

Fact Checking Indexer

Human Computer Interaction Course
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1 Introduction

The idea behind Fact Checking Indexer

The use of fake news in order to gain popularity and political consensus is happening more and more often all over the world. Sometimes it is quite easy to detect a fake news, but it can happen that a person without previous education on the matter can trust everything he reads on the web and spread a false information. The purpose of this project is to help people find reliable sources of information through an index, computed using the last available news from the sources, checking if they are true or false comparing with certified sources.

2 Requirement Analysis

Before we start our project we did a literature search regarding the problem. We found that there is a trust index which measures the average percent trust in NGOs, business, government and media conducted by Edelman 2019 report[1]. In the report it is clearly stated that only a small portion of countries' NGOs, business, government and media found trustable by people. Also, in the report we realised that the news engagement has risen at around 22 percent in just one year between 2018 and 2019 and on the trend to rise more. In the same report, we found a very crucial information for our project: 73 percent of people that is joined in the research said that they worry false information or fake news being used as a weapon and are looking for reliable sources.

2.1 Competitors Analysis

These are the main alternatives or competitors to our application:

- **Oigetit** is a fake news filter where every single article is assigned with a fake news filter score.
- **InfoPost** is another fake news filter where user has a personal AI which checks the news that user reads for credibility.
- **The Factual** is a service where it uses Factual Credibility grade for articles to calculate their credibility.

	Oigetit	InfoPost	The Factual	FCI (Our)
Home Feed	Yes	Yes	Yes	Yes
Favorite List	No	Yes	No	Yes
Index of Reliability	Yes	No	No	Yes
Index Explanation	No	No	No	Yes
Pros	<i>Easy to use Well structured advanced search</i>	<i>Implements AI</i>	<i>Nice designed</i>	<i>Personal feed Explanation of index User Centered</i>
Cons	<i>No personal feed</i>	<i>Just says if a news is reliable or not</i>	<i>Not focused on user experience, static.</i>	<i>Doesn't implement AI techniques</i>

Table 1: Competitor Analysis

2.2 Questionnaire analysis

In this section, we will show the results of our questionnaire analysis. The received answers helped us to improve our original idea, and showed us that some of our intuitions were good. We reached an amount of 91 answers, divided in three languages (Italian, English, Turkish):

Choose your language / Seleziona la lingua / Dilinizi seçin:

91 risposte

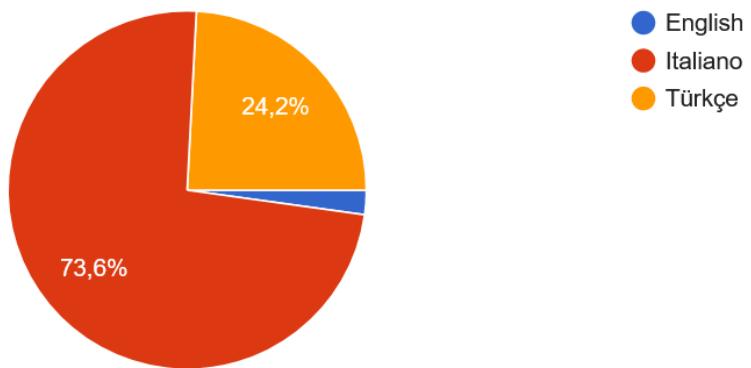
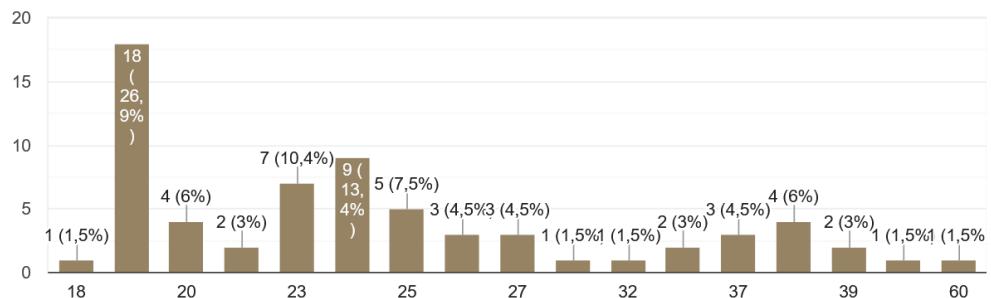


Figure 1: Language selection

Therefore, in the following pages, for each question, 3 graphs will be shown.

Età

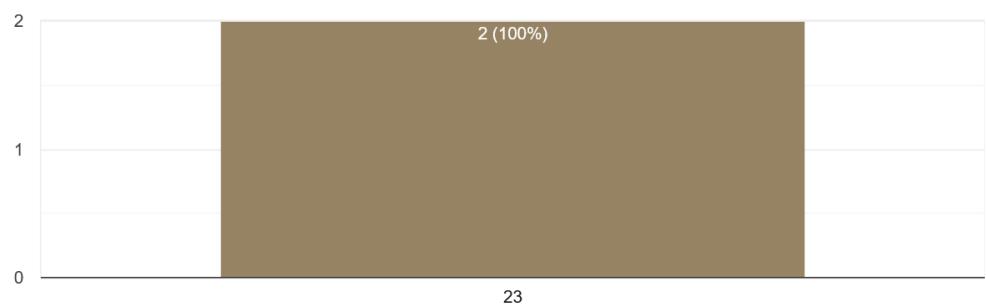
67 risposte



(a) ITA

Your Age

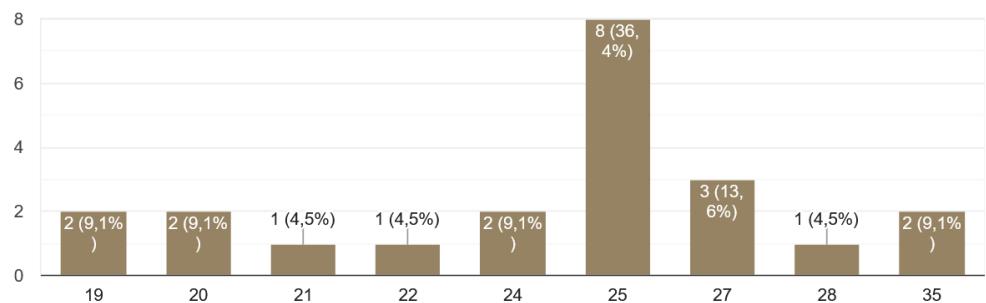
2 risposte



(b) ENG

Yaşınız

22 risposte

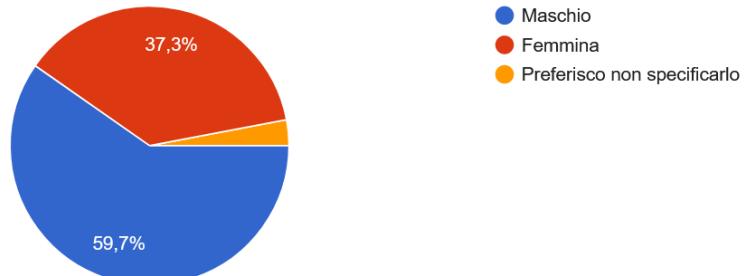


(c) TUR

Figure 2: Results about Age

Sesso

67 risposte



(a) ITA

Gender

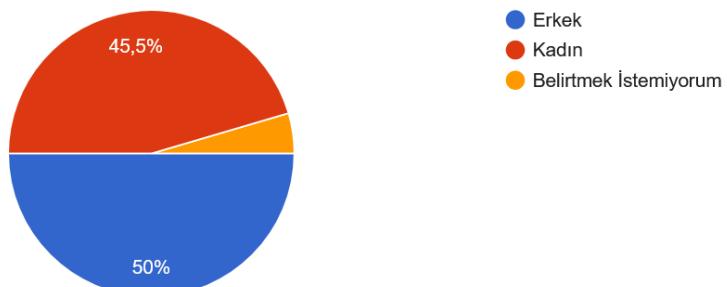
2 risposte



(b) ENG

Cinsiyetiniz

22 risposte



(c) TUR

Figure 3: Results about Gender

Titolo di studio

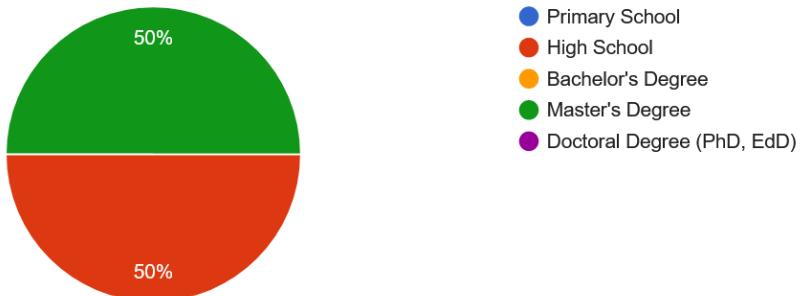
67 risposte



(a) ITA

Which is the highest educational level you achieved?

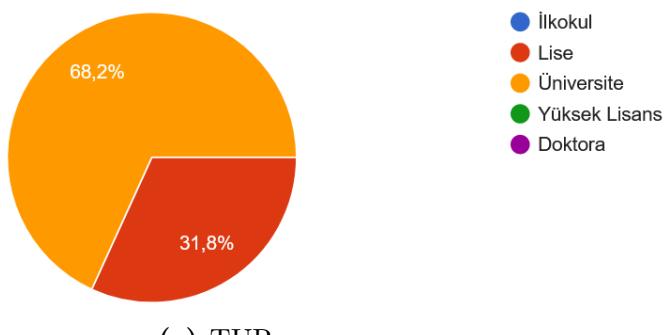
2 risposte



(b) ENG

Tamamladığınız en yüksek eğitim seviyesi nedir?

22 risposte

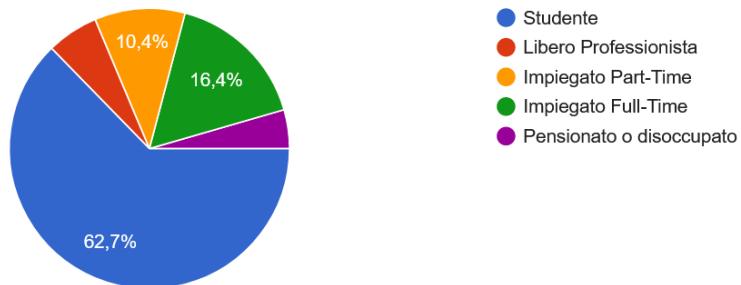


(c) TUR

Figure 4: Results about Educational Level

Stato lavorativo

67 risposte



(a) ITA

What is your current employment status?

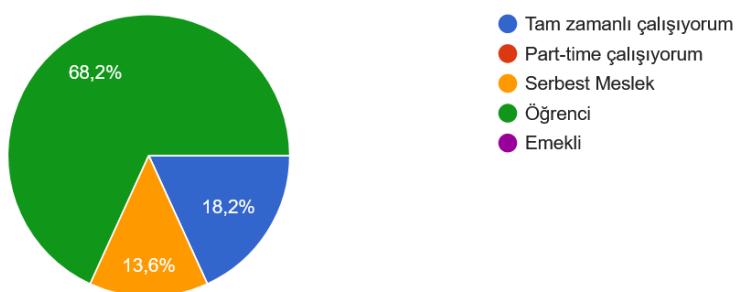
2 risposte



(b) ENG

Mevcut istihdam durumunuz nedir?

22 risposte

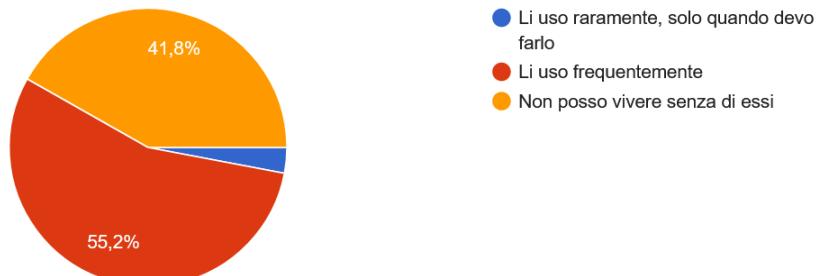


(c) TUR

Figure 5: Results about Work Situation

Qual è il tuo rapporto con i dispositivi tecnologici?

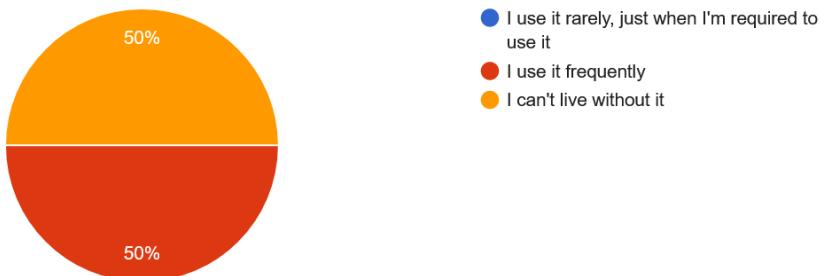
67 risposte



(a) ITA

What's your relationship with technology?

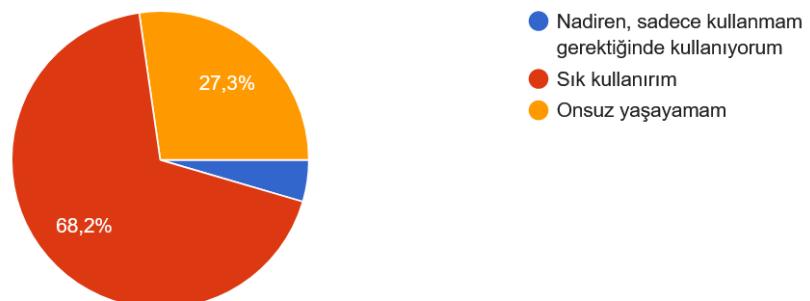
2 risposte



(b) ENG

Teknoloji ile ilişkiniz nedir?

22 risposte

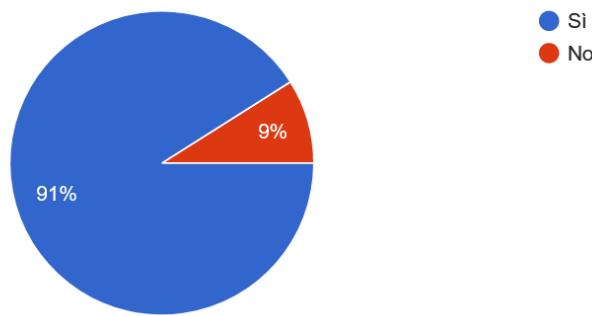


(c) TUR

Figure 6: Results about Technology

Ti interessa rimanere aggiornato sugli ultimi avvenimenti?

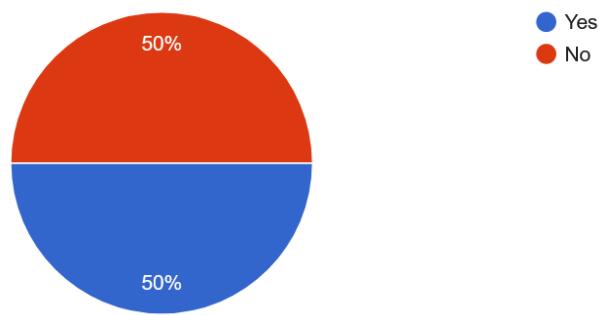
67 risposte



(a) ITA

Are you interested in latest developments?

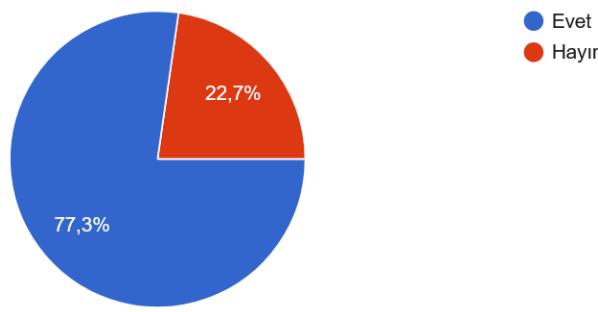
2 risposte



(b) ENG

En son gelişmelerle ilgilendiyor musunuz?

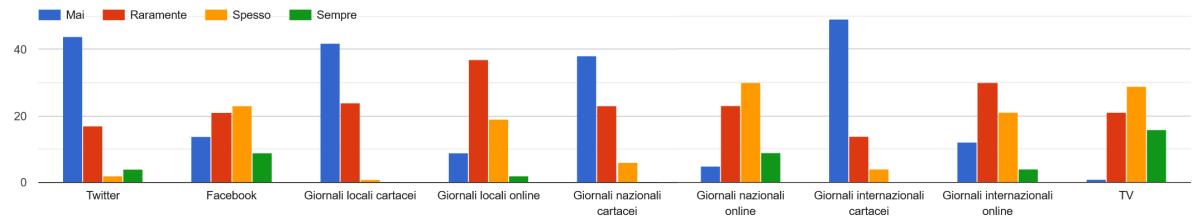
22 risposte



(c) TUR

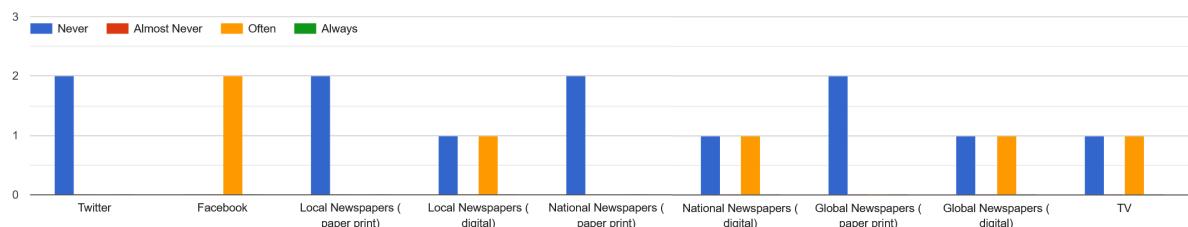
Figure 7: Results about Interesting in latest developments

Quanto spesso usi i seguenti mezzi per informarti?



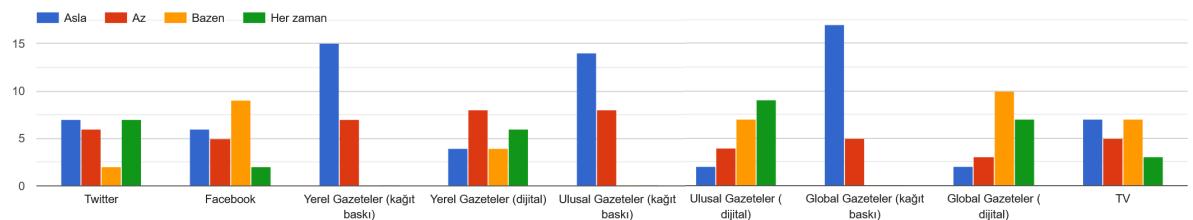
(a) ITA

How often do you check the followings for news:



(b) ENG

Haberler için aşağıdakileri ne sıklıkta kontrol edersiniz:

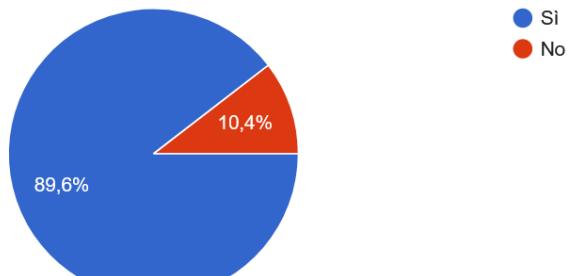


(c) TUR

Figure 8: Results about Work Situation

Hai mai ricontrollato una notizia letta?

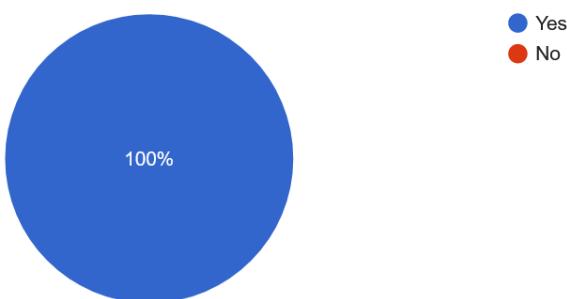
67 risposte



(a) ITA

Have you ever fact checked a news?

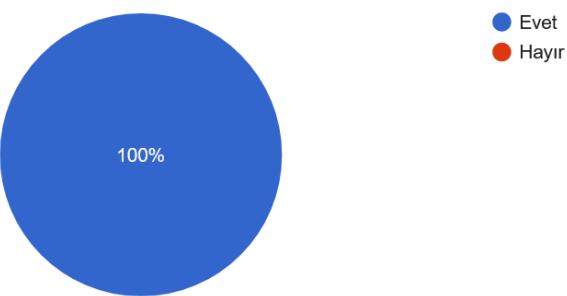
2 risposte



(b) ENG

Daha önce bir haberin doğruluğu araştırdınız mı ?

22 risposte

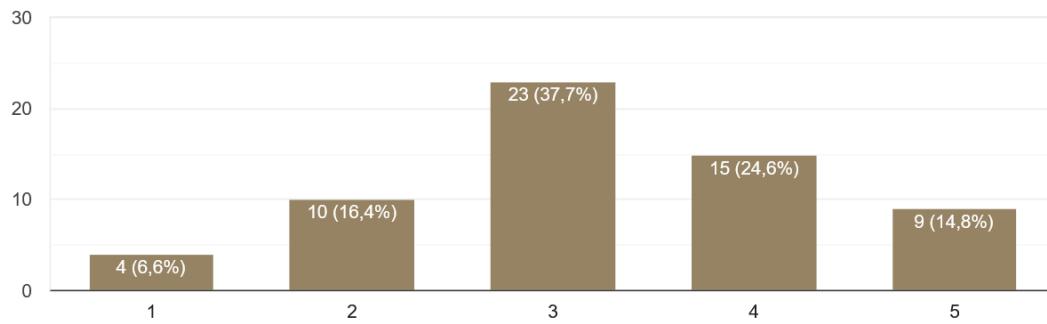


(c) TUR

Figure 9: Results about Fact checking

Se hai risposto sì, quanto spesso controlli le notizie lette?

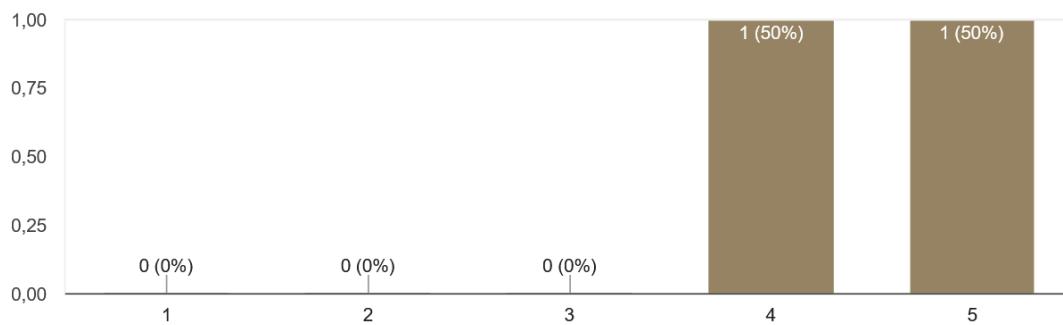
61 risposte



(a) ITA

If you have done, how often do you fact check a news?

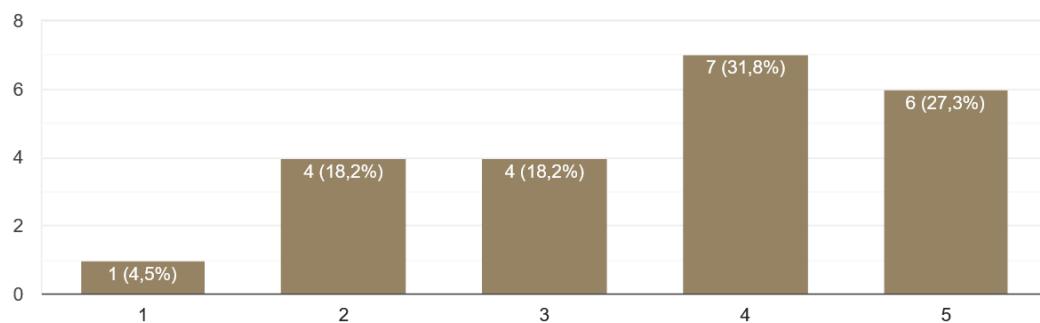
2 risposte



(b) ENG

Eğer yaptıysanız, haberlerin doğruluğunu ne sıklıkla kontrol ediyorsunuz?

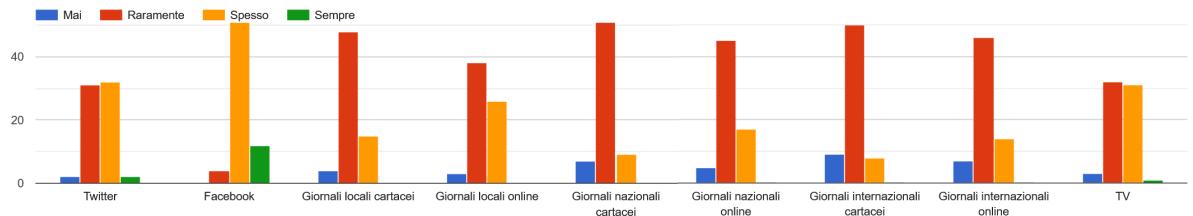
22 risposte



(c) TUR

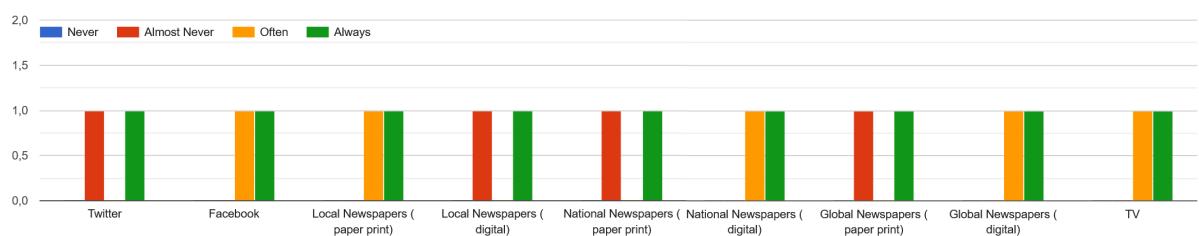
Figure 10: Results about Fact Checking Frequency

Secondo te, quanto spesso si incontra una fake news su:



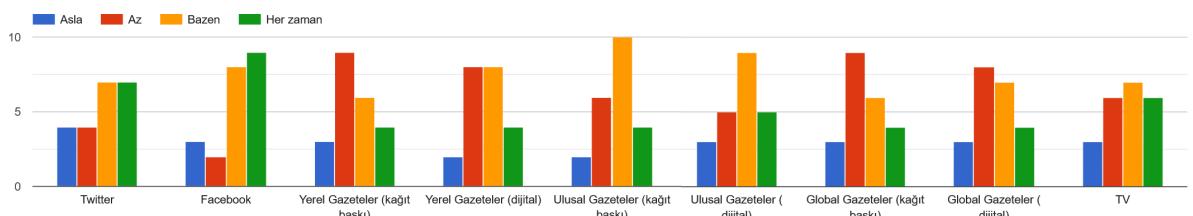
(a) ITA

How often do you believe you see fake news in below options:



(b) ENG

Aşağıdaki seçeneklerde sahte haberleri ne sıklıkta gördüğünüzü inanıyorsunuz

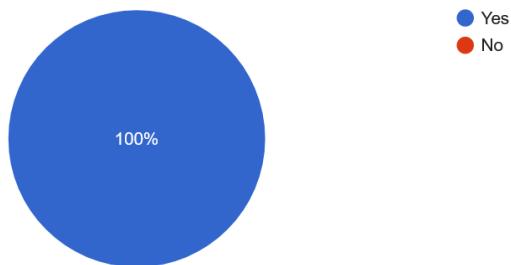


(c) TUR

Figure 11: Results about Frequency of encountering a fake news

According to what is written above, would you be interested in downloading this app?

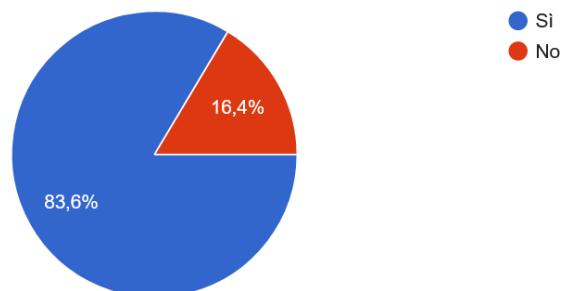
2 risposte



(a) ITA

In seguito a quanto detto qui sopra, saresti interessato a scaricare quest'app?

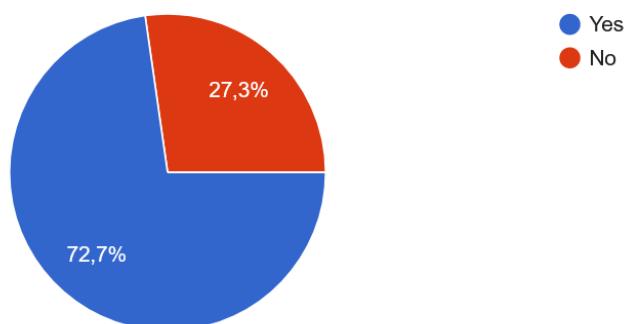
67 risposte



(b) ENG

Yukarıda yazılınlara göre, bu uygulamayı indirmek ister misiniz?

22 risposte



(c) TUR

Figure 12: Results about Interest in downloading the app

2.2.1 Remarks

Apart from the data presented in the previous pages, we performed also an open-question analysis on some key points of the project:

- Almost the whole analyzed sample answered that, to fact check a news, they compare more than one source of information available on the web, putting in the background “offline” sources.
- Most of the sample prefers online information instead of keeping informed through paper print journals or TV, especially from 18 to 27 years old, but thinks that social networks are not a reliable source.
- Almost the whole analyzed sample wants a list containing the favorite news, to be compiled by the user, from which they can get a news feed. We decided to implement it in Fact Checking Indexer.
- Some of the analyzed sample would like to have the possibility of saving news in order to read them later. We decided to implement it in Fact Checking Indexer.
- Most of the sample want to know how a specific index is computed and why, and this confirms our starting point, since this was a key feature of Fact Checking Indexer from the beginning.
- It is interesting to report that a minority of the sample, especially in the range 30+ years old, wanted us to implement a feature to show also weather and traffic in the app. We choose to not implement these feature because we think they are off-topic, and because we chose to focus on people below 30 years old, since they are the most interested in the app.
- Unifying the data from different languages, after compiling our questionnaire, the 82% of the interviewed people said that they would be interested in downloading the app. About the remaining 18%, the main motivations to not downloading the app are:
 - Too many apps on the phone: we can not do anything.
 - They think they can recognize a fake news on their own: we should develop a simple interface, so that this kind of user will be interested in downloading our app.
 - They have doubts about our impartiality: we must gain people’s loyalty over time, and we will start this process being crystal clear about our evaluations.

2.3 User Analysis

To collect some information about the user interested in the app, we used the questionnaire of Section 2.2, since there was a section about personal information. From these information, we could find the best profile for our project:

- Age: Between 18 and 35 years old.
- Gender: No remarkable preferences.
- Educational level: People graduated in High school or with a Bachelor Degree were the most interested in our project.
- Job status: Students are the most interested in our project.
- Relationship with technology: Most of the sample uses technology on a daily basis, almost the 40% cannot live without it.

All of these specification were chosen keeping in mind the the best user for us, that is an user that fact-checks news after reading them using online tools, and knows which tools are reliable for retrieving information, therefore our app will perfectly match their interests.

2.3.1 Persona 1

Name	Paolo
Age	24
Gender	Male
Level of Education	Bachelor Degree
Job Status	Student
Location	Caserta (Italy)

Table 2: User Profile Persona 1

Persona

Paolo is a 24 years old man. He has a Bachelor Degree and is now studying for the Master Degree in Electronic Engineering in Caserta, Italy. During his free time Paolo likes following politics, since he was an activist before starting university, and tries to keep updated on the last World developments.

Scenario

Paolo is studying for an exam session, and he has a little free time because he has some exams left behind, therefore is full of stuffs to do. While he is eating, he is

barely listening to a news on TV, but at first glance it seems a scaremongering to him. He would like to check on different sources he knows, but he has no time to spend in digging in the web to get more information about it.

2.3.2 Persona 2

Name	Francesca
Age	23
Gender	Female
Level of Education	High School
Job Status	Student
Location	Milan (Italy)

Table 3: User Profile Persona 2

Persona

Francesca is a 23-year-old non-resident student based in Milan, Italy. She is studying for a Bachelor Degree in Interpreting, and before starting University she never cared about politics or being update on what is happening in the World, because she was convinced of the uselessness of politicians and journalistic reportings.

Scenario

Francesca, while using Facebook, encounters a strange news about vaccines: she feels that maybe something is fake, but she does not know how and where to check the truthfulness of that news. She tries using Google, but it seems that some sites are corroborating the news, and some others are denying it, and she does not know which sites are reliable.

2.4 Interviews

Out of our 94 responders, we have chosen 3 people for in depth interview. We have asked them open-ended questions for us to help improve our product. We have asked them the following questions:

- Do you follow news, if so how often?
- How often do you think you come across fake news?
- When you are following news how do you make sure what you are reading are accurate?
- What would you expect specifically in an application that helps you to identify fake news?

2.4.1 Interviewee 1

Name: Temirlan

Age: 25

Profession: Software Engineer

From: Kazakhstan

Responses:

1. I do, everyday.
2. Usually everyday I see at least 1 fake news.
3. I check specific keywords that may trigger me.
4. As a software engineer, I can say that I would expect this application to use high calibrated machine learning algorithms to detect patterns.

Insights:

- Frequent news follower
- Knows how to detect fake news by experience
- Expects technological solutions to address this problem

Needs:

- Show people how we calculate index
- Use technology stack to detect fake news

2.4.2 Interviewee 2

Name: Pedro

Age: 52

Profession: Manager

From: Brazil

Responses:

1. I only follow news when I get home from work while having dinner with my family.
2. Most of the time when I scroll on the internet I encounter fake news. Hence, i don't follow internet media much.
3. I trust government and NGO sources.
4. If I can follow the topics that I like and only get news regarding that topics it would be really nice. Of course, these news should be ranked with respect to reliable sources.

Insights:

- Not everyone follow news frequently
- Trust in official sources
- Lack of trust in internet media

Needs:

- Highlighting of official sources
- Ease of use for old people
- Allow to follow specific topics and get news only on them

2.4.3 Interviewee 3

Name: Anisa

Age: 26

Profession: Human Resources Employee

From: Kenya

Responses:

1. I don't follow politics because I don't like it. I only follow world developments, entertainment and magazine news. I use Twitter and follow only the most trusted news outlets from there to get informed about the world.
2. I come across with fake news a lot. Generally, those who share these fake news are the normal people. Hence, I don't follow people's opinions on news. However, sometimes I happen to see that even most trusted media outlets share biased news.
3. I look at the responses for that news and try to synchronize with the media outlets that I follow.
4. Sharing the news with friends should be easy.

Insights:

- Limitation of topics
- Trust in big media outlets but not full trust
- Desire to curb news from 1st person outlets

Needs:

- Allow to follow media outlets
- Easy sharing options

3 HTA — STN

Hierarchical tasks analysis is an extension of the fundamental task analysis. We extend the fundamental task analysis to find Hierarchical Tasks Analysis(HTA). By doing this we show what the user wants to achieve and how to do what in order to achieve these goals. We have also added State Transition Network which is a diagram that is developed from a set of data and charts the flow of data from particular data points to the next in a probabilistic manner. In the first HTA we show that how a user can fact check a news using our application. For the second one we have showed how the user can manage its favorite list via several options. After the feedback from Prof. Mirabella, we have updated the following figures.

3.1 Task 1 - Fact check a news

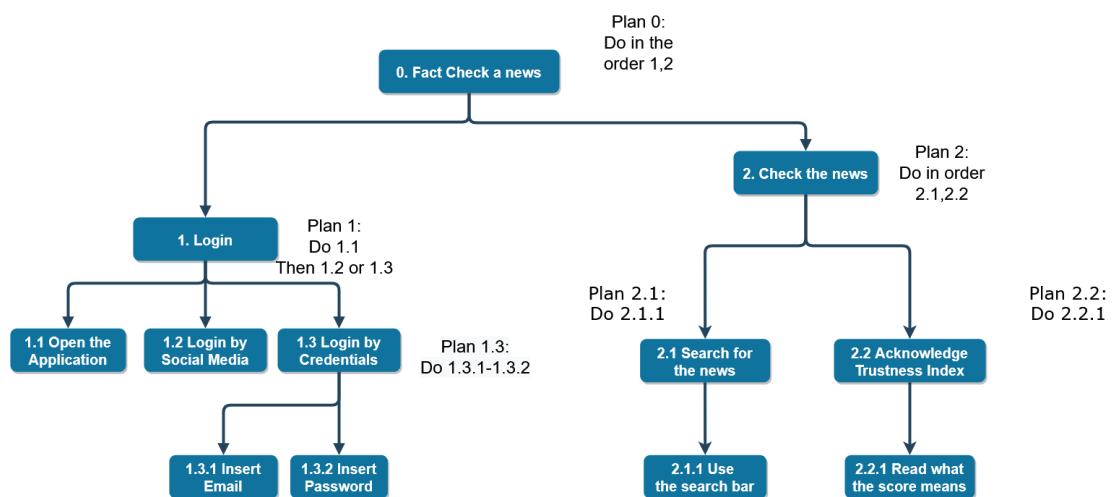


Figure 13: HTA Task 1

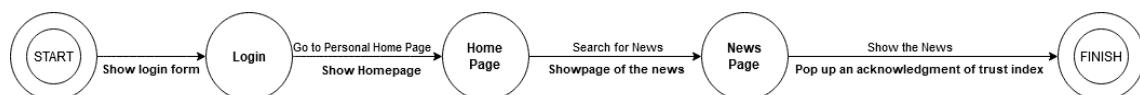


Figure 14: STN Task 1

3.2 Task 2 - Manage Favorite List

In this task, we consider the user already logged in and located in the favorite list page.

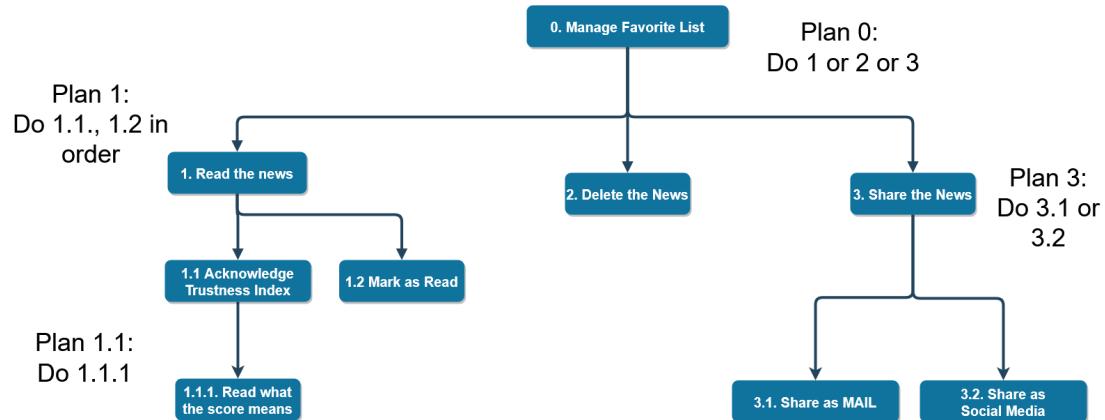


Figure 15: HTA Task 2

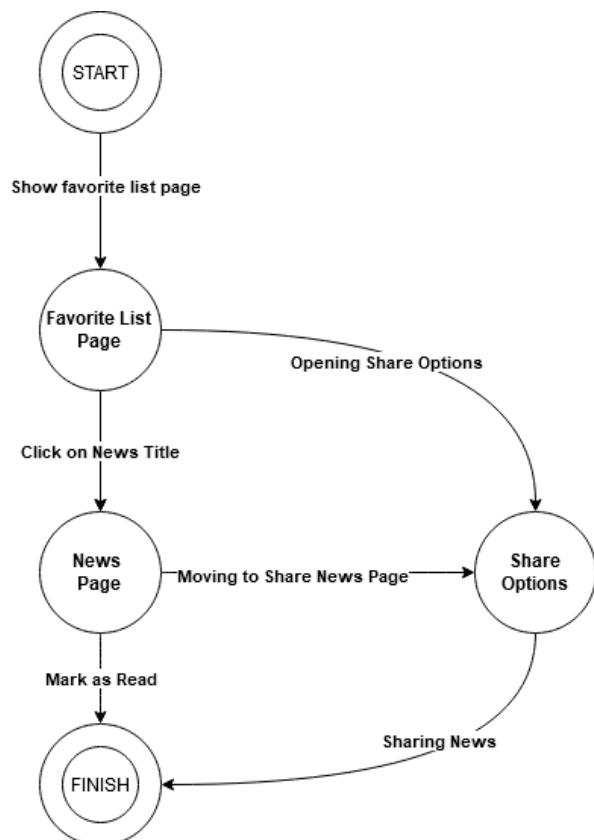


Figure 16: STN Task 2

4 Mockups

In this section, we are going to discuss the mockups of our first prototype. These mockups are built according to the questionnaire results and to HTA and STN presented in previous sections. Our application is aimed to help users keeping updated on the latest news while checking the reliability of their sources.

Actions presented in this section are:

1. **Sign up** filling a form inserting data.
2. Check the **reliability** of a source.
3. **Add to favorite list** a certain news that the user likes.

4.1 Actions mockups

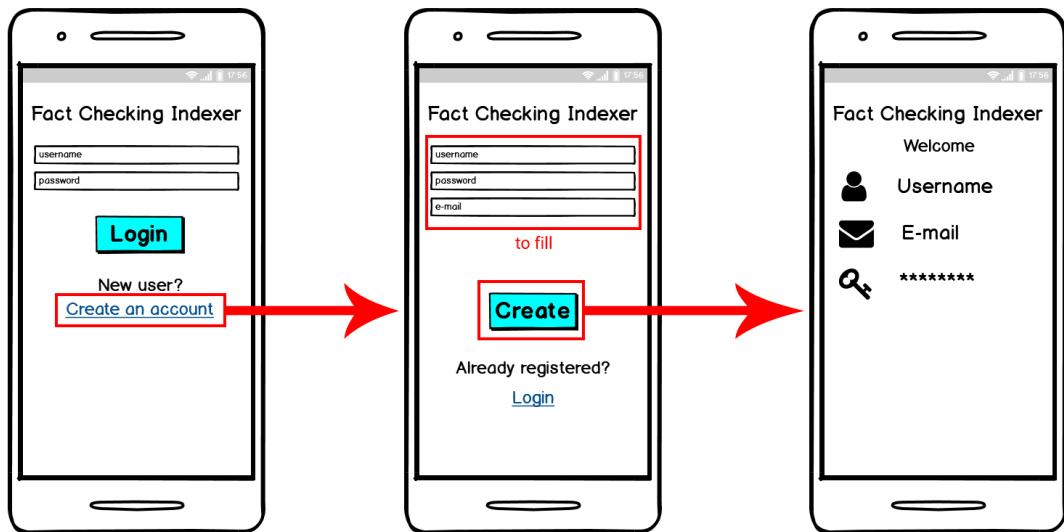


Figure 17: Sign up task

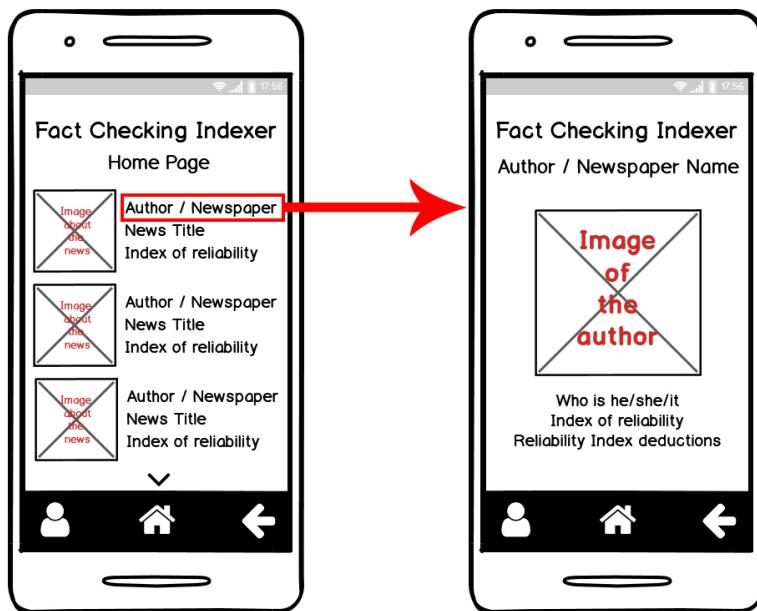


Figure 18: Check reliability task

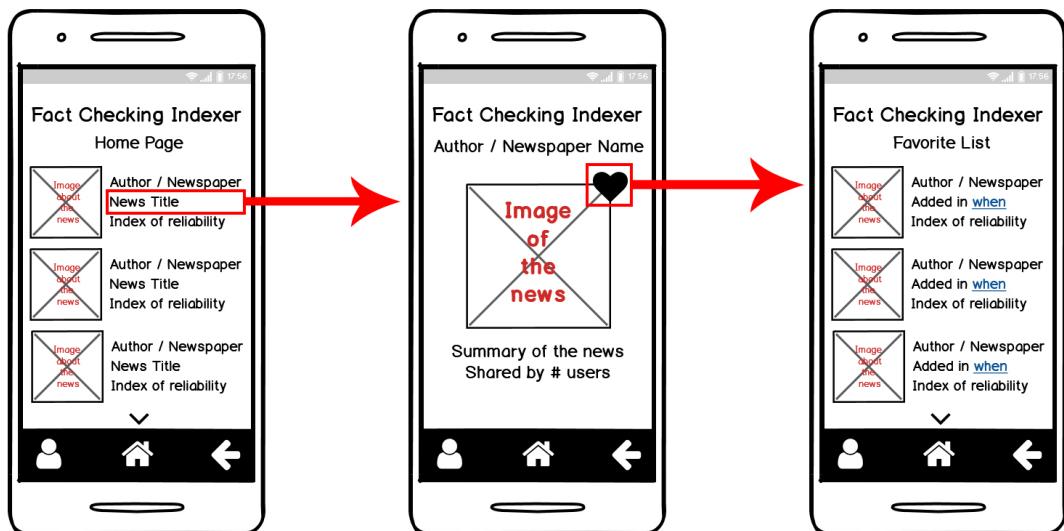


Figure 19: Add news to favorite list task

5 Low-Fi Prototype

Using results of previous sections, a first low-fi prototype has been built. Moreover, the overall graphics has been updated to match material design guidelines and the icons were taken from ionicons.com. Other changes made are:

- News page now has link to author and index score explanation.
- The page about Author and index page was split in author page and index explanation page.
- Settings page was implemented.
- Tabs bar has been changed from User — Home — Back to Favorites — Home — Settings.

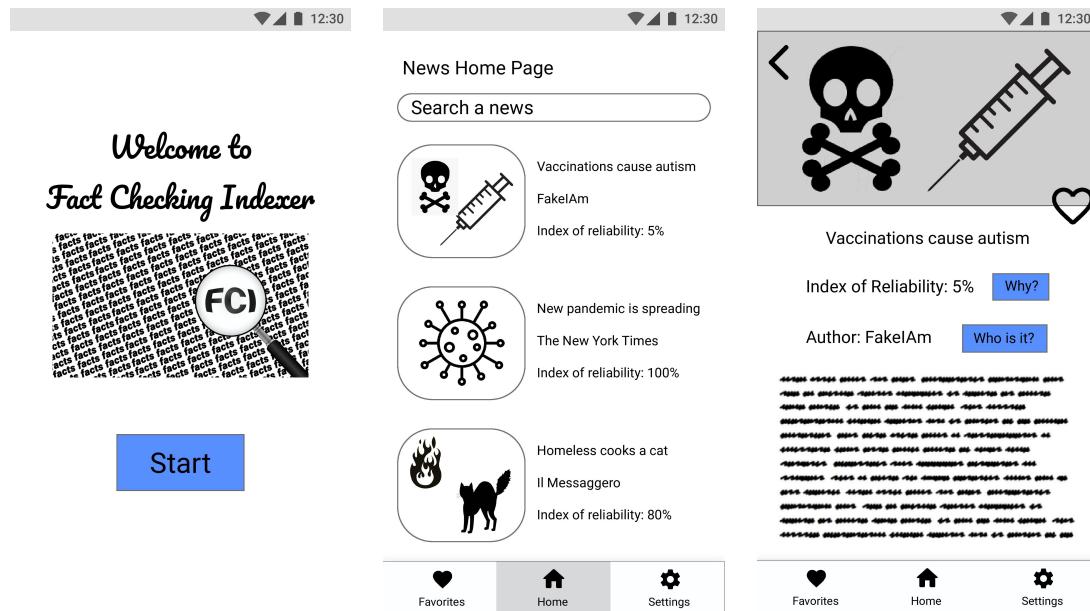


Figure 20: Low-Fi Prototype

**Figure 20:** Low-Fi Prototype

6 Expert based evaluation

Evaluation occurs in laboratory or field, especially in collaboration with the user, that should be considered through the entire development lifecycle, to make tests of the functionalities and usability of the current system. It is useful to evaluate both design and implementation and ideally, the evaluation process should be considered at all stages in the design life cycle. Evaluation techniques have multiple goals to achieve: the evaluation of a possible extent of system functionalities, like for example the task that users are interested in; the evaluation of the effect of the interface on the user, like for example the user's experience of interaction or how it is easy to learn and to use or the satisfaction of the user; the identification of specific problems, like for example errors, confusion and unexpected results. Heuristic Evaluation and Cognitive Walkthrough are examples of the expert analysis methods.

6.1 Heuristic Evaluation

A heuristic evaluation is a usability inspection method for computer software that helps to identify usability problems in the user interface design. This method was developed by Jakob Nielsen and Rolf Molich and it is basically based on the comparison between your own interface and the usability principles. Given that usability criteria, called "the heuristics", the interface and its compliance will be examined, and the analysis result in a list of potential usability issues.

6.2 Molich and Nielsen's Heuristics

Molich and Nielsen developed a heuristics list which is composed by 10 "heuristics":

1. **Visibility of system status:** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
2. **Match between system and the real world:** The system should speak the user's language, following real-world conventions, using words, phrases and concepts familiar to the user and making information appear in a natural and logic order,rather than using system-oriented terms.
3. **User control and freedom:** Given that users often make mistakes, choosing the wrong system function, they need a clearly "emergency" exit to leave the unwanted state. Because of that, the system should support undo and redo.

4. **Consistency and standards:** Follow platform conventions so that users don't have to understand if different words, situations or actions mean the same thing.
5. **Error prevention:** Having a careful design which prevents a problem from occurring in the first place is better than a good error message, so eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
6. **Recognition rather than recall:** Minimize the user's memory load by making objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
7. **Flexibility and efficiency of use:** Allow users to personalize frequent actions with accelerators. Accelerators, unseen by the novice user, may often speed up the inter-action for the expert user such that the system can provide for both inexperienced and experienced users.
8. **Aesthetic and minimalist design:** Dialogues should not contain information which is irrelevant or rarely needed, because every extra unit of information in a dialogue, competes with the relevant units of information reducing their visibility.
9. **Help users recognize, diagnose and recover from errors:** Error should not be expressed in codes, but in plain language, precisely indicating the problem and constructively suggesting a solution.
10. **Help and documentation:** It may be necessary to provide help and documentation, even though it is better if the system can be used without documentation. Any information should be easy to search, focused on the user's task, so make a list of concrete steps to be carried out, and not be too large.

6.3 Expert Report

Evaluator: Valeria Mirabella

Prototype: Low-Fi

Date: 11/07/2020

Evaluation:

Frame	Heuristic Violated	Severity	Description / Comment
Search a news	Flexibility and efficiency of use	3	User could be interested in filter news for a specific period, or geographic areas etc. Consider designing an advanced search
Favourite list	Flexibility and efficiency of use	3	Consider the possibility to delete from favourite list, or sort the list

Table 4: Expert report: Heuristic Evaluation

The "severity" number identifies:

- 0 - I don't agree that this is an usability problem at all
- 1 - Cosmetic problem only
- 2 - Minor Usability problem
- 3 - Major usability problem
- 4 - Usability catastrophe

7 Medium-Fi Prototype

Taking into account the expert-based evaluation with the heuristics violated in the Low-Fi Prototype, we started developing the Medium-Fi Prototype. We made some changes to solve issues pointed out in expert-based evaluation:

- **Frame "Search a news"; Heuristic violated: "Flexibility and efficiency of use", Severity: 3:** the Home page, where the frame search a news is, was implementing only a basic search bar. Expert-based evaluation make us understand that the user would like to have more search options, like search by topic, by geographic area, by date interval. Therefore, we added these options in the Medium-Fi prototype.
- **Frame "Favourite list"; Heuristic violated: "Flexibility and efficiency of use", Severity: 3:** in the favourite list, we did not take into account the possibility to delete or share a news directly from the list of the favourite news, nor to sort it. After expert-based evaluation comment, we decided to implement these features in Medium-Fi prototype.

Moreover, a graphic restyling has been made, adding a more tempting UI to make the app look better. Finally, this is the Medium-Fi prototype:

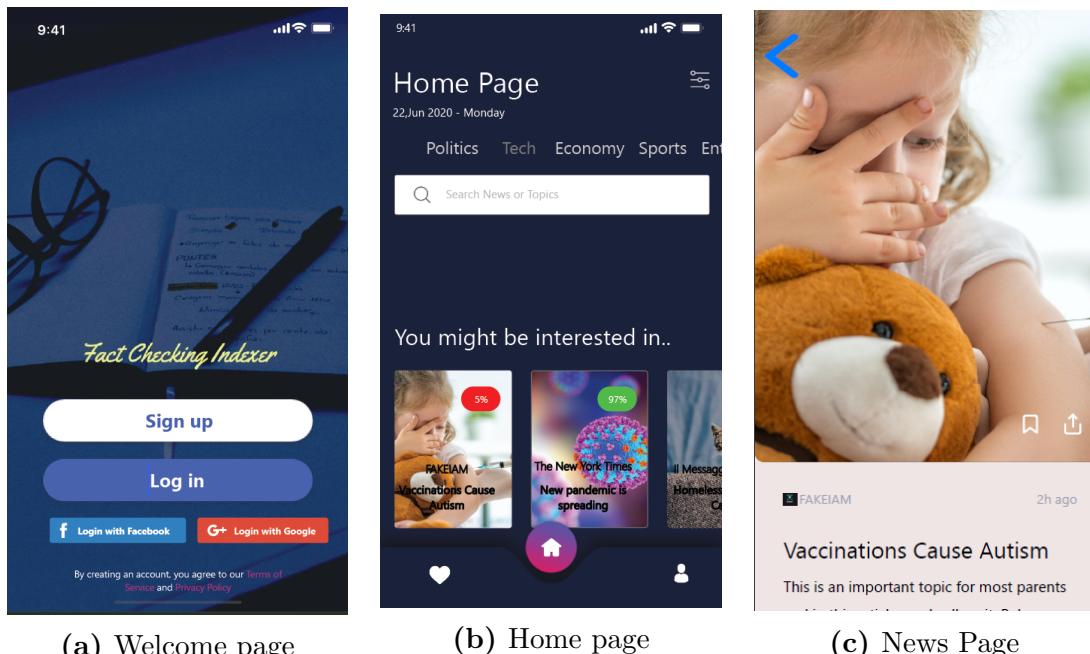


Figure 21: Medium-Fi Prototype

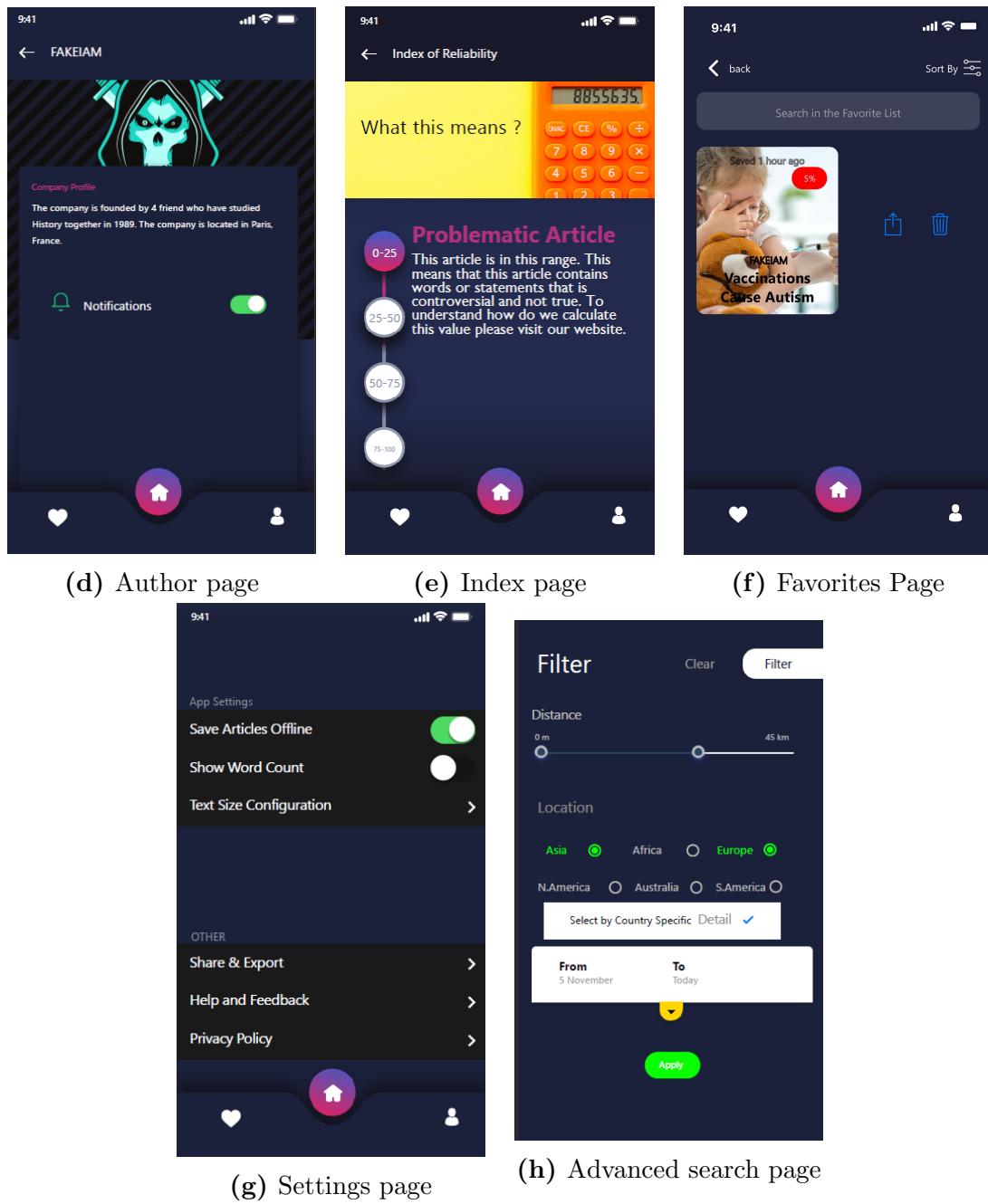


Figure 21: Medium-Fi Prototype

8 Think Aloud Evaluation

To perform think aloud evaluation, we chose a group of 5 people of different ages, and did the experiments using these criteria:

- We explained why we grouped them and what we are doing.
- Each person had to accomplish a series of task, which were:
 1. Login
 2. Add a news to the favourites
 3. Share a news
 4. Remove the news from the favourites
- We explained that we are not testing them, but the application.
- The experiment took place using Google Meet, since because of COVID-19 sanitary emergency not all the people who accepted our invitation were in Rome. We sent them an .apk file of Fact Checking Indexer to let them test our app with us.
- While executing each task, we asked the users to say aloud what they were doing, what they thought it was happening and whatever they were thinking related to the app.
- During the experiment, we took notes of users thoughts.

Note: We chose this list of tasks because they are the main features of our application. The age of the participants was between 18 and 32 years old, that fits the age chosen in our user requirements.

8.1 Discussion about the session

The group of people involved in our think aloud evaluation seemed to be quite happy about our application and our idea. None of them found any problem to accomplish the task, but they pointed out some UI features to change to improve the results, which are going to be discussed in the next session.

9 High-Fi Prototype

Using information gathered during the think aloud evaluation session, we started building the High-Fi prototype. From think aloud evaluation, we got:

1. Login and signup buttons color should be changed to better match our color palette.
2. Back button in news page should be changed, and we should add a time bar which show how many minutes it takes to read the article.
3. We should change the color of the index floats in the home page and improve readability of news title.
4. We should add an introduction to the app, people did not like to be thrown directly in the app. We will also add a skip button for advanced users.

9.1 Changes made

We are going to see the first 3 changes (the fourth has been directly implemented in High-Fi prototype since it was done from scratch):

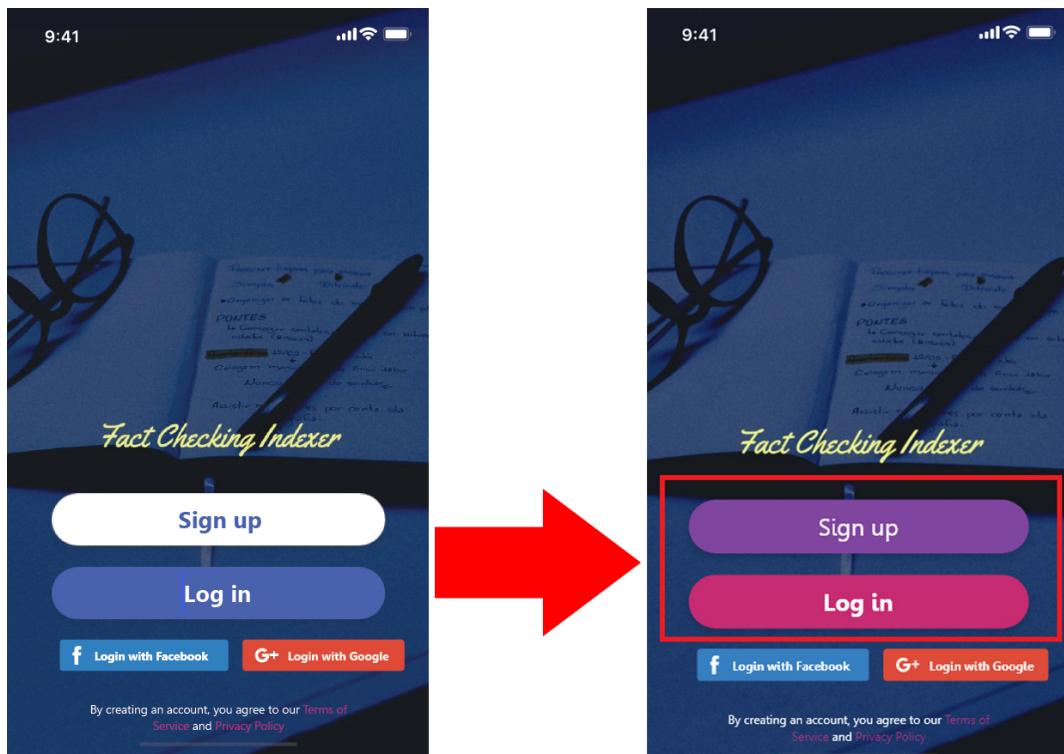


Figure 22: First change

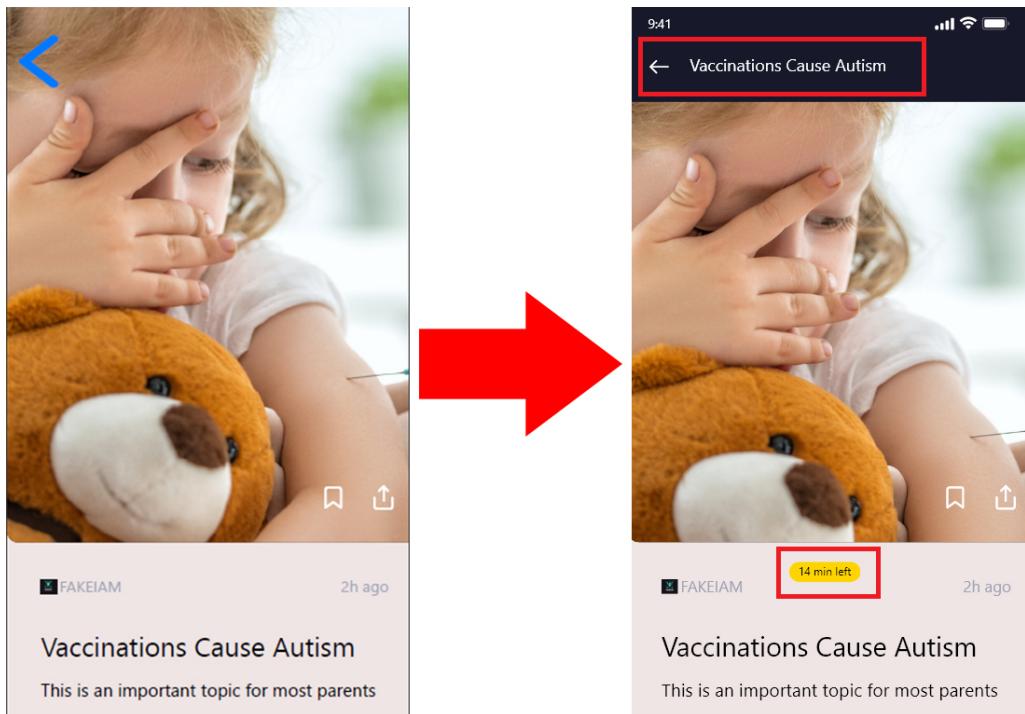


Figure 23: Second change

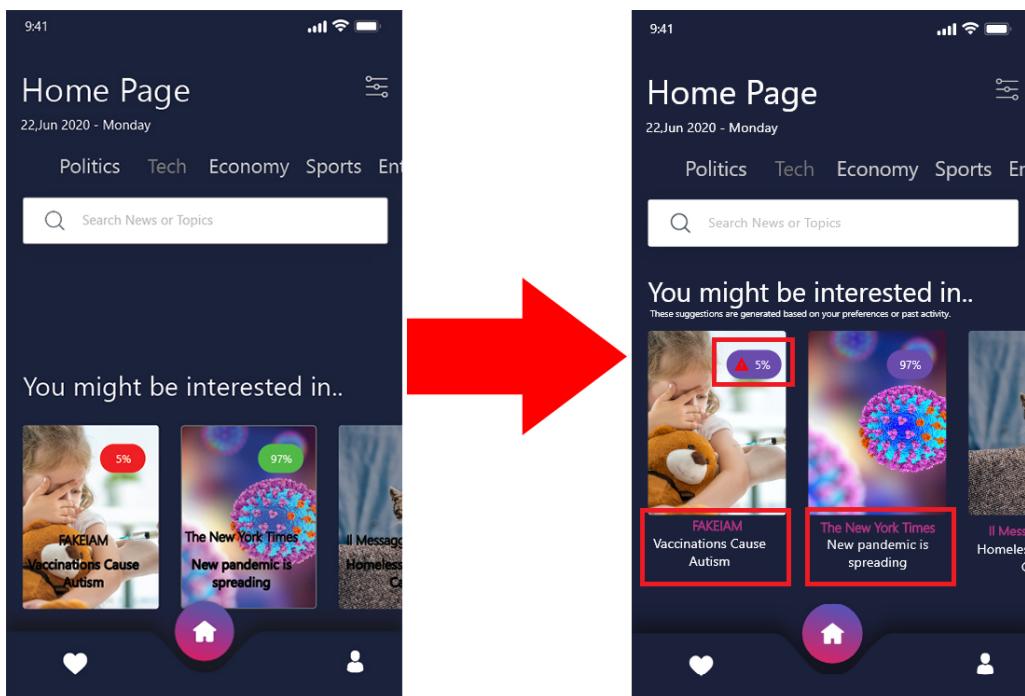


Figure 24: Third change

9.2 High-Fi Prototype

Finally, let's see the full High-Fi prototype:

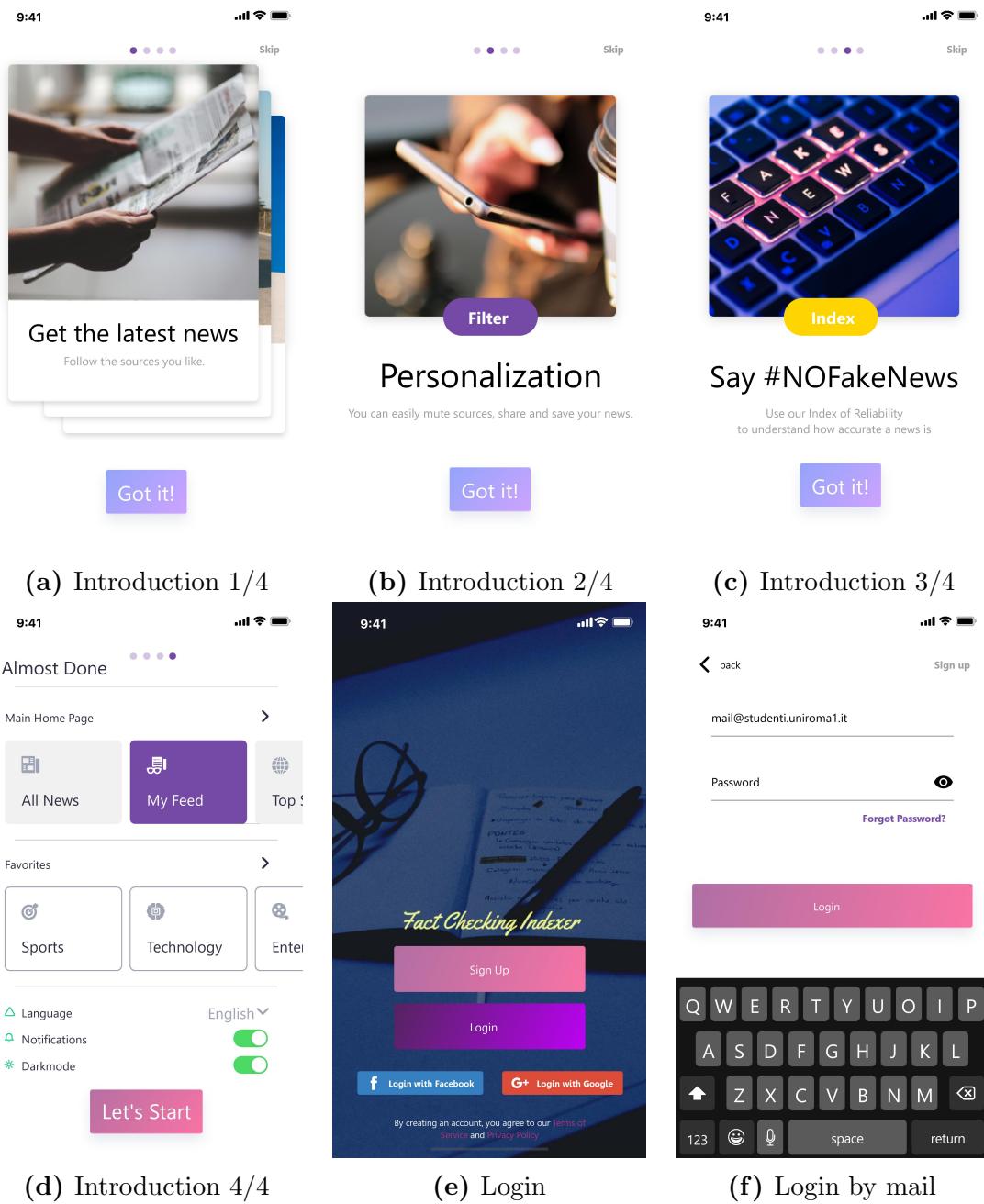
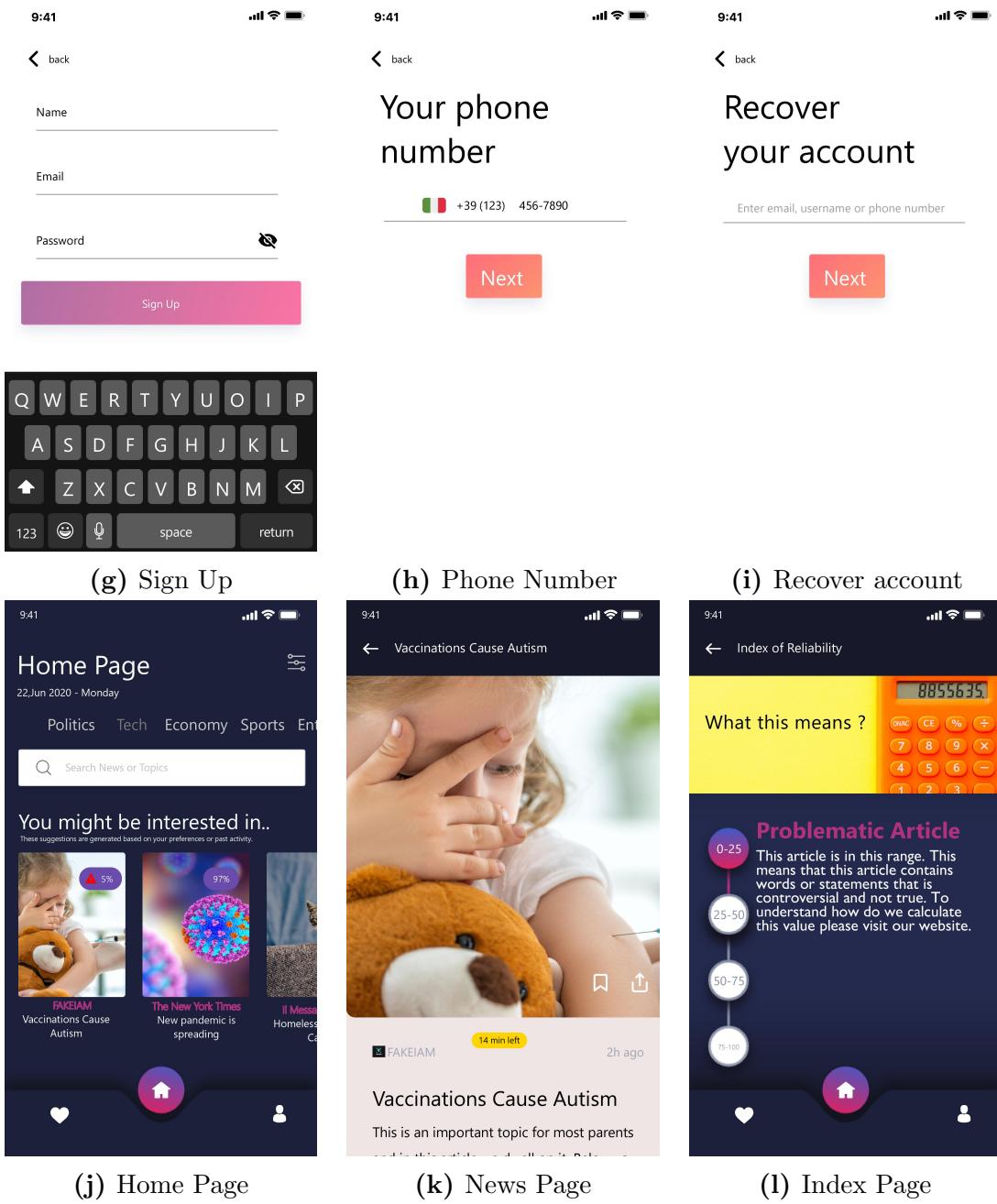
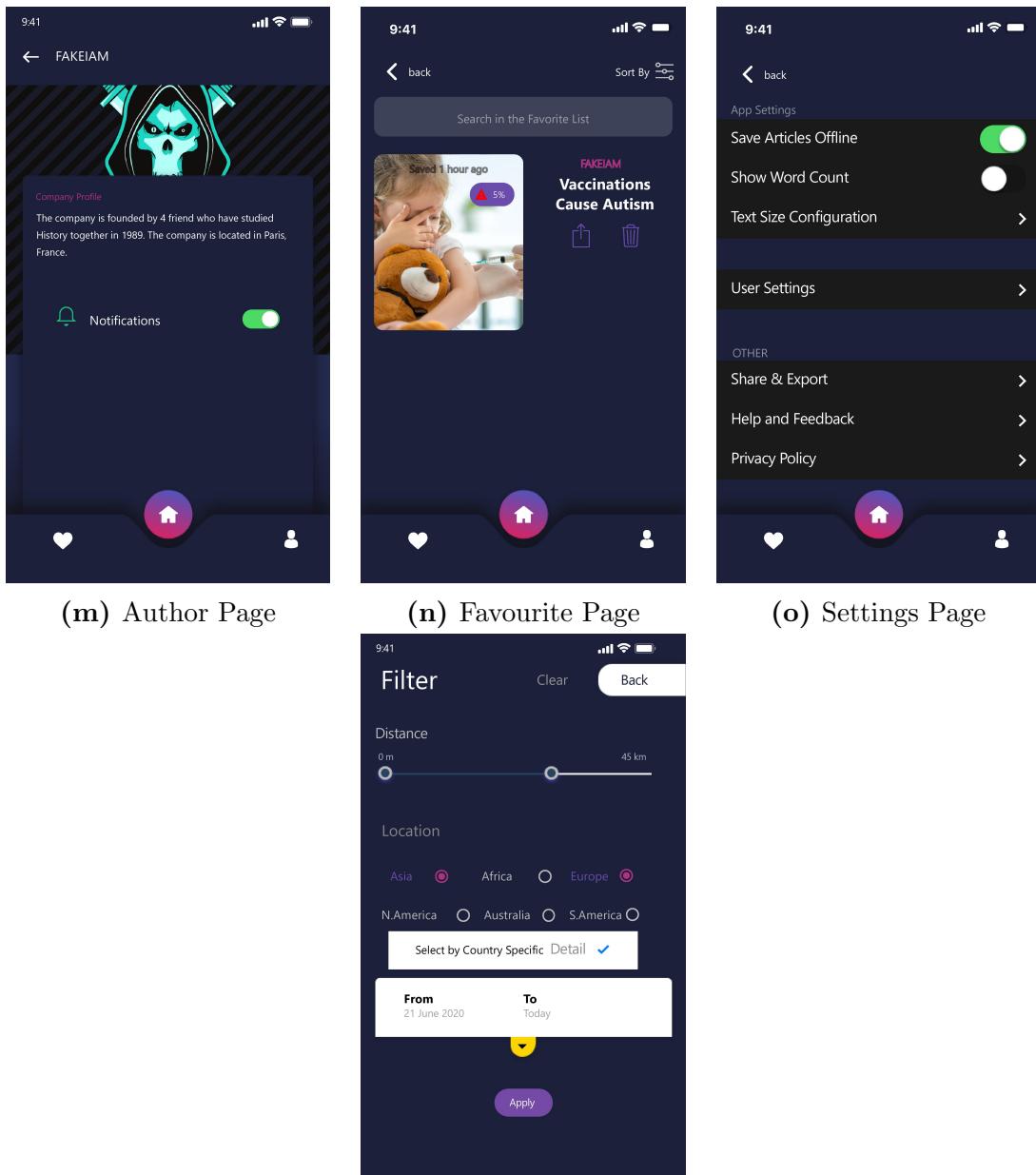


Figure 25: High-Fi Prototype

**Figure 25:** High-Fi Prototype

**Figure 25:** High-Fi Prototype

10 Controlled Experiment

During the final stages of the app, we noticed that an user could have wasted time looking for buttons to add a news to the favourite list and to share it. Therefore, we developed two interfaces:

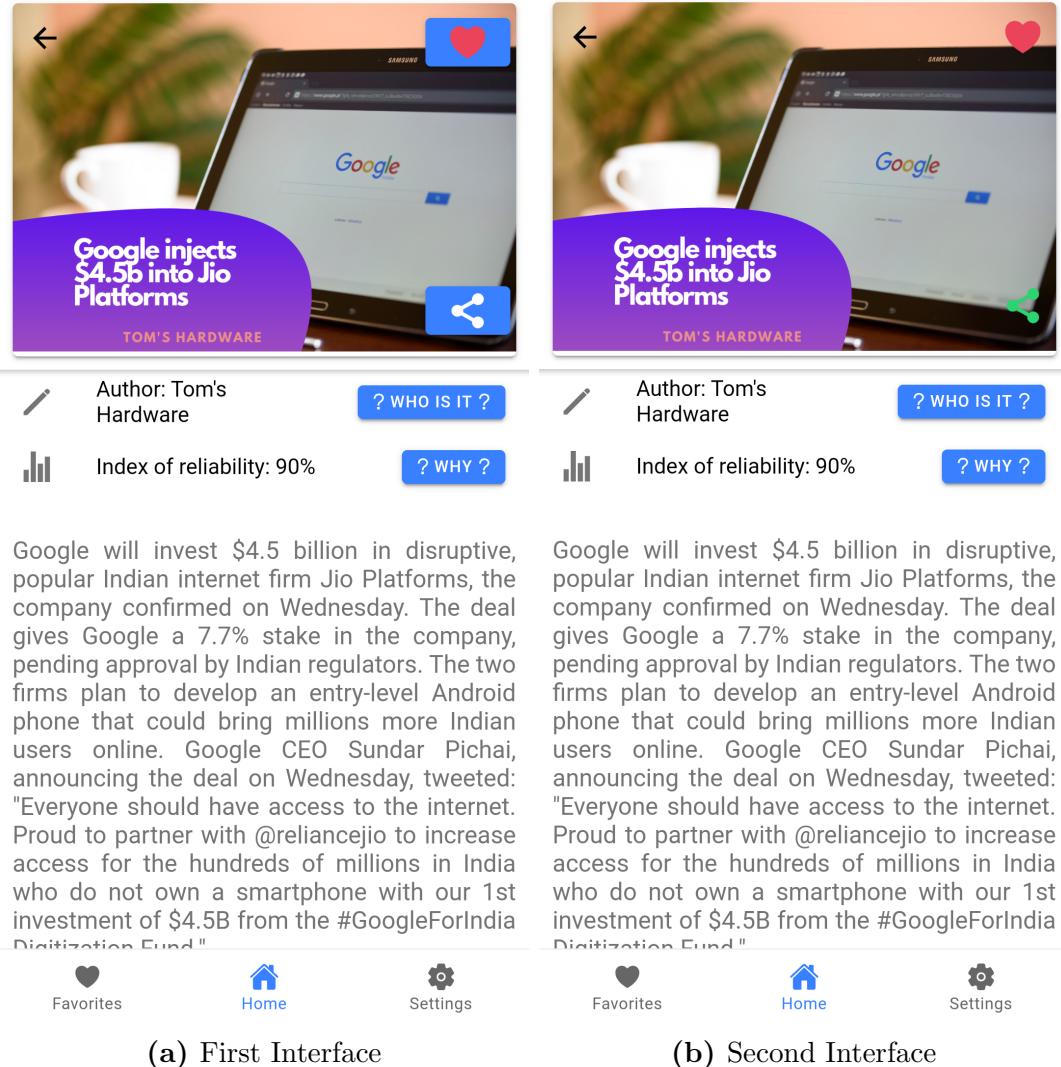


Figure 26: Different interfaces

In the first interface, buttons for adding/removing news from favourites and for sharing the news have a background in contrast with their color, while in the second one they do not have it. Our assumption is that the first interface makes the user complete the tasks of adding/removing a news and share it faster than the second interface. To verify our assumption, we performed a controlled experiment.

10.1 ANOVA One-Way Analysis

The controlled experiment has been performed with ANOVA One-Way Analysis. We sent the application to 20 different people to perform the tasks. The users performed the experiments under different conditions, since we split the 20 people into 10 people which will use the first interface and other 10 people which will use the second interface.

- **Participants:** 20 people in a range of age 18-35 years old according to user profiles.
- **Variables:**
 - *independent*: the two interfaces
 - *dependent*: the time in seconds to execute a task
- **Hypothesis:**
 - *null*: there are no differences between the two interfaces.
 - *our*: users will be faster using the first interface rather than the second one.
- **Experiment:**
 - *task*: open a news, add or remove a news to the favourites, than share it.
 - *assumptions*: user has completed the introduction, is logged, and he is now in the home page.
- **How to apply ANOVA?** We used a chronometer to check how much time each user performs the same requested task with the two different interfaces. All the value are collected in order to compute the analysis.

Interface 1	Interface 2
8,93	20,12
11,07	24,72
13,12	15
18,22	14,64
12,45	13,1
17,03	18,98
13,9	16,91
15,43	17,62
10,15	16,23
10,55	21,02

Table 5: Time measure results

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Interface 1	10	130,85	13,085	9,430
Interface 2	10	178,34	17,834	12,025

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	112,77	1	112,77	10,51	0,0045	4,41
Within Groups	193,09	18	10,73			
Total	305,85	19				

Table 6: ANOVA results

10.2 Analysis of the results

The ANOVA analysis was performed using **Data Analysis** function in Microsoft Office Excel. The results showed that $F > F_{crit}$, so we can reject *null* hypothesis, therefore confirming *our* hypothesis. In particular, users could not find the buttons add/remove to favourite list and share in a quick way using interface 2, while using interface 1 this could have been possible.

11 Conclusions

This project was different from other exams for us, because we needed to interface with real users, each one with different thoughts and problems, and we had to try to settle all their different points of view. We also had the possibility to improve our technical skills in developing mobile application and interfaces, in particular we discovered Ionic framework, which allowed us to improve our skills in Angular, TypeScript, Standard CSS and Android app building and deploying. Moreover, we could also improve our skills using UI design tools like Balsamiq Mockups, Adobe XD and others. We learnt how to work in a new prospective, putting the user as the core of the project, while in other exams we always put the coding tools and our knowledge as the core of the project.

11.1 Implementation Details

As stated before, we used Ionic Framework to develop our app, using Android as referring platform to deploy it. The full implementation could be found by clicking [here](#).

11.2 Future Implementation

For several reasons, we did not implement some features, which we leave to future development. Some of them could be:

- **Implement a neural network** to automatically tag news by topic and geographic location using machine learning techniques. Moreover, the net could also been able to assign the index dynamically referring to other features we did not consider in our implementation.
- **Implement a live server linked to major databases** to have live access to the news and be updated in real-time.

References

- [1] Course material
- [2] Balsamiq Mockups: <https://balsamiq.com/>
- [3] Adobe XD: <https://www.adobe.com/it/products/xd.html>
- [4] Ionic Framework: <https://ionicframework.com/>
- [5] Angular: <https://angular.io/>
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- [7] Icons: <https://ionicons.com/>
- [8] Android Studio: <https://developer.android.com/studio>
- [9] Material Design: <https://material.io/>
- [10] To build ANOVA: <https://statisticsbyjim.com/anova/one-way-anova-excel/>
- [11] Implementation: [click here](#)