



ALZheimer's GARden

// TEAM

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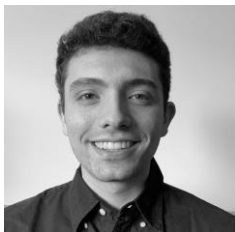
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// ALZHEIMER DISEASE // *Paese Ritrovato*



// WHO ARE WE HELPING

mild to moderate Alzheimer's Disease



Ornella

70 years old

AD diagnosed at 65

married for 40 years

mother of two

// WHO ARE WE HELPING



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mild to moderate Alzheimer's Disease

spontaneous confabulation, temporal and
spatial confusion, behavioral changes
leading to occasional delirium

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fair level of self-reliance and independence

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mild to moderate Alzheimer's Disease

spontaneous confabulation, temporal and spatial confusion, behavioral changes leading to occasional delirium

fair level of self-reliance and independence

spend time together during meals and other social activities

// OUR PURPOSE

Understand the social behavior of Alzheimer's Disease patients living in *// Paese Ritrovato* **to promote sociability** among them so as **to improve their quality of life** and slow down the progression of the disease

// STAKEHOLDERS



// LA MERIDIANA //

The organization that manages *Il Paese Ritrovato*

wellbeing of patients

the solution must be sustainable



// CAREGIVERS //

The nurses working at *Il Paese Ritrovato* play a crucial role

quickly understandable solution

know patients socialization level



// DOCTORS //

While not directly involved, they prescribe residents treatments

go beyond the limits of medicine

collect insights on patients



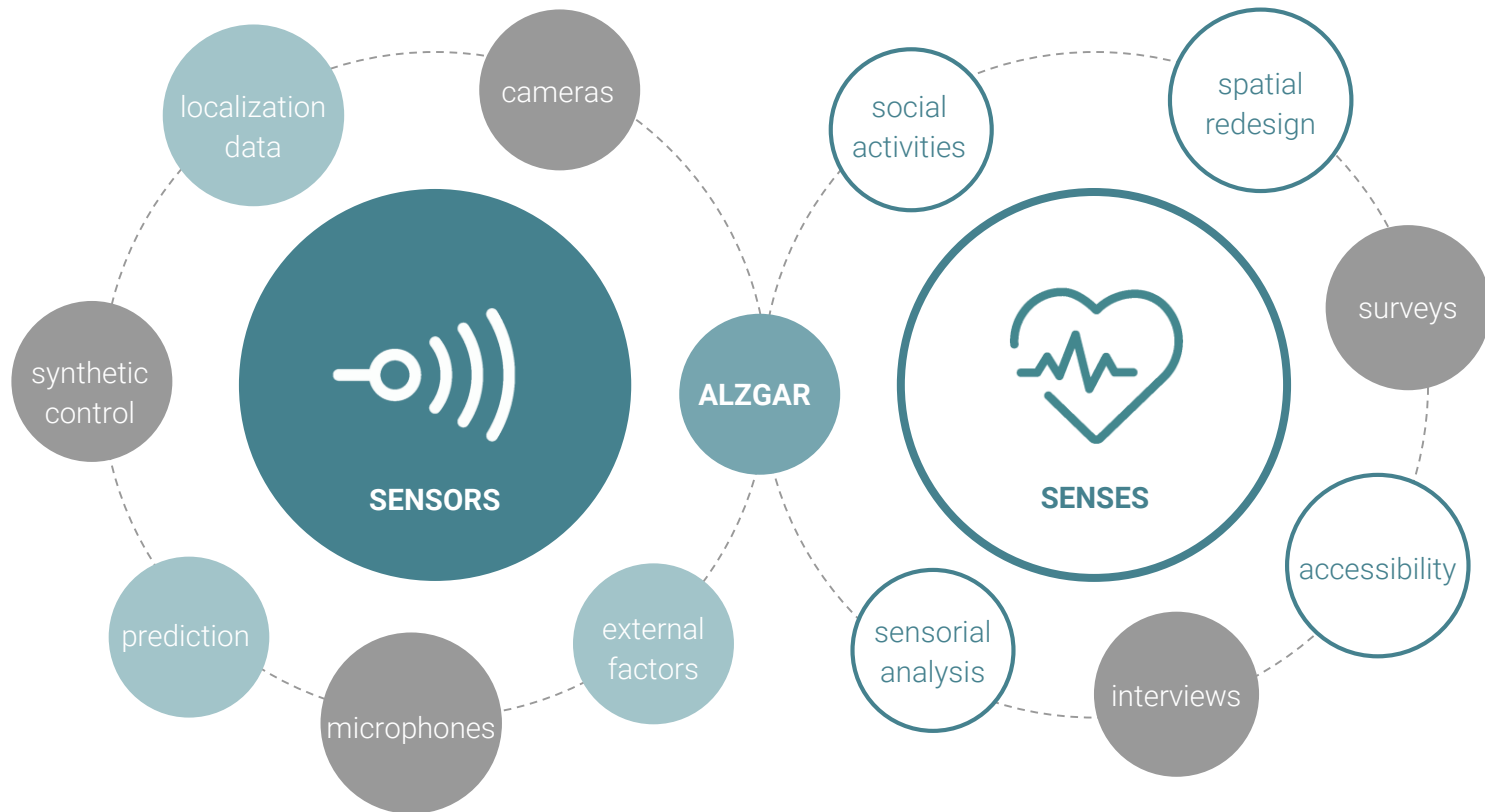
// RELATIVES //

Families are concerned for their relatives staying at *Il Paese Ritrovato*

patients data should be managed securely

family member wellbeing

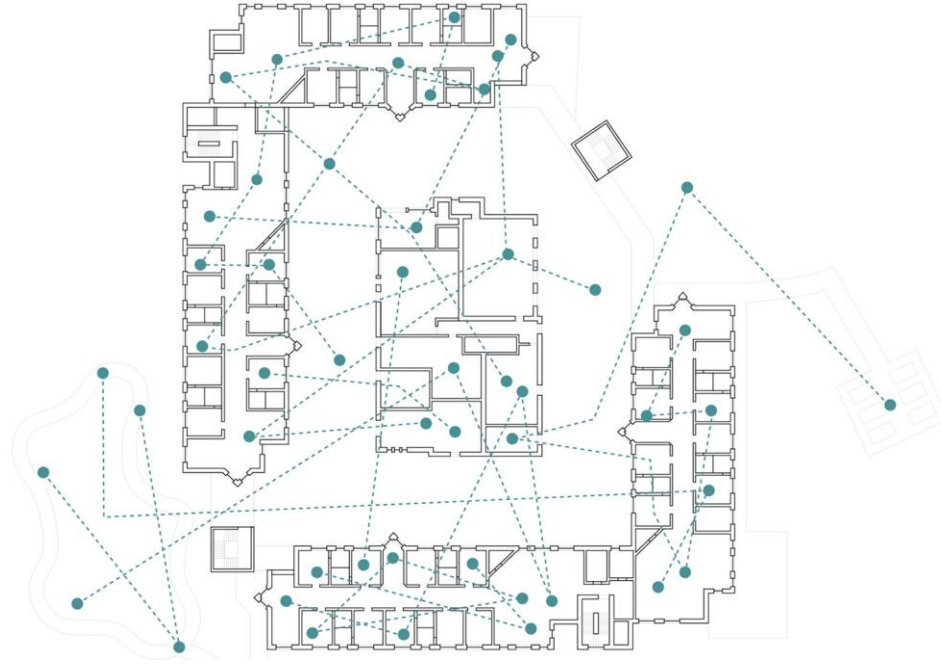
// EXPLORING OPPORTUNITIES



// LOCALIZATION SYSTEM



Bluetooth Wristbands



Network of Antennas

//ANALYSIS



people

Measuring the strength of
relationships



places

Measuring the popularity of
collective places

// PEOPLE

measuring the strength of relationships



Relational Index

percentage of time spent
together in a day



two individuals

// PEOPLE

measuring the strength of relationships



Relational Index

percentage of time spent
together in a day



two individuals



single individual



community

// SOCIABILITY correlation analysis



Season



Temperature



Weather



Bedroom floor



Predisposition
to walk



Hourly walked
distance

// SOCIABILITY

Social Profile

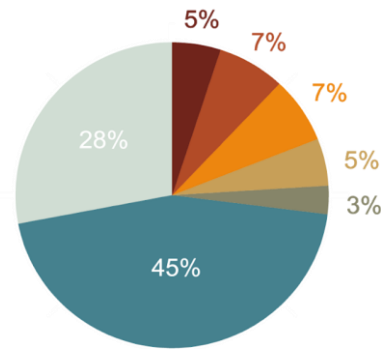
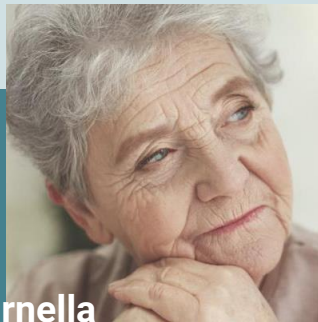
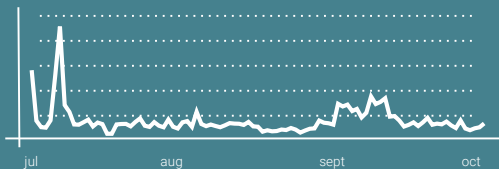
Ornella
Relational Score



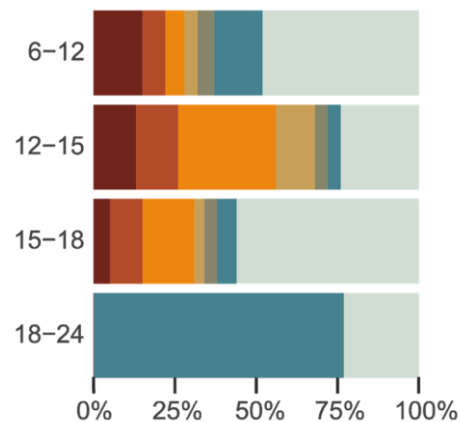
Ornella

70 years old
AD diagnosed at 65
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mother of two

Ornella's
Relational Index



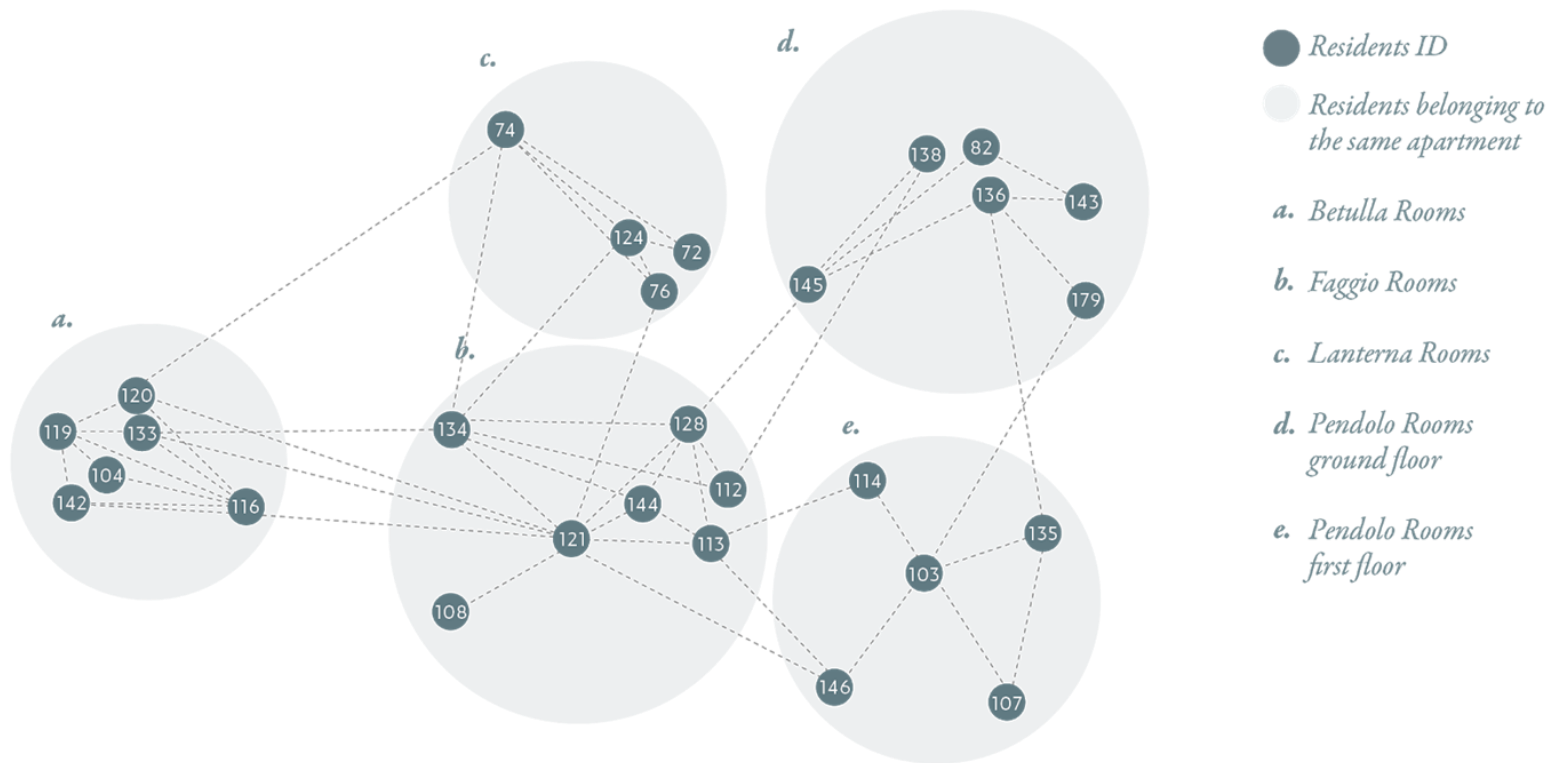
Most Visited Places in a Day



Most Visited Places throughout the Day



// SOCIABILITY social network



// POPULARITY

measuring the attendance of places



Popularity Index

number of people visiting a place
throughout the day

// POPULARITY

measuring the attendance of places



Popularity Index

number of people visiting a place
throughout the day



hourly and daily



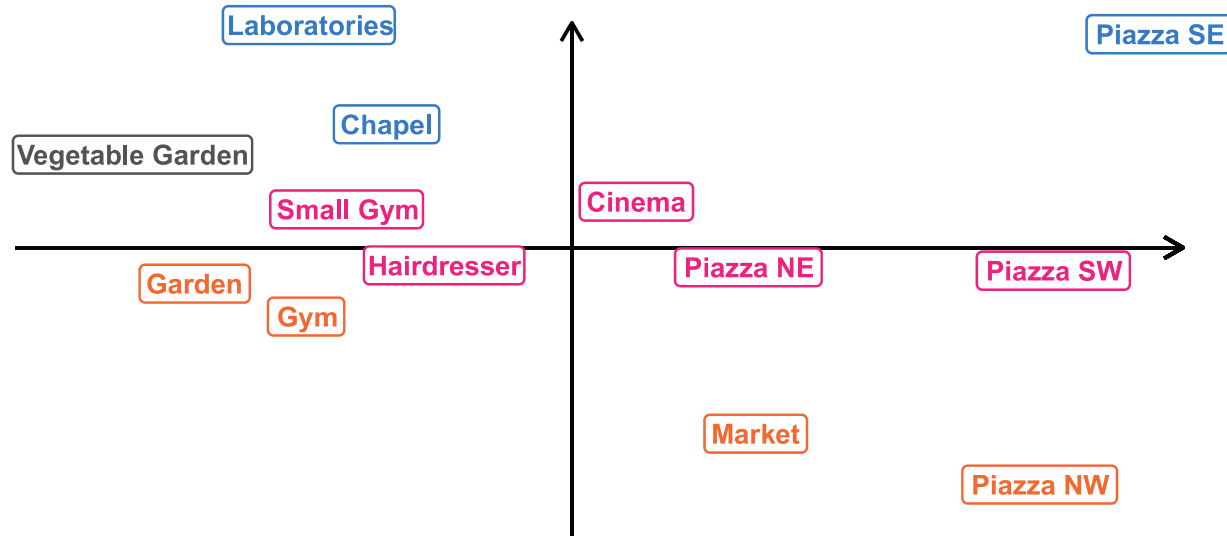
cluster places with
similar trends



identify popular and
overlooked places

// POPULARITY identifying overlooked places

Popularity in winter and spring

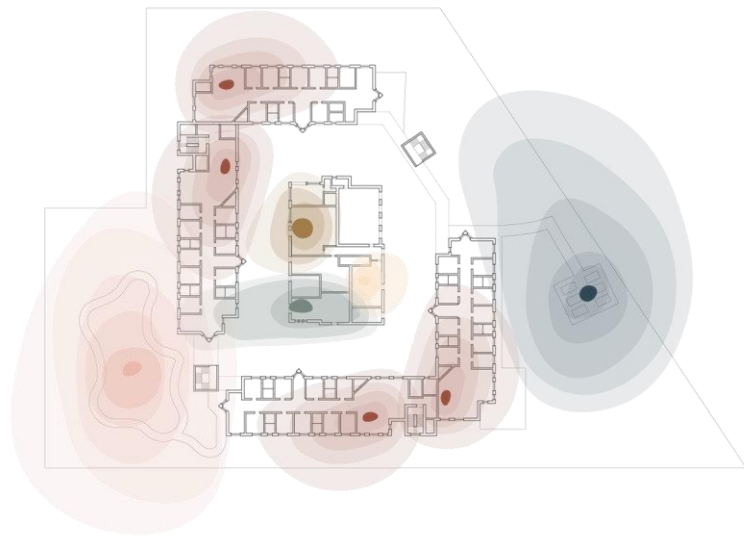


Cluster

1. ■ 2. ■ 3. ■ 4. ■

// SENSES smells/sounds

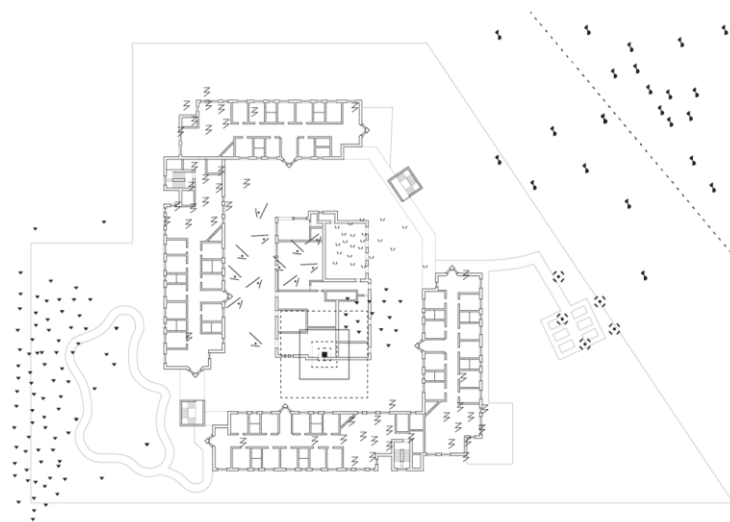
Smells Map



TYPOLOGIES

- | | | |
|--|---|---|
|  painted wood |  flowers |  traditional dishes |
|  wet soil |  wax/incense |  coffee |

Sounds Map



TYPOLOGIES

- | | | | |
|---|---|---|--|
|  kitchen jangles |  applause |  hoe-shovel beat |  chapel bell |
|  people voices |  hammer beat |  children voices |  train rattling |

// ACCESSIBILITY
























- 1. Wandering Garden
- 1. Lab of Memories
- 1. Multimedia Room






Predictive tools to support social activities scheduling, continuously **learning** and **adapting** to the behavior of residents.

Non-invasive installations to stimulate **senses** and promote **sociability**, ultimately enhancing the wellbeing of residents.

// COMMUNITY PREDICTION TABLE

Time	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
	RI ^d	PI ^d _p	RI ^d	PI ^d _p	RI ^d	PI ^d _p	RI ^d	PI ^d _p	RI ^d	PI ^d _p	RI ^d	PI ^d _p	RI ^d	PI ^d _p
8 - 12		café, 0,35 garden 0,13		ortus, 0,45 theatre 0,61		café, 0,35 lab 0,13		kitchen, 0,75 tv room 0,73		lab, 0,22 kitchen 0,17		café, 0,95 garden 0,73		church, 0,95 ortus 0,83
12 - 15		kitchen, 0,88		café, 0,54		café, 0,09		kitchen, 0,16		ortus, 0,91		kitchen, 0,78		café, 0,48
15 - 20		lab, 0,64 ortus 0,55		church, 0,10 café 0,22		lab, 0,84 garden 0,75		theatre, 0,54 ortus 0,45		lab, 0,14 garden 0,25		garden, 0,54 café 0,42		garden, 0,24 kitchen 0,15

 low
 medium
 high

// ACTIVITIES



// ACTIVITIES music therapy



promotes positive
self-esteem

enhances feelings
of competence,
independence

lessens the
experience of
social isolation



Any public space
with no particular
physical constraint
is suitable for
activities involving
music



+ Stimulates
participation
+ Stimulates
reminiscence
+ easily
implementable
+ Not expensive
+ Safe

- Possible
frustration

// ARCHITECTURAL REDESIGN



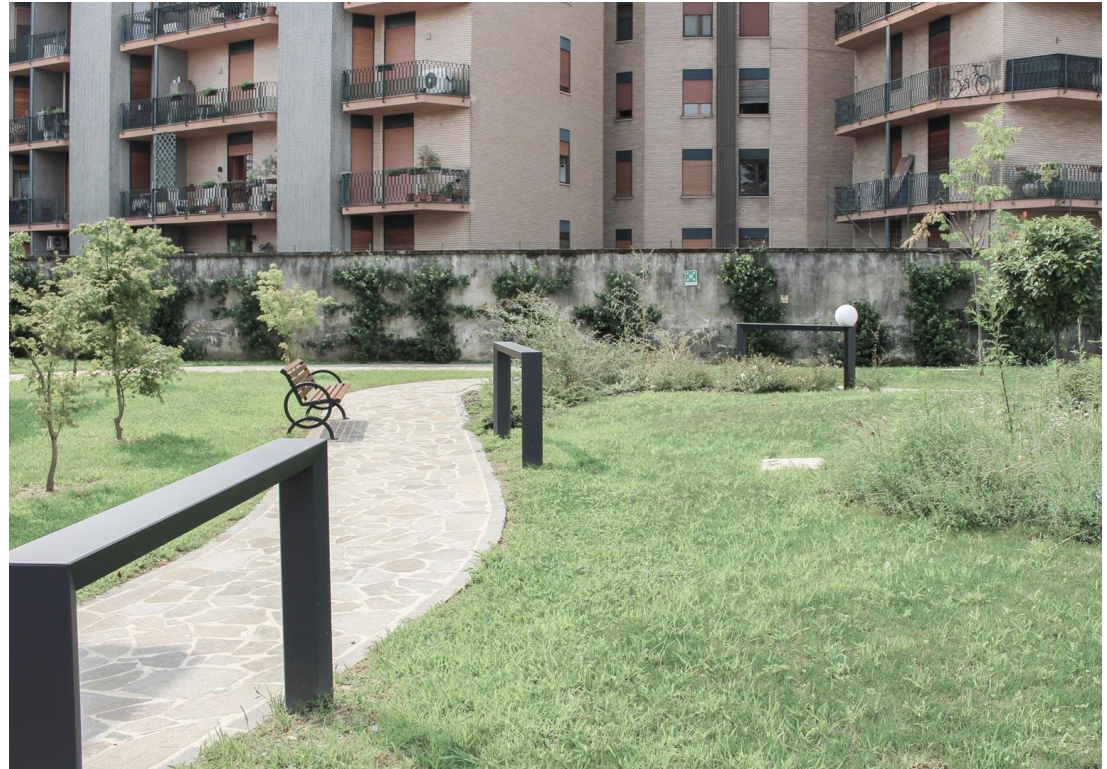
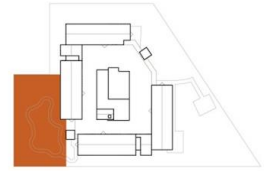
Wandering Garden

Quite large garden with **Twisting Path**

Labirint of Boxwood

Sounds and **Smells**

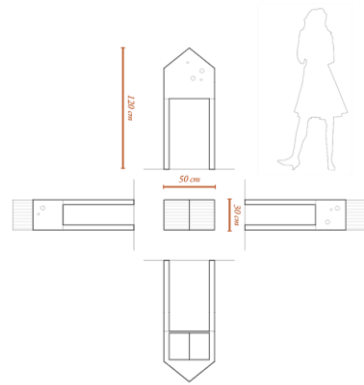
Not fully exploited



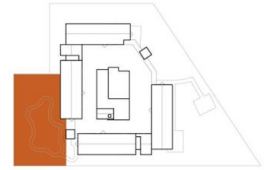
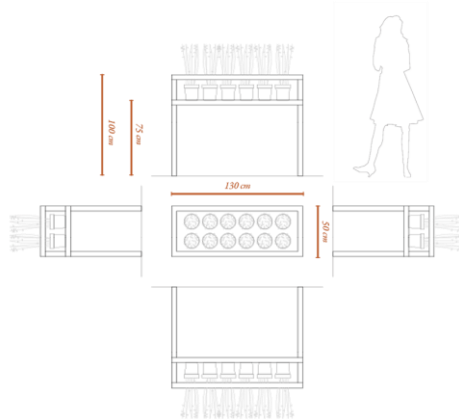
// SOUNDS HOUSES GARDENS TO COMPOSE



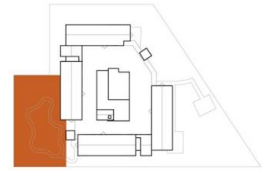
Sound House



Garden to Compose



// SOUNDS HOUSES GARDENS TO COMPOSE



// ARCHITECTURAL REDESIGN



Lab of Memories

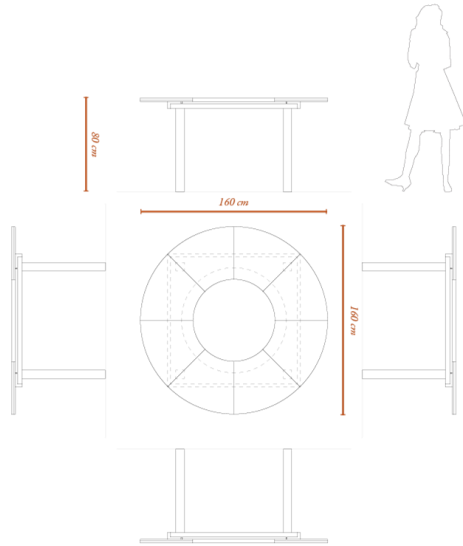
Intimate and **cozy** environment

Located in the **center** of the main square

Unpopular activities hosted in this space



// TACTILE TABLE



TACTILE MATERIALS



// ARCHITECTURAL REDESIGN

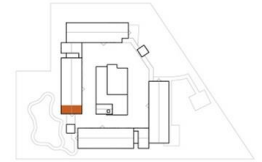


Multimedia Room

Each apartment has one

Technological devices available

Quite overlooked



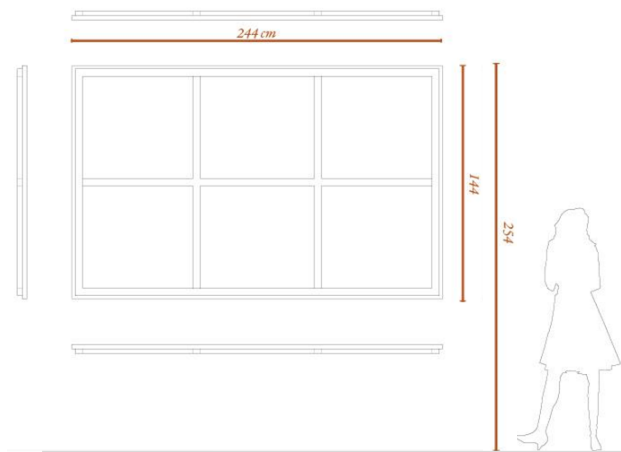
// SEASONAL WINDOW



SEASONAL LANDSCAPES



// SEASONAL WINDOW



// BUSINESS OPPORTUNITIES



REUSABLE

e.g., monitor gatherings
and trace infections



CHEAP

Bluetooth technology is
becoming cheaper and
more precise



EXTENSIBLE

other sensors and devices
can be easily integrated



**MARKET
OPPORTUNITY**

dementia care alone
already represents a big
and expanding market

// GANTT Chart

T Team
GB Gloria Bellini
MC Marco Cipriano
NDA Nicola De Angeli
JPG Jacopo Pio Gargano
MG Matteo Gianella
GG Gianluca Goi
GR Gabriele Rossi

Lockdown

MAY.19 JUN.19 JUL.19 AUG.19 SEP.19 OCT.19 NOV.19 DEC.19 JAN.20 FEB.20 MAR.20 APR.20 MAY.20 JUN.20 JUL.20 AUG.20 SEP.20

First Phase

Problem Exploration
 Stakeholders Definition
 Visit to *Il Paese Ritrovato*

State Of The Art

Alzheimer's Treatment SOTA
 Architectural Approach
 Dementia-specific Technology SOTA
 Social Wellness SOTA

Data Cleansing

Database Exploration
 Places Clustering
 Data Cleaning

Analysis

Sensorial Maps Development
 Statistical Analysis Relational Index
 Statistical Analysis Popularity Index
 Data Insights and ICCHP Paper Development

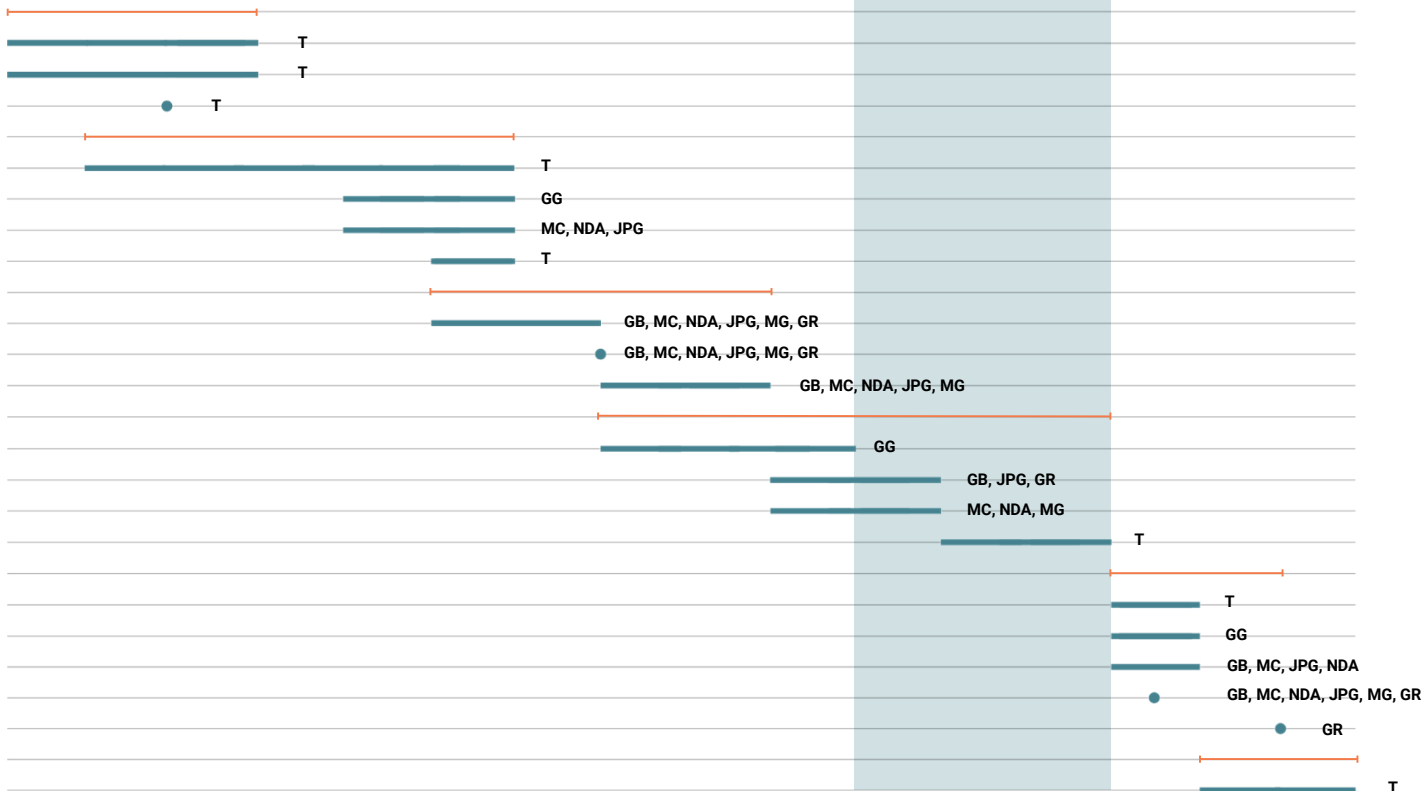
Proposals

Social Activities Analysis and Integration
 Spatial Intervention Proposals
 Prediction Tools Development
 Covid-19 Analysis

Business Model Analysis

Finals

Final Report Development



// BUDGET



Almost **82%**

€ 4106 / 5000

	Travels	€ 208	5%
	ICCHP Conference Publication	€ 758	19%
	MDPI Sensors Publication	€ 1850	45%
	Printed Materials	€ 590	14%
	Data Hosting, Statistical Analysis, Prediction Tools Development	€ 700	17%

// CONCLUSIONS

Analyzed the social behavior of the residents of Il Paese Ritrovato, introducing and leveraging the Relational Index and the Popularity Index

Identified overlooked places
Designed data-driven technological and architectural solutions to promote sociability and enhance accessibility

Presented predictive tools to support caregivers during activity scheduling
Proposed installations to mitigate the risk of crises and promote mental stability

// FUTURE WORK



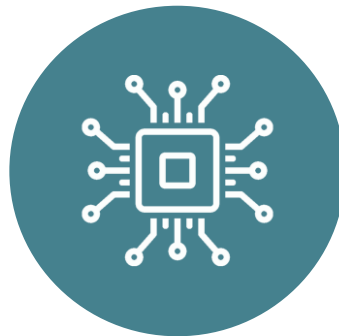
WEB INTERFACE

data visualization tool to allow caregivers, doctors and psychologists to gather insight into the collected data



MOBILE APP

caregivers can manage and keep an eye on their patients in a smarter and easier way



HEALTH DATA

collect other data to effectively monitor patients wellbeing and health



CAREGIVERS

extend the analysis to caregivers to understand how their behavior influences the sociability and the wellbeing of patients

thank you

Alzheimer's Garden