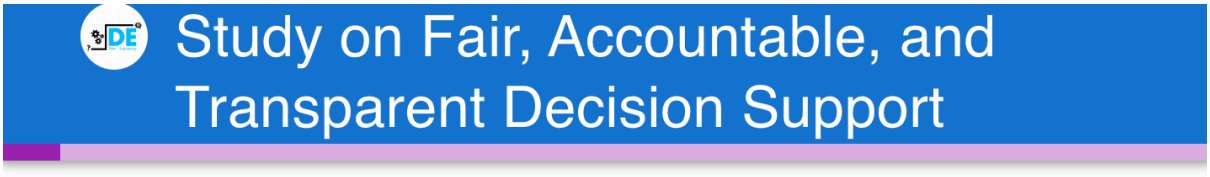
In this Document, we provide Screenshots of the texts and questionnaires used for our study on human attitudes towards critical programs (here duplicate detection of financial records) with and without explanations.

In order to understand the workflow, we want to briefly summarize it: After welcoming the participants and introducing the study and its requirements, participants filled out Questionnaire 1. They were then introduced to the specific study scenario and filled out Questionnaire 2. After providing them with their Task Description which was adjusted to whether the participant was in the group provided with explanations or without, the participants had to decide for 60 tuples (not shown here), whether they were duplicates or not or not enough information was available. Afterwards they filled out Questionnaire 4 before they were thanked for their participation which concluded the study.



Welcome!

This study is part of our **Fair, Accountable, and Transparent Decision Support research project**, in which we assess the usefulness of computer program explanations.

The main goal of this study is to capture whether **human attitudes towards critical programs** change when presented with explanations. To this end, we have designed a **real-life financial scenario**, which may affect everyone to some extent, where a computer program proposes decisions. Explanations can then show how the decision came about.

As participant, you will be presented with a **short introduction to the scenario and your task**. Afterwards, you will have to assess **whether you agree with the proposed decision of a program**. We also have prepared **several short questionnaires** to assess your opinions. All in all, the study is expected to take about 15 - 30 minutes.

We collect your responses and various metrics during your decision-making process but **no personal data**.

CONTINUE

Study on Fair, Accountable, and Transparent Decision Support

Questionnaire 1

Since we are looking into technology acceptance, we first want to learn more about your general attitude towards IT-technology.

1.1 What is your personal attitude towards the impact of IT technology on society?

- ○ very helpful
- ○ helpful
- ○ somewhat helpful
- ○ neither helpful nor harmful
- ○ somewhat harmful
- ○ harmful
- ○ very harmful

1.2 I use IT-technology that may put me or others at risk.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

1.3 Assuming I am aware that I use an IT-technology that, while being useful, may put myself or others at risk. My attitude is best described as:

- ○ I am eager to experiment with the latest technologies in all areas of my life and believe that the benefits by far outweigh any potential risks to myself or others.
- ○ I frequently use such IT technologies in all sorts of areas of my life, and occasionally check to see if they might be risky or if there is a less risky alternative.
- ○ I regularly use such IT technology, but I usually take the time to assess its risks to myself and others before doing so.
- ○ neither agree nor disagree
- ○ I use such IT technology reluctantly, namely only when I must or when, after careful consideration, I come to the conclusion that the harm to me and my fellow human beings is minimal and the benefit outweighs these risks by far.
- ○ I try to avoid using such IT technologies whenever possible because I don't trust them; if I do have to use them, I go out of my way to protect myself and others from possible risks.
- ○ I do not use any IT-technologies, because I think they can't be trusted under any circumstances and they have a bad influence on me and the people around me.

1.4 Can you briefly describe one use of IT-technology from your personal experience or general knowledge that might put people at risk?

Please enter your answer here.

BACK CONTINUE

Study Scenario

Our study will take place in a **financial scenario** where an automated decision support system has the potential to put **peoples' lives at risk**. In our example, the **credit scoring company *CSC*** determines a credit score for each person based on their financial history. This **credit score** stands for how likely it is that the person can pay back a credit. Banks, insurances, and other financial partners can then look up the credit score of a person in order to make decisions about them.

It is critical for all persons in the CSC database that their **score is correct**, because the score is used to decide whether a person should be granted a loan, is considered as trustworthy applicant for renting an appartment, or is offered a contract! Of course, it is also of vital importance to the users of the CSC database, that this information is correct.

Take for example that Peter Parker applies for a loan with the *Loan Bank*. In order to assess the credibility of Peter Parker, the Loan Bank will then contact CSC, to inquire Peter Parker's credit score. The CSC must make sure that they reply with the correct Peter Parker's score which might be based on payments on previous loans and current debt status. The correct matching is important to Peter, as it influences this and future appliactions, to the Loan Bank since they want to make sure that Peter Parker is in fact likely to pay back their loan, and of course to the CSC itself, since this scoring is the core of their business.

With the growing importance of **digitalization**, companies like the CSC face new challenges. One of them is to cope with huge datasets. Especially merging information about a certain person is of vital importance in order to compute the correct score. As the amount of information about a single person grows, the manual merging process performed by humans gets more and more error-prone. Also, introducing a fully **automated process** is challenging due to legal requirements. Therefore, CSC has decided to make use of a program that **supports its employees in merging credit scoring information** but does not make the final decision. That is, for a new financial event emitted by source systems concerning a certain person, the program suggests to the employees to which existing person's financial history the entry should be added. In order to achieve this, the program uses a technique called **duplicate detection**. If both, financial event, and, financial history, refer to the same real world person, these two persons are considered duplicates. Therefore, all data on the idenified duplicates can be merged for decision making.

In the case of Peter Parker, the CSC might receive new information about the loan that he takes out from the Loan Bank. Then the system's job is to find the financial history of the correct Peter Parker among all of the similar people in their database. Based on Peter's personal information, the CSC is able to identify him, adds the new information to his history, and can update his score for future inquiries about his credibility.

Your task will be to assess this new program of the CSC.

BACK CONTINUE

Questionnaire 2

Before you start the study, we want to know more about your perception of the scenario and problem understanding.

2.1 How could an erroneous merge of two people's entries in a credit score database affect those people's lives negatively?

- ○ They could be denied a loan, e.g., for pursuing education or buying a car.
- ○ They could be removed from the pool of applicants for a rental apartment.
- ○ They could be denied a mobile phone contract.
- ○ Their data might be exposed to others when they complain about their credit score.
- ○ All of the above.

2.2 I think automatic detection of duplicates in credit score data can work.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

2.3 I see a significant risk that people could be harmed by an automated duplicate detection program.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

BACK CONTINUE

Study on Fair, Accountable, and Transparent Decision Support

Task description

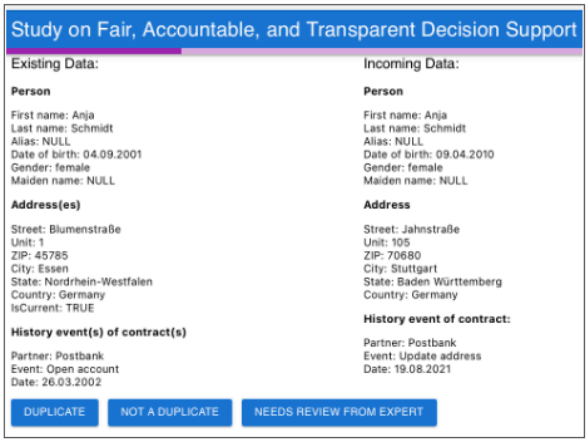
We want you to asses the new program of CSC. Imagine, you work as an employee for CSC and your task is to add an incoming financial event of a person to their corresponding event history. The CSC programm will **show you pairs of a newly received financial event and a probable matching event history**. Based on similarities of data in the event history and the new event, the CSC programm calculated a probability, that the person in the event history and the new event is the same person. **In this study, you will be shown 60 pairs** of varying similarity that have been selected by the program as highly likely duplicates.

In the image below, you can see a screenshot of the program showing the **event history of a person (on the left)** and a **newly received event (on the right)** that has to be added to the correct person in the database. CSC keeps personal information such as first and last name and date of birth along with addresses and bank events the person was involved in in the past. All of this information can be used to identify duplicates in the data.

After reviewing the entries, **you must decide** whether both records **are actually duplicates, are not duplicates** or when you are not sure, you can also **refer the decision** to a different department which will contact the people in question (which is however very time-consuming). You **submit your decision by clicking the respective button** below the data.

For this study, you have been selected to review the program's decision without further explanations.

Disclaimer: The data is purely fictional, any similarities to real people are pure coincidential. But the scenario is realistic. **However, be aware that your decision in real life could have an impact on the people involved. Make sure that you only mark the correct duplicates or people might be at risk of getting a lower credit score than they deserve.**



BACK CONTINUE

Study on Fair, Accountable, and Transparent Decision Support

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You are also provided with some explanation (above the data) about what parameters influenced the program's decision. The explanation includes a similarity score between the two persons, and additional positive and negative indicators, such as that the new event is triggerd through a changed address which can explain differences in addresses.

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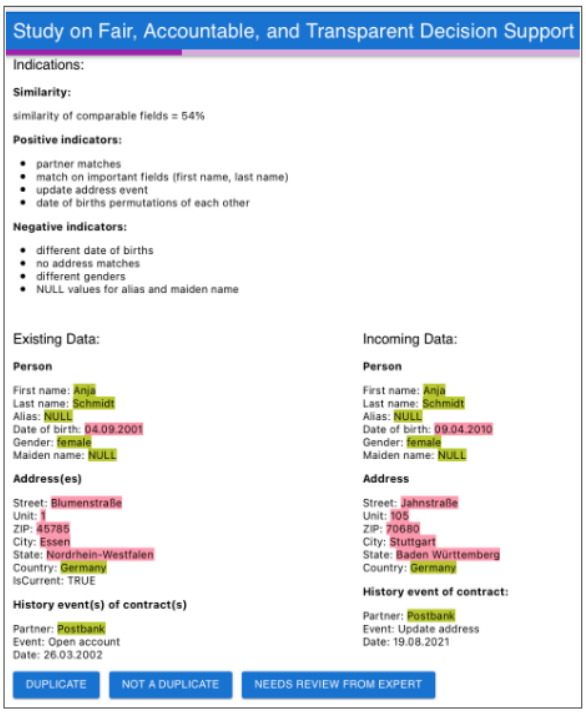

BACK CONTINUE

Questionnaire 3

Before you start the study, we want to know more about your perception of the scenario and problem understanding.

3.1 What are duplicates when it comes to personal data?

- ◯ Multiple copies of a database of personal data.
- ◯ Two identical personal values, e.g., the exact same names.
- ◯ Two data entries with possibly different values but referring to the same real person.

3.2 Which of the following entry pairs of a movie database are likely to be duplicates:

- ☐ Title: The MATRIX / Director(s): The Wachowskis / Year: 1000 — Title: Matrix / Director(s): The Wasowskis / Year: 1999
- ☐ Title: Cinderella / Director(s): Kenneth Branagh / Year: 2015 — Title: Cinderella / Director(s): Kiran Nakti / Year: 2015
- ☐ Title: Monty Python and the Holy Grail / Director(s): Terry Gilliam / Year: 1957 — Title: Monty python and the holy grail / Director(s): Terry Gilliam, Terry Jones / Year: 1975

BACK CONTINUE

Study on Fair, Accountable, and Transparent Decision Support

Questionnaire 4

Now that you have completed the tasks, we are interested in what you think about the automatic entity resolution program.

4.1 Using the system improves my performance in identifying duplicates.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.2 Using the system when identifying duplicates increases my productivity.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.3 Using the system enhances my effectiveness in identifying duplicates.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.4 I find the system to be useful when identifying duplicates.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.5 My interaction with the system is clear and understandable.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.6 Interacting with the system does not require a lot of mental effort.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.7 I find the system to be easy to use.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.8 I find it easy to get the system to do what I want it to.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.9 The quality of the output I get from the system is high.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.10 I have no problem with the system's output.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.11 I have no difficulty telling others about the results of using the system.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.12 I believe I could communicate to others the consequences of using the system.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.13 The results of using the system are apparent to me.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.14 I would have difficulty explaining why using the system may or may not be beneficial

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.15 I would feel safe if people's data were processed by this system.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.16 I would feel at risk if the system was used to decide about me and my data.

- ◯ strongly agree
- ◯ agree
- ◯ somewhat agree
- ◯ neither agree nor disagree
- ◯ somewhat disagree
- ◯ disagree
- ◯ strongly disagree

4.17 I believe in the benefits of the new system.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.18 Assuming I have the power to make decisions in a credit scoring company, I would predict that I would decide to use the system.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.19 I trust this system.

- ○ strongly agree
- ○ agree
- ○ somewhat agree
- ○ neither agree nor disagree
- ○ somewhat disagree
- ○ disagree
- ○ strongly disagree

4.20 Do you have additional remarks?

Please enter your answer here.

CONTINUE

Study on Fair, Accountable, and Transparent Decision Support

Thank you for participating in our study!

This study is part of our **Fair, Accountable, and Transparent Decision Support research project**, in which we assess the usefulness of computer program explanations.

The results of this study will be examined, and published as a scientific paper. If you want to receive a copy of the paper, once it is published, please enter your e-mail-address below. Otherwise, just close the tab.

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