PROCEEDINGS OF SCIENCE

Amai! Co-creating AI-based solutions for societal challenges

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The project "amai!" ("Oh my" in Flemish) implements citizen science methods to co-develop solutions using artificial intelligence (AI) for societal challenges. The project looks for AI solutions in the field of mobility, climate, health, and work, and with the overarching theme of digital inclusion. Citizens and citizen organisations are included in the entire development process of the AI solutions, from sharing their initial ideas and co-defining solutions, to selecting proposals to receive funding to implement the solution, and involvement in the training of the AI solutions. The target audience is people not primarily interested in AI but who are interested in solving societal issues. Citizens are also invited to take part in other activities, such as using creative AI tools and playing the amai! card game. This contribution gives an overview of the approach of amai! and touches upon valuable discussions on this approach during the poster session of the Engaging Citizen Science Conference 2022 in Aarhus, Denmark.

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1. Introduction

Artificial Intelligence (AI) is an emerging technology with many new applications being developed. AI is present in our daily lives, even more than we might realise. Along with this, ethical and societal discussions about AI are on the rise. However, knowledge of AI in the general public is still rather limited [1].

With this in mind, the citizen science project "amai!" was launched in 2021 as part of the Flanders AI programme [2]. Amai! is being run by Scivil, the Flemish Centre for Citizen Science, together with the Flemish Knowledge Centre for Data & Society. The aim of the project is to give citizens a voice in AI solutions that are being developed. Citizens can share their ideas for AI solutions, vote on project proposals based on these ideas, and subsequently get involved in the development of these applications. Additionally, amai! provides education about AI and raises public awareness of AI, thus giving people a sense of what AI is and how they encounter it in their daily lives.

The project is aimed at the general public, more specifically at "Societal implementers" [1]. These are people who are not primarily interested in AI, or have little knowledge of technology, but are deeply concerned with current societal challenges. The aim is to introduce AI to them by including them in the development of concrete societal applications. The project is focused on applications in four key themes: mobility, climate, health and work, as well as the overarching theme of digital inclusion.

2. Methods

Throughout the project, maximum involvement of citizens, civil society organisations active in the four key themes, and other stakeholders is crucial part of all the steps of the process. The project encompasses four phases, all including citizen science methods. Firstly, research questions are collected by inviting citizens to share their ideas and questions for AI. Secondly, solutions are co-defined by bringing together citizens and other stakeholders around the questions and ideas of the citizens. Thirdly, an open call takes place for consortia to develop and implement one of the solutions and receive €75.000 funding for this. Citizens have the final vote in the selection of the winning projects. Finally, four selected projects are developed, which include citizens through various methods, e.g., collection of data or focus groups.

2.1 Collection of research questions

Citizens were asked to share their ideas on an online platform [3]. The platform also includes information about AI through recognisable stories that explain the key AI-concepts (e.g., why and how a spam filter uses AI). Interactive brainstorm sessions were organised for citizens and civil society organisations, often in collaboration with the civil society organisations working on one of the amai!-themes (e.g. Cyclists' union).

Broad communication to the general public was key. Social media campaignes, as well as a partnership with the Flemish public broadcaster VRT, gave a broad exposure to the project, online and on the radio.

This phase resulted in 352 ideas for AI. AI-professionals were invited to share feedback on the platform, in order to spark the conversation with citizens and guide them in thinking about a solution.

2.2 Co-creation of solutions

The collected ideas were clustered by topic. This resulted in eight to ten clusters for each of the four themes (e.g., clusters in health: mental health, food, lifestyle, etc.). These clusters were the starting point in co-creation sessions with citizens, experts in the societal themes, and AI-experts. In small, mixed groups they defined the scope of the requirements for AI-solutions. The sessions resulted in 34 concepts for AI-solutions.

2.3 Open call for projects and selection through public vote

A panel of AI experts then tested the concepts for feasibility, desirability and innovation potential. Seventeen concepts passed this check. They were included in an open call for proposals where consortia could receive up to €75.000 to develop one of these concepts. Consortia needed to be a mix of different partners, such as civil society organisations, knowledge institutions, IT companies and local governments. Twelve project proposals were received, four of which were selected for funding. For the selection, a jury of experts thoroughly checked the quality of the proposals. Seven proposals passed this check and were selected for the large scale public voting on the amai!-platform.

2.4 Development of solutions with citizen science methods

Four projects received funding for developing an AI solution. Regular intervisions between the projects and the amai!-team take place, supporting the consortia on using citizen science methods and incorporating human-centric AI. Citizens are involved in the development process using various engagement techniques. The process is widely communicated to the general public via the amai!-website, social media, a monthly newsletter, and a radio item on the national broadcaster.

2.4.1 Mobility: mapping quality of bike paths

This project is developing a new smart sensor to register the quality of bike paths while cycling. By combining this registered data with location data, an AI application is trained to classify the bike paths according to condition, safety, ease of use and design. This information is then used to create an accessible map of cycling safety and comfort in Flanders. To make the registration of bike paths accessible, the project is also developing a smartphone app. Citizens are included in the testing and training of both the device and the app.

2.4.2 Health: personal diabetes assistant

This new digital assistant gives people with Diabetes type I personal suggestions on what to eat while exercising. This assistant uses AI to create personal feedback for each individual, other than generic suggestions that might not be as helpful. Citizens are included through focus groups on the app development and through clinical studies.

2.4.3 Climate: mapping of trees in cities

This project creates a detailed map of all trees in cities. Image recognition techniques with AI analyze drone images to create the map. Citizens train the algorithm by ground-truthing the trees. Thanks to the collaboration of citizens and the AI techniques, tree mapping can be

done faster and more efficiently than if it were done by citizens without AI support. This allows larger areas of trees to be mapped than would otherwise be possible.

2.4.4 Work: live subtitles in the classroom

This application creates subtitles during class (in Flemish), to assist students with a foreign mother tongue. Simultaneously reading what the teacher is saying and listening at the same time makes it easier to follow the class as well as learn the language. To create the subtitles, an AI application is being developed using speech-to-text software that translates the words the teacher says into written words on the student's laptop in real time. Citizens are involved in the development through focus groups and testing the application.

3. Amai! 2022

While the four selected projects are being developed in 2022, the entire amai!-project has also been renewed for a second edition, meaning a new start of idea generation. The approach is similar to the first edition, with a few key differences.

3.1 Activities

While last year's edition took place mostly online, due to COVID-19 restrictions, this year a wider range of offline AI activities have been developed, such as an interactive idea booth and workshop sessions. The focus shifted from attracting people online to taking the project to the places where people are (e.g. festivals, libraries, etc.). Train-the-trainer sessions were also organised to upscale the project and share the material more broadly.

Additionally, an AI card game has been created for children from 8 years old and up. The aim of this game is to be the first to build your AI-solution by collecting all the right cards, including technical cards as well as cards concerning the ethical aspects of AI. The game is played by simple rules and the cards are visually attractive to keep it accessible to young people and people without technical background.

3.2 Digital inclusion

While the first edition focused on four main themes (mobility, health, climate, work), in the second edition this is extended with a fifth, overarching theme—digital inclusion. Five projects will receive funding, including one that works on a digital inclusion solution. Additionally, anyone sharing their AI-ideas is asked to reflect upon the challenges their idea could bring regarding accessibility and inclusion. Citizens are also encouraged to share ideas on how digital inclusion can be improved through AI.

Furthermore, since AI regularly raises concerns for citizens, amai! collects conditions for desirable and acceptable AI-solutions. This is done through the online platform as well as during workshop sessions and focus groups. The answers and conversations from citizens will be used as input for a policy charter on trustworthy AI.

4. Discussion

Amai! is a citizen science project on AI for societal challenges. It aims to include citizens at every step in the process: idea generation, co-creation of solutions, selection of proposals and the

development of the solutions. Running the project was both very rewarding and challenging, and provided plenty of opportunities to learn. We would like to highlight a number of findings that sparked discussion during the poster session at the Engaging Citizen Science Conference 2022 in Aarhus, Denmark.

During the first edition of the project, in 2021, COVID-19 was still very present. This meant that most of the project ran online. While we communicated broadly to the general public, and many people visited the website, we found that sharing ideas was difficult. In contrast, this year we have been collecting ideas at real-life activities while engaging in valuable conversations with citizens and guiding them towards an idea.

Furthermore, finding the right wordings and stories to inspire people towards an idea of their own was a learning process during the project. In the second edition, we are using the four selected ideas of the first edition as examples, which really helps. Additionally, citizens have been more inclined to share "problems" they encounter rather than share "ideas" for AI. It is all about using the right words to lower barriers in people's minds.

The amai! card game was an even bigger success than we imagined. The card game is useful for both children and adults for starting a conversation on AI, as it includes a lot of AI language, such as "data", "self learning", etc., as well as information on ethics and following the law. At the same time, the game is very accessible to play, even with no prior knowledge of AI. Creating the right tools for the general public remains a challenge, but this game is a successful addition to the project.

Finally, later this year, we will be releasing a toolbox that brings together the different methods used in the amai!-project, as well as our lessons learned. This way, the approach can be applied in different countries and communities and for themes other than AI.

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