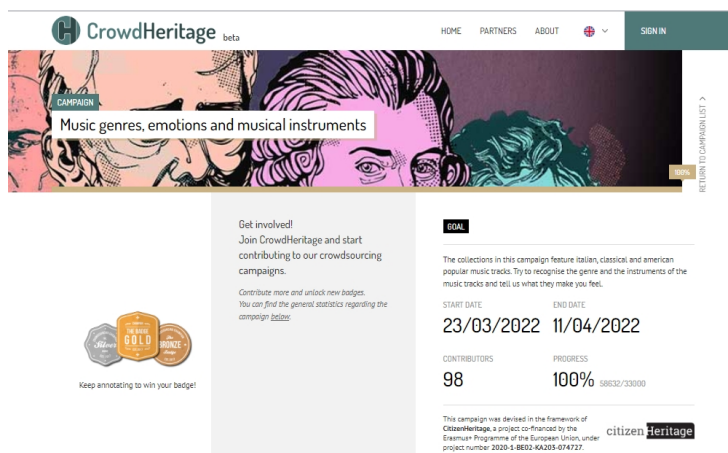


Computer science workshops and citizen science case study at NTUA

CitizenHeritage promotes participative approaches to support citizen science and citizen participation in cultural heritage, with a focus on involving university students with cultural heritage projects. This work goes in the direction of growing in higher education institutions teaching and learning programmes of new and digital skills for the cultural professionals of tomorrow.

In this context, partner NTUA the National Technical University of Athens conducted a **citizen science case study** that employed crowdsourcing techniques as part of a homework assignment involving higher education students of computer science.

Students were engaged in an online campaign in the form of a challenge workshop, with the aim to enrich the metadata associated with a selection of music tracks retrieved from the Europeana digital library. Making use of a platform that supports crowdsourcing in the cultural heritage domain, students were asked to listen to music tracks and annotate them along three main categories, including emotion, genre, and instruments.



The screenshot shows the CrowdHeritage website interface. At the top, there is a navigation bar with 'HOME', 'PARTNERS', 'ABOUT', and 'SIGN IN'. Below the navigation bar is a banner image with the text 'Music genres, emotions and musical instruments'. To the right of the banner is a 'RETURN TO CAMPAIGN LIST' link. Below the banner, there is a section titled 'Get involved!' with the text 'Join CrowdHeritage and start contributing to our crowdsourcing campaigns.' and 'Contribute more and unlock new badges. You can find the general statistics regarding the campaign below.' To the left of this text are three circular badges: 'SILVER', 'GOLD', and 'DIAMOND'. Below the badges is the text 'Keep annotating to win your badge!'. To the right of the 'Get involved!' section is a 'GOAL' section with the following information: 'The collections in this campaign feature Italian, classical and American popular music tracks. Try to recognise the genre and the instruments of the music tracks and tell us what they make you feel.' Below this is a table with columns 'START DATE' and 'END DATE', showing '23/03/2022' and '11/04/2022' respectively. Below the table is another table with columns 'CONTRIBUTORS' and 'PROGRESS', showing '98' and '100%' respectively. At the bottom of the 'GOAL' section, there is a small text block: 'This campaign was devised in the framework of CitizenHeritage, a project co-financed by the Erasmus Programme of the European Union, under project number 2020-4-BE02-KA205-074727.' and the 'citizenHeritage' logo.

View the campaign: <https://crowdheritage.eu/en/music-citizen>

The results of the campaign were further analyzed and exploited by students through the use of semantic web technologies, in order to construct a knowledge graph and an ontology, extract additional knowledge, and make music recommendations. In total, 98 students participated in the campaign, contributing over 8300 tags concerning 854 tracks.

The process also led to the creation of an openly available annotated dataset, which can be useful for music tagging models. The outcomes of the campaign and the feedback collected via an online questionnaire allowed us to draw useful insights about the challenges and benefits of incorporating crowdsourcing techniques in computer science curricula and the educational gains for students.