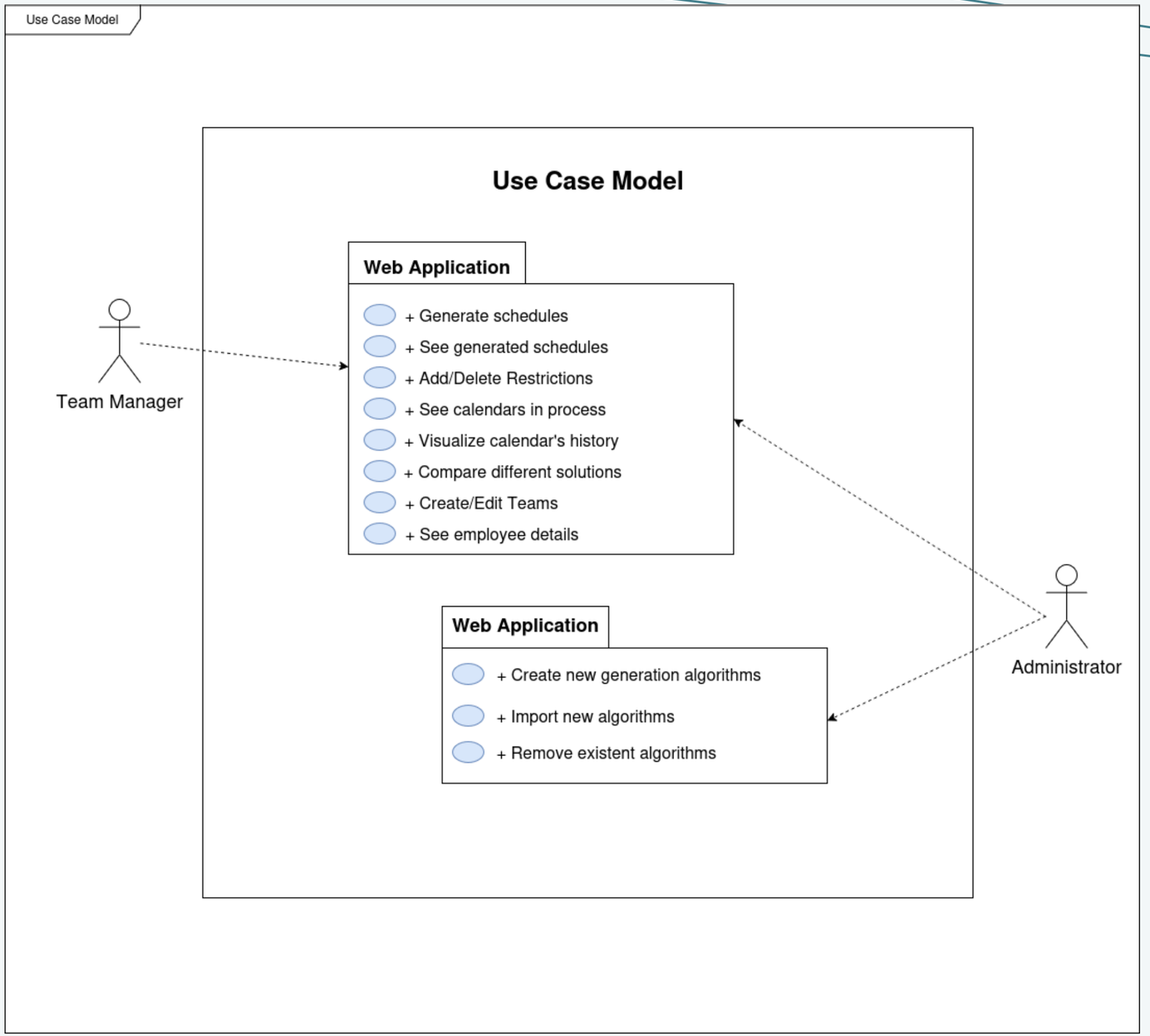
04 Actors

Administrators

Team Managers



05 Use cases


Use Case Model
Use Case Model
Web Application
+ Generate schedules
+ See generated schedules
+ Add/Delete Restrictions
+ See calendars in process
+ Visualize calendar's history
+ Compare different solutions
+ Create/Edit Teams
+ See employee details
Team Manager
Web Application
+ Create new generation algorithms
+ Import new algorithms
+ Remove existent algorithms
Administrator

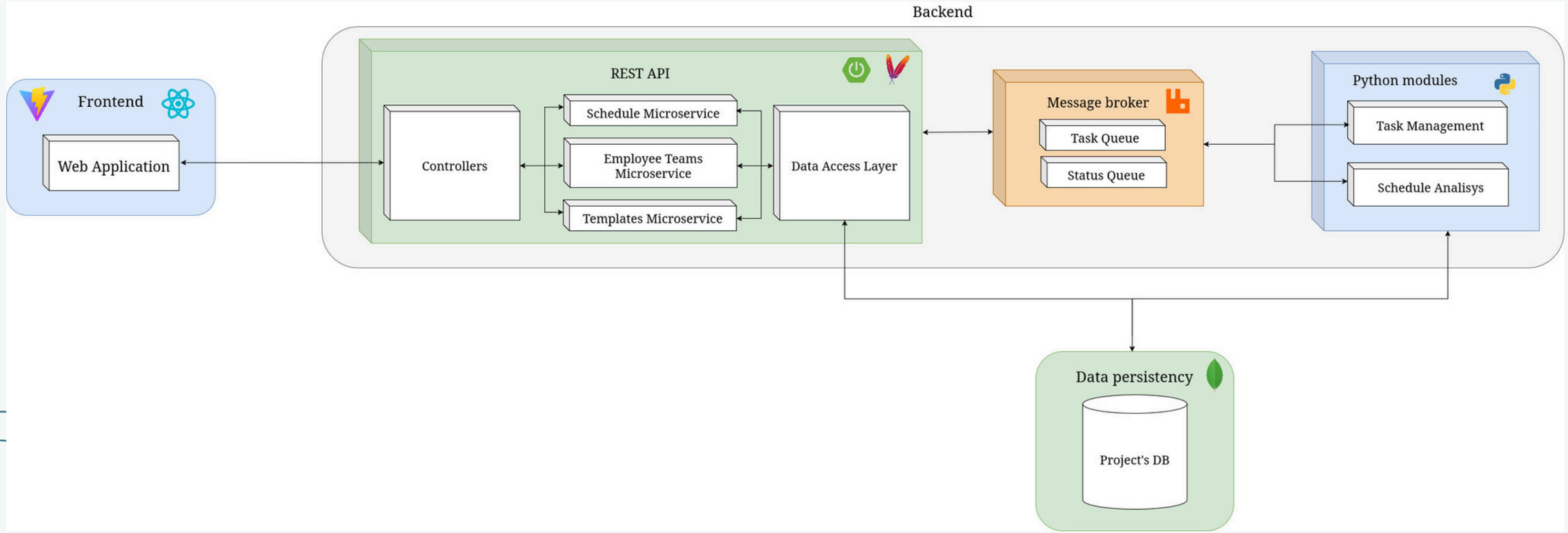
06 Functional Requirements

- Request the generation of a new schedule
- Optimize generated schedules
- Fetch all schedules
- Set of algorithms
- Real-time update of schedules generation process
- KPI-based comparison between multiple schedules
- Dynamically management of new methods

07 Non-Functional Requirements

- Performance and scalability in schedule generation
- Availability & Reliability over the schedule generation process
- System monitoring and metrics vizualization

08 Final Architecture



09 All developed and tested solutions

With good results and performance

Interger Linear Progamming

Hill Climbing

Greedy Randomized

Greedy Randomized refined with Hill Climbing

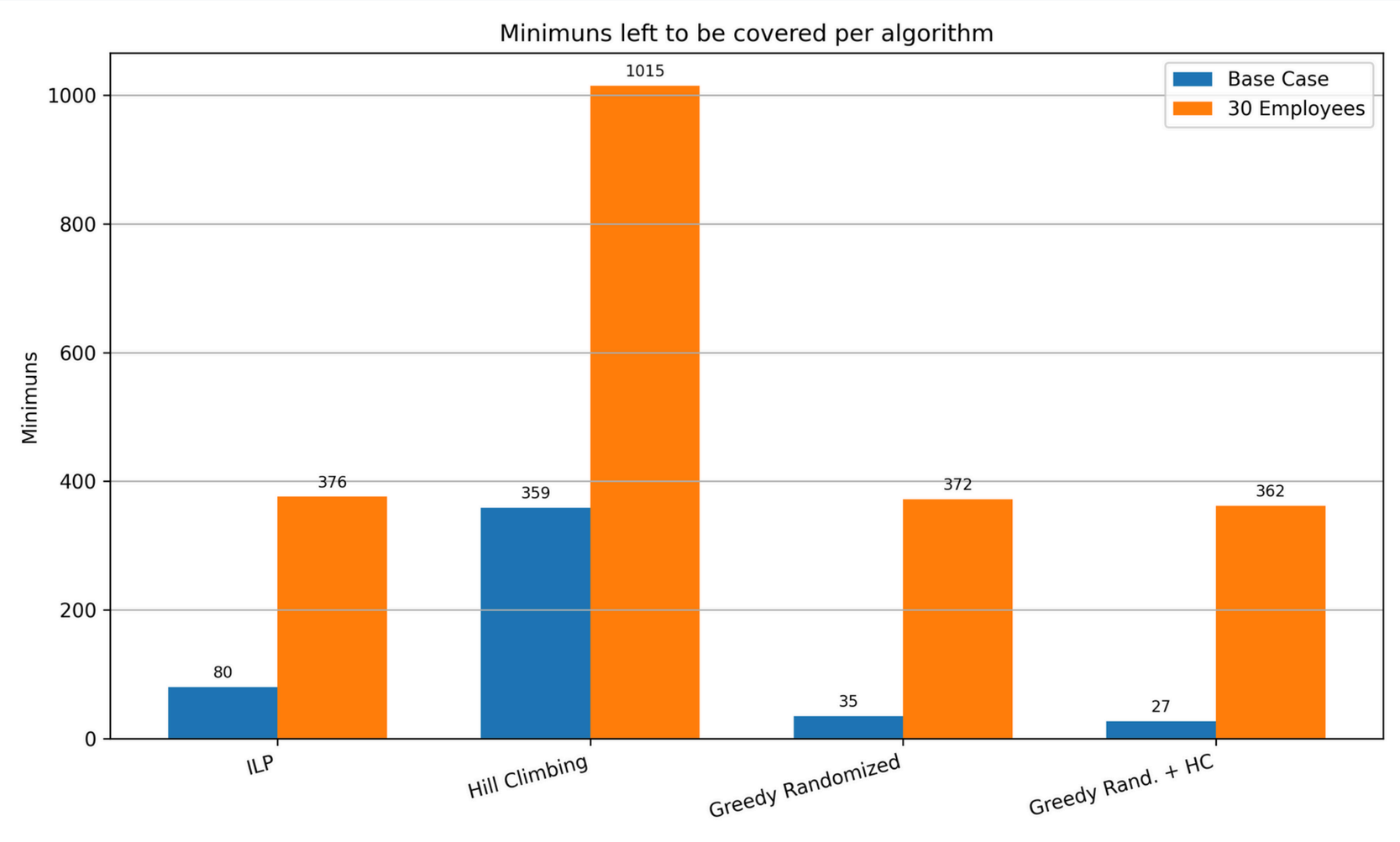
With unsatisfactory results and performance

Constraint Propagation Search

Genetic Algorithm

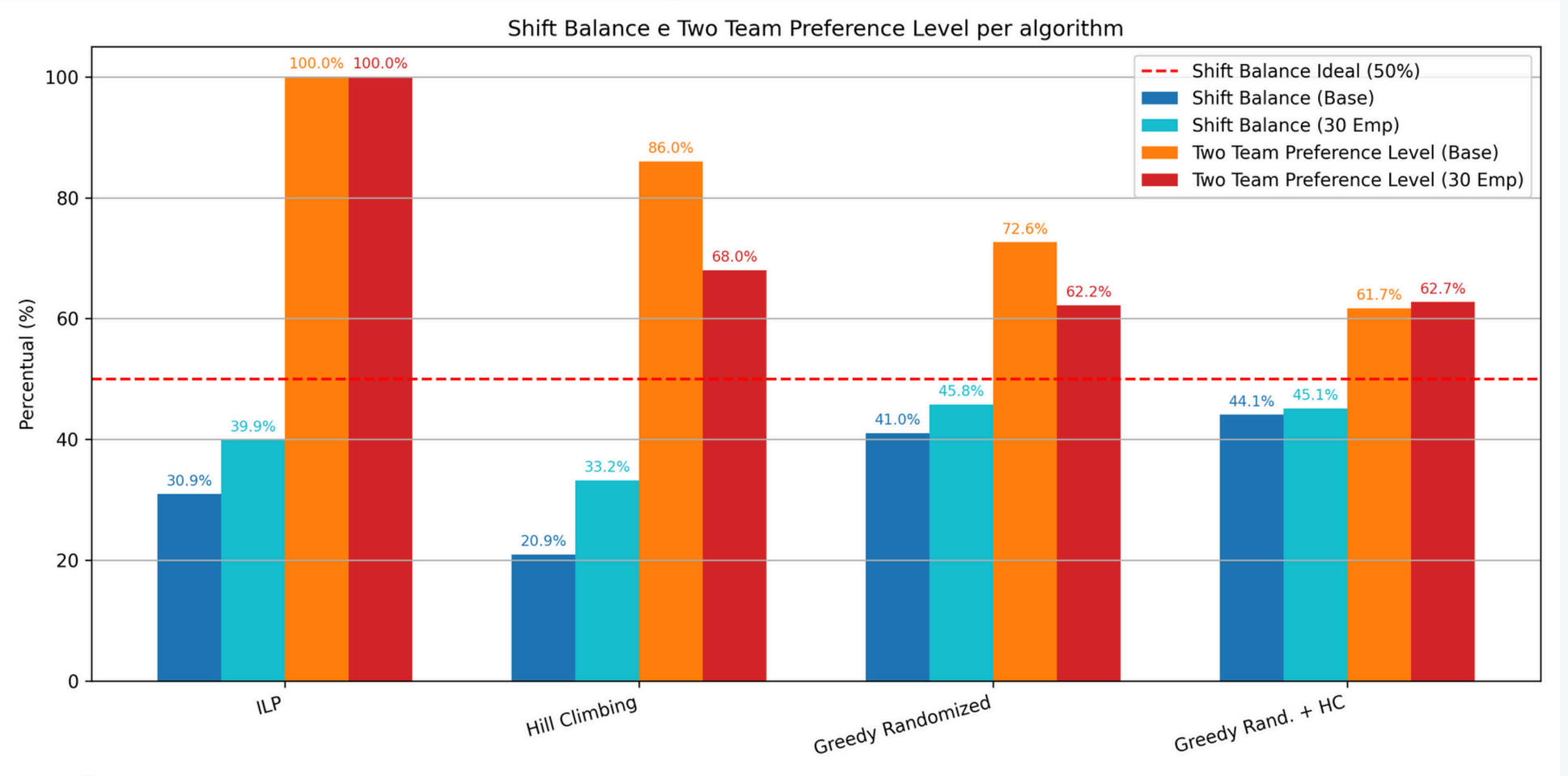
10 Tests and Results

Minimums employees left to cover



10 Tests and Results

Shift Balance and Teams preferences



11 Future Work

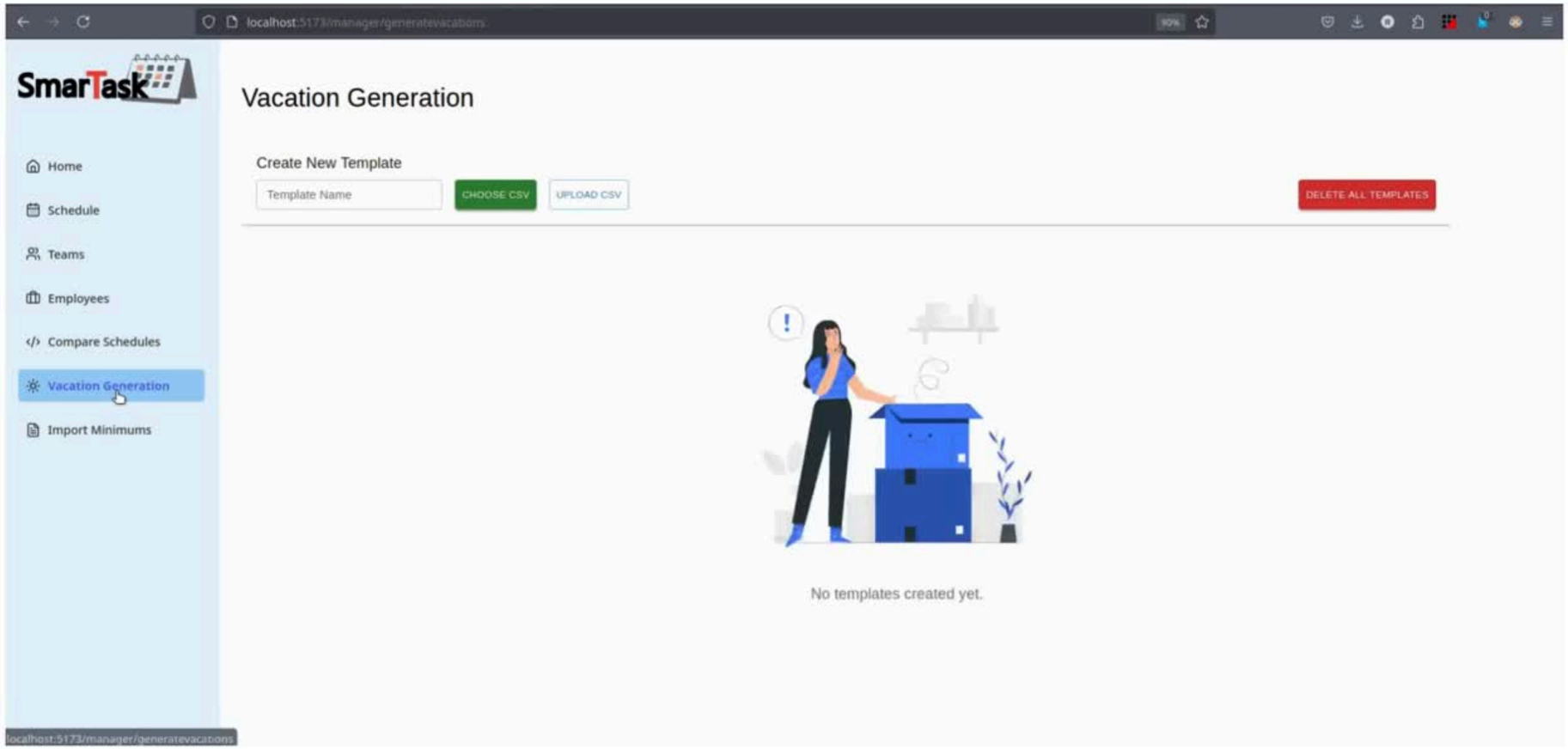
Feature

- Dynamically management of new methods
- Dynamically management of scheduling generation process
- Research, develop and test new solutions

Improvement

- Schedule data vizualization
- Investigate the unsatisfactory solutions

12 DEMO


localhost:5173/manager/generatevacations
SmarTask
Home
Schedule
Teams
Employees
Compare Schedules
Vacation Generation
Import Minimums
Vacation Generation
Create New Template
Template Name
CHOOSE CSV
UPLOAD CSV
DELETE ALL TEMPLATES
No templates created yet.
localhost:5173/manager/generatevacations

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Thanks!

https://pi-smarttask.github.io/website/