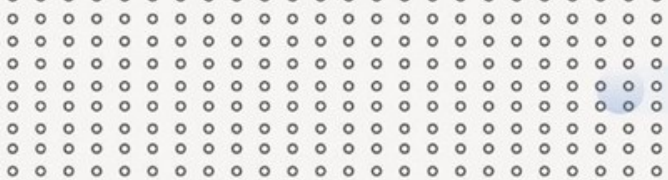
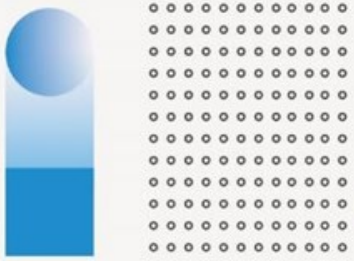
LINKSFOUNDATION.COM



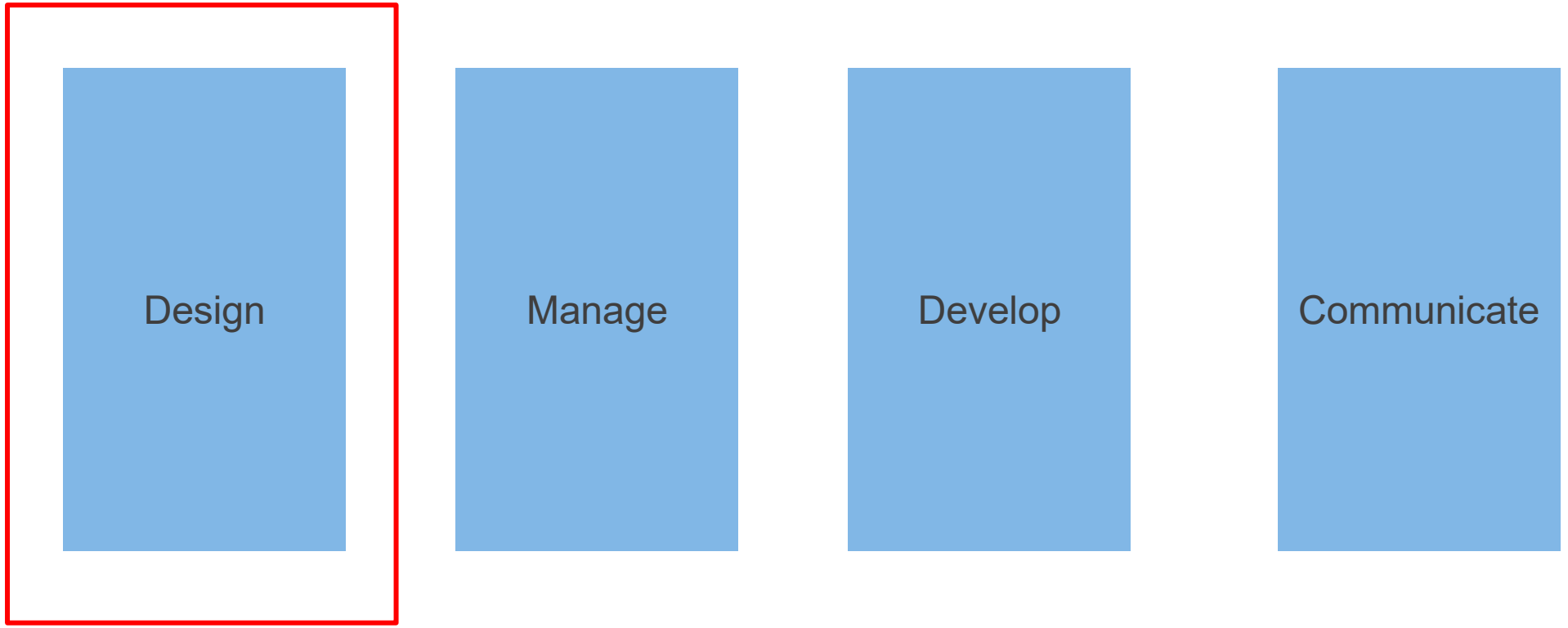
Applied Data Science Project

Politecnico di Torino

L7 – Functional requirements and diagrams



Pillars



Knowledge tools

- Customer Journeys
- Persona canvas
- User requirements
- System diagrams

Knowledge tools

- Customer Journeys
- Persona canvas
- User requirements
- System diagrams

lectured by Prof. Frisiello

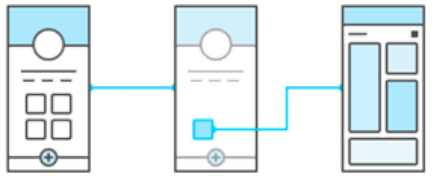
From user to requirements

Personas and stories are mapped into journeys, cases and requirements

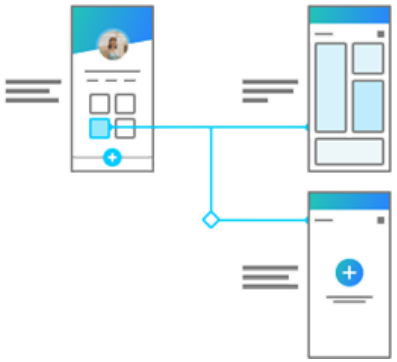
1.
User goal
Goal or story level

2.
Task flow
Action level

3.
Wireflow
Component level



4.
User Flow
Interaction level



Personas
User stories

User journeys
Use cases
User requirements

UX Collective, User flow is the new wireframe

Aligning User Stories, Use Cases and Requirements

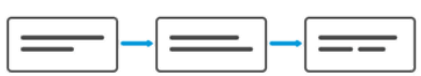
From user to requirements

From the user requirements, it is derived the system requirements

2.

Task flow

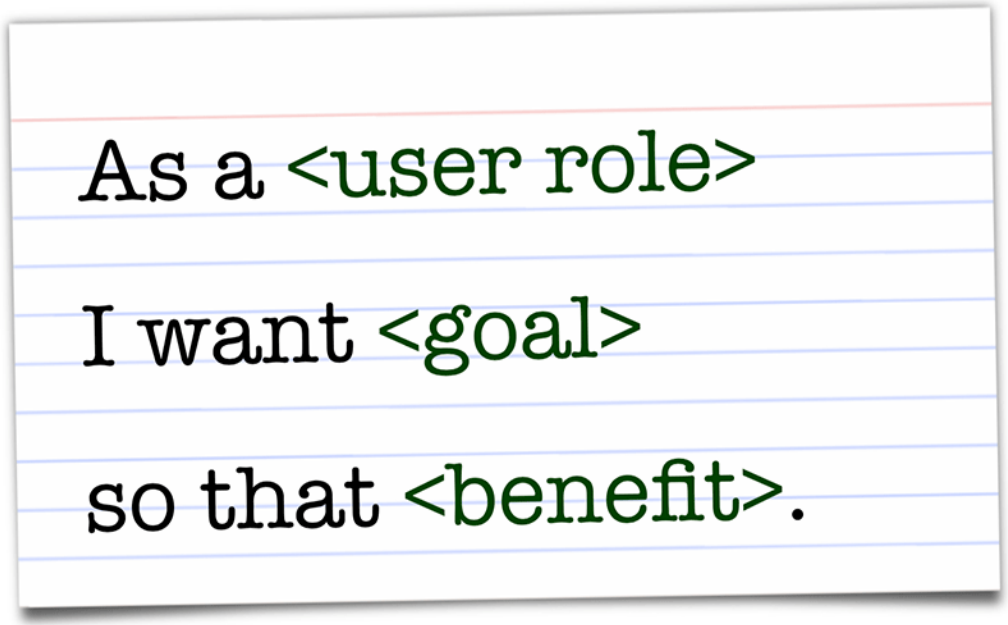
Action level



System requirements

User journeys
Use cases
User requirements

User stories



How to craft a good user story

Use cases

Two alternatives

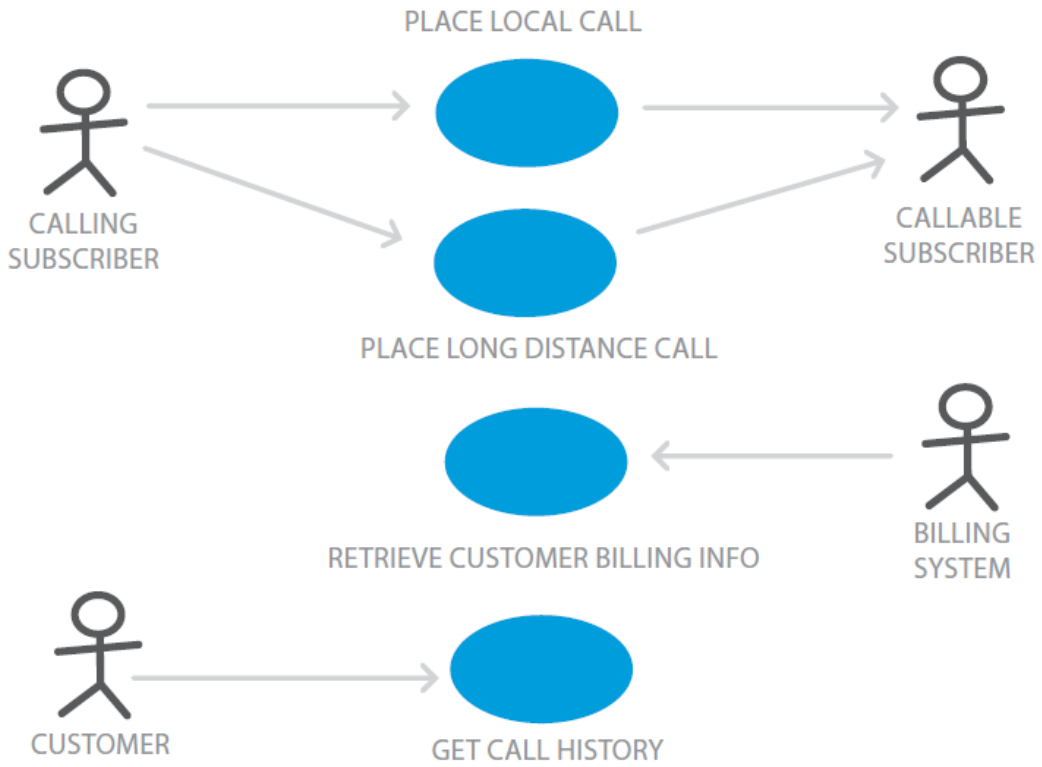


FIGURE 1: THE USE-CASE DIAGRAM FOR A SIMPLE TELEPHONE SYSTEM

BASIC FLOW	ALTERNATIVE FLOWS
1. Insert Card	A1 Invalid Card
2. Validate Card	A2 Non-Standard Amount
3. Select Cash Withdrawal	A3 Receipt Required
4. Select Account	A4 Insufficient Funds in ATM
5. Confirm Availability of Funds	A5 Insufficient Funds in Acct
6. Return Card	A6 Would Cause Overdraft
7. Dispense Cash	A7 Card Stuck
	A8 Cash Left Behind
	etc..

FIGURE 2: THE STRUCTURE OF A USE-CASE NARRATIVE

Jacobsen I. (2011). Use-case 2.0. The Guide to Succeeding with Use Cases

User requirements

Functional: What does the system do?

- Capacities, characteristics, functionalities, services provided by the system
- Use verbs to name them

Non functional: How does the system work?

- Properties of the system
- Operational modes (such as robustness, precision, fairness)
- Use attributes to name them

Functional requirements

- Defined according to the results of the user requirement
- Classified according to priority
- Can be adapted in the execution of a project
- Must be validated when testing the system by the end users

ID Req	Requirement description	Status	Actions	Priority
RE01	The system offers remote onboarding	In progress	Add voice in the authentication process	Must have

Agreed To do In progress Done Future

IEEE 830-1993 - IEEE Recommended Practice for Software Requirements Specifications

Recommendations to describe requirements

- Requirements are described in a positive fashion and are precise

The system does not allow to access with an outdated smartphone

If the user has an outdated smartphone, the system guides the user to update

The system lets users access

The system allows the access if a user records a video, holds an electronic ID

Garrett, Jesse James. The elements of user experience. User-centered design for the web. New Riders, 2011.

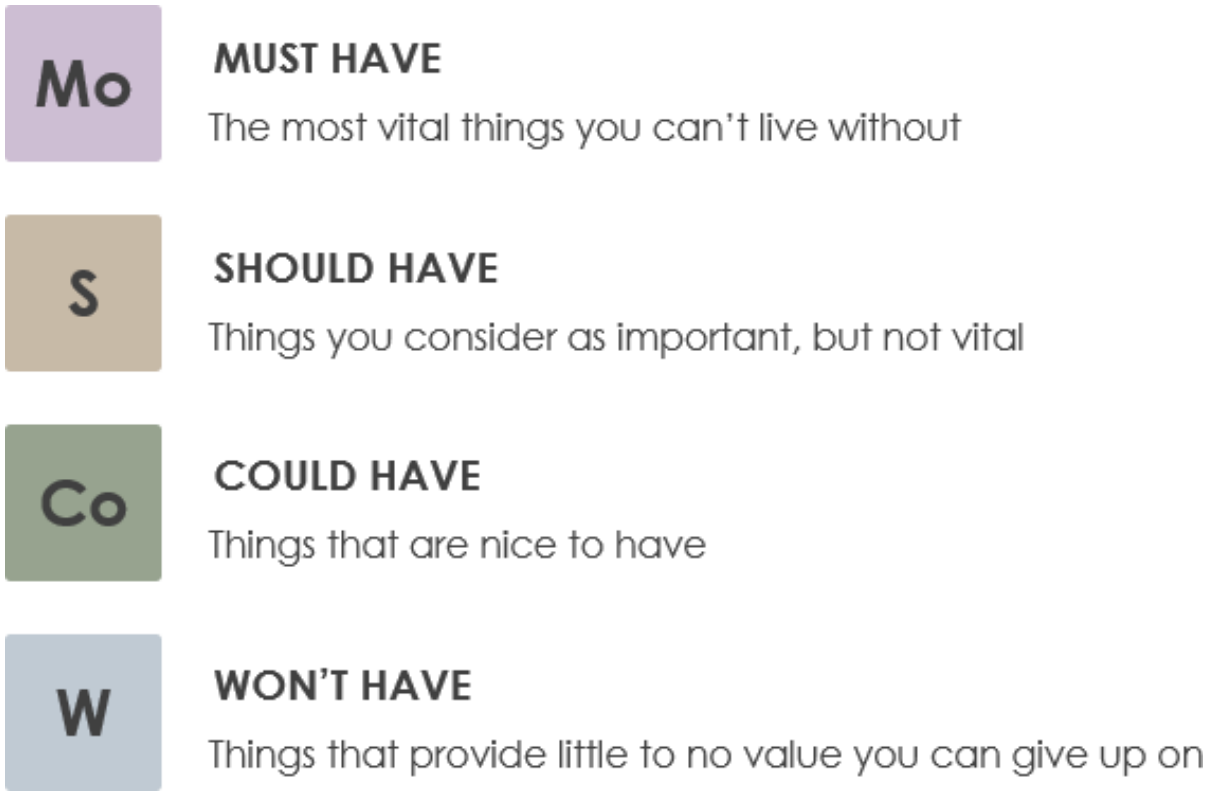
Recommendations to describe requirements

- Be objective and requirements should be false if the conditions are not satisfied

Garrett, Jesse James. The elements of user experience. User-centered design for the web. New Riders, 2011.

Priorities

- There are things that require more attention than others
- It is recommended the Moscow Method



Non functional requirements

- Defined according to the results of the user requirement
- Classified according to priority
- Can be adapted in the execution of a project
- Must be validated when testing the system by the end users

ID Req	Reference personas	Requirements	Priority
RE01	Layla – Citizen	Simplified access to the municipality registry though her smartphone	Must have

Report listing requirements

1. Introduction
   - 1.1 Value Proposition
   - 1.2 Application area
   - 1.3 Background
   - 1.4 Glossary

2. Description
   - 2.1 Functionalities
   - 2.2 General constraints
   - 2.3 Use context
   - 2.4 User characteristics

3. Specific requirements
   - 3.1 Functional requirements
   - 3.2 Non functional requirements

Table 1 — Example documentation by context of use

Subclause[a]	Context of use	Could the context of use influence ease of operation?	Design limits established based on available data?	Context of use accounted for in design?
6.1	Main goal(s)			
6.2	Factors relating to other equipment			
6.3	Physical environmental factors			
6.4	Social environmental factors			

[a] Refers to the breakdowns of context of use given in the subclauses of Clause 6.

Table 2 — Example documentation by user characteristic

Subclause[a]	User characteristics	Could the user characteristic influence ease of operation?	Design limits established based on available data?	Range of user characteristics accounted for in design?
7.2.1	Cognitive abilities			
7.2.2	Knowledge and experience			
7.2.3	Cultural differences			
7.2.4	Literacy			
7.2.5	Language			
7.3.2	Body dimensions			
7.3.3	Biomechanical abilities			
7.3.4	Visual abilities			
7.3.5	Auditory abilities			
7.3.6	Handedness			
7.4.1	Demographics in general			
7.4.2	Age			
7.4.3	Gender			

Report listing requirements

1. Introduction
   1.1 Value Proposition
   1.2 Application area
   1.3 Background
   1.4 Glossary

2. Description
   2.1 Functionalities
   2.2 General constraints
   2.3 Use context
   2.4 User characteristics

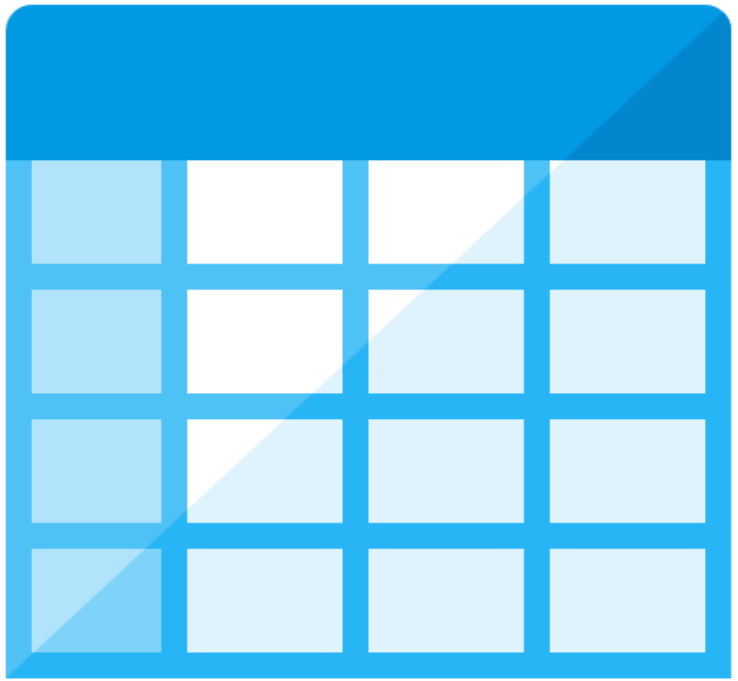
3. Specific requirements
   3.1 Functional requirements
   3.2 Non functional requirements

User Story	Functional Requirements & Priorities			
	High Priority *(i.e. Must have)*	**Medium Priority** *(i.e. Should have)*	**Low Priority** *(i.e. Could have)*	**No Priority** *(i.e. Won't have)*
I (Angie) as the director of Latinitas would like to be able to export donor history data (name, data, amount, payment type) so that I can report to my board on increases and decreases in donor dollars.	• Create Donor Table to store info about donor • Create Donation Table used to store donations but Donor and Date. • Build report query that pulls all donors and donation info • Report must be able to run via a button on a Reports page that only admin people have access to see	• Allow report to run with filter criteria • Allow user to save preset settings on report filter criteria to speed up running reports	• Have reports be automated so they run via a nightly program that emails report to admins	• Reports to be accessible via mobile devices

REQ ID	ODOT PRIORITY	REQUIREMENT	AUDIENCE SEGMENTS					
			C	ICT	TT	ADA	CT	ALL
RR001	2	The system should allow the user to enter a multi-point route using a combination of the criteria specified in MP004c-f and h.	X	X	X	X		
RR0011	1	The system shall allow the user to select destination points by clicking on the map.	X	X	X	X		
		The system shall allow the user to specify the following when determining road routes (note: this functionality is for trip planning.):						
RR002a	2	- starting date AND/OR ending date if only one date is specified, the system calculates the other.			X	X		
RR002b	2	- starting time/ending time if only one time is specified, the system calculates the other.			X	X		
RR002c	2	- month of travel (instead of start/end)			X	X		
RR002d	4	- quickest route (by time)						X
RR002e	1	- shortest route (by miles)	X	X	X	X		
RR002f	2	- most scenic route (based on scenic byways within a user-specified mile radius of the direct (shortest) route			X	X		
RR002g	3	- routes most recommended by others			X	X		

App for editing

The most used app for editing functional and non functional requirements is a spreadsheet



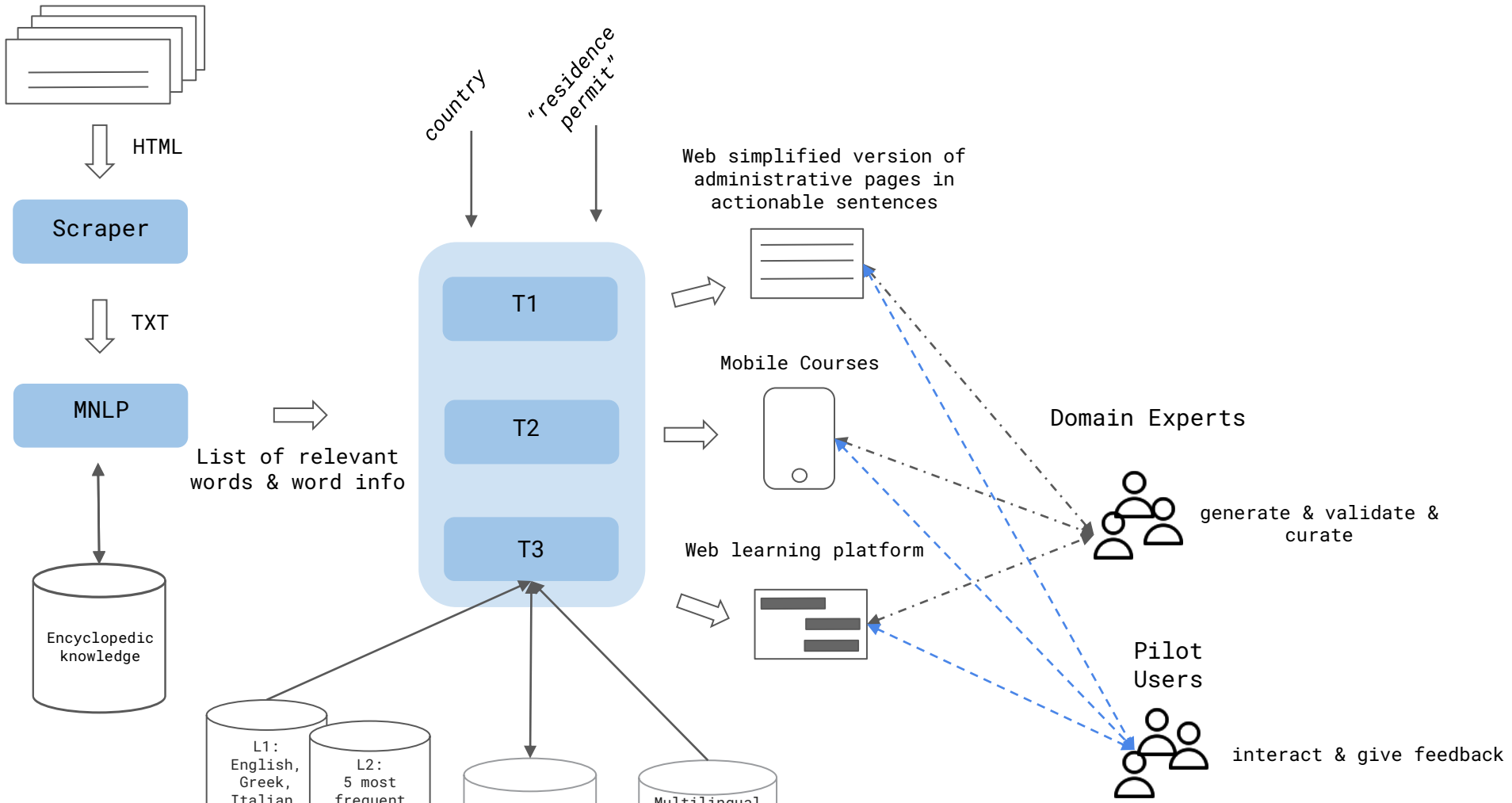
Functional Diagram

It describes the functions, links and interplay of the whole system (either be a project or a software)

Note of styles:

- functions or software components are represented by blocks
- input and output elements of a block represented with arrows lines
- relationships among functions are labeled with text
- stakeholders (such as users) are illustrated with icons

Example



ref: H2020 easyRights project

App for editing

Numerous digital tools available to create a functional diagram (many are collaborative)

In this course, we will use https://www.diagrams.net

- it is available both as online application running in a browser and as desktop application
- it can be utilized with a free license
- it syncronises with GDrive, OneDrive, other cloud services and locally

Diagram of Didi's tool

Hands on

Diagram of the whole project

Represent the target user (Didi's, owner of the restaurant)

Represent the data source

Add (at least) one block to define the machine intelligence that computes the sentiment

Represent the output

Diagram of the software

Represent the input text

Represent the classifier
- represent the vectorization
- represent the classification

Represent the output

Diagram of Didi's project

Whole project

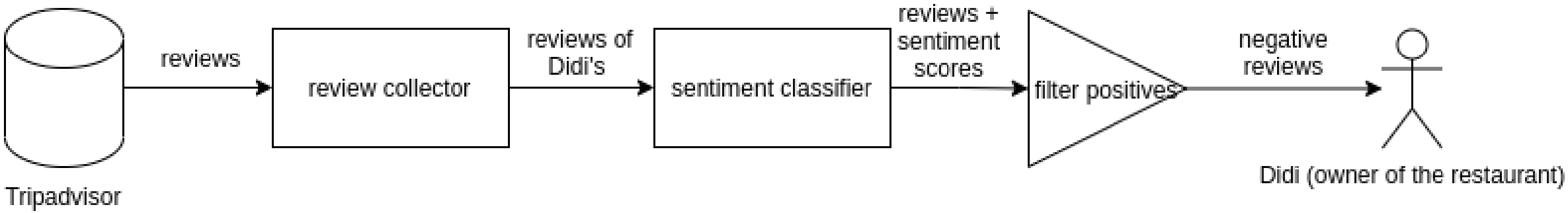
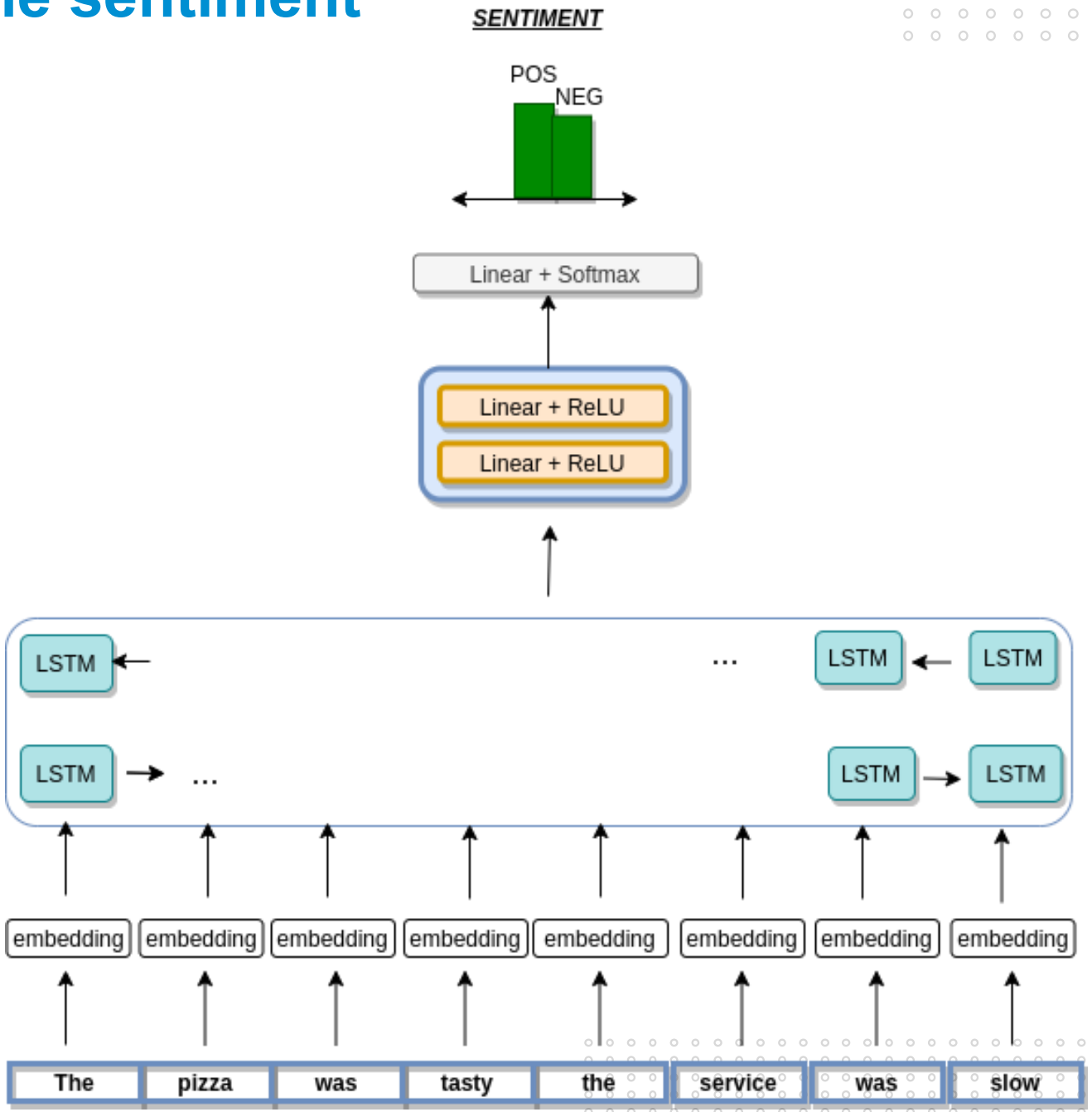


Diagram of the sentiment classifier

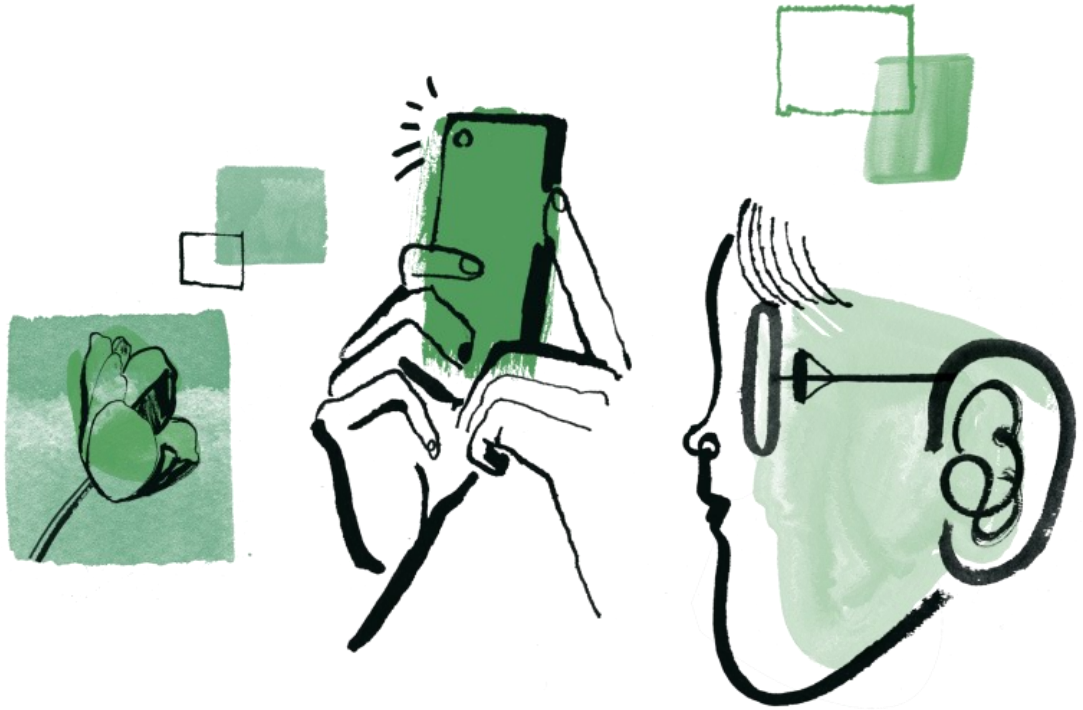
Software



People + AI initiative

Inspiring reading

People + AI Guidebook
https://pair.withgoogle.com/guidebook



Thank you for your attention.

Questions?

FONDAZIONE links

PASSION FOR INNOVATION

CONTACTS

Giuseppe Rizzo

Program Manager (LINKS Foundation) and
Adjunct Professor (Politecnico di Torino)

giuseppe.rizzo@polito.it

FONDAZIONE LINKS
Via Pier Carlo Boggio 61 | 10138 Torino
P. +39 011 22 76 150
LINKSFOUNDATION.COM