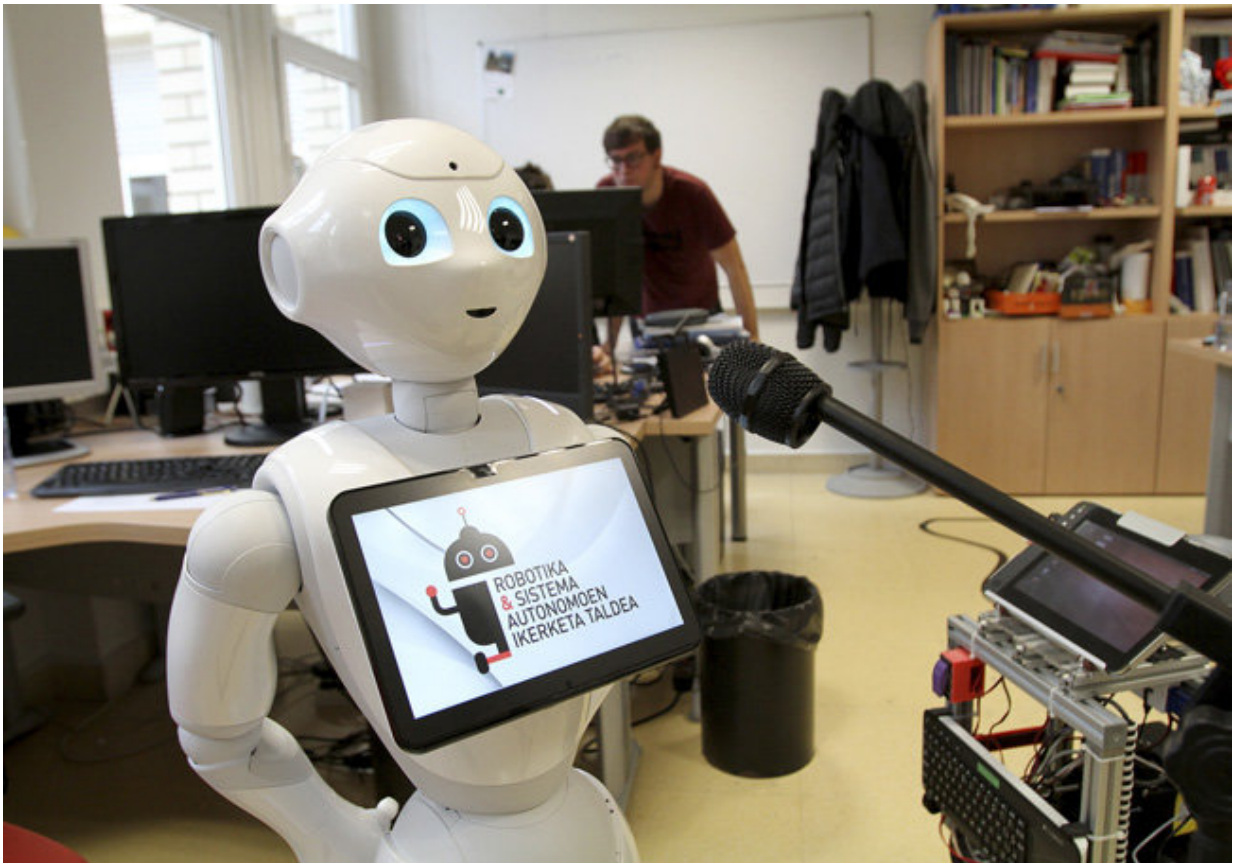


Deep-learning system generates specific genre-based music

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Two new automatic methods of generating and classifying music have emerged in the context of the BertsoBot project. Credit: University of the Basque Country

Izaro Goienetxea, a UPV/EHU researcher, has developed a method for automatically generating new tunes on the basis of a collection or corpus

comprising tunes used in bertso—a form of extempore, sung, Basque verse-making. She has also presented a new way of representing pieces of music, and developed a new method for automatically classifying music. *PLOS ONE* has reported on the research conducted in the UPV/EHU's Robotics and Autonomous Systems research group.

One of the lines of research undertaken by the Robotics and Autonomous Systems (RSAT) research group at the UPV/EHU's Faculty of Informatics is to develop interaction between humans and machines or robots. Its BertsoBot project is regarded as a major one "in which we get robots to sing verses," said the group's leader, Basilio Sierra. The research group is working on voice signal comprehension, computer vision, browsing, and the generation of new musical melodies.

Izaro Goienetxea, a researcher in the group and a Ph.D. student, is involved in two areas of research: the automatic generation of music and the automatic classification of music. The researcher says that many methods based on grammars or statistical models have been developed for music generation, but "the coherence of the melodies will need to be taken into consideration to be able to generate melodies that are easy to understand. We would need to be sure that certain segments are repeated within the new melodies, not only on the note level but also on other more abstract melodic levels."

Even though the work had its beginnings in the generation of music, the results have led her to explore ways of classifying music. "We have more and more music available on the internet, and one aspect that is becoming important is the possibility of producing automatic classifications of music so that large music collections can be produced," said Goienetxea.

Classifying similar bertso melodies

In an article published in the *PLOS ONE* journal, two new methods developed as a result of that research have been presented. First, a musical classification method according to genre, based on a new way of representing music and works by grouping together similar bertso tunes. Through it, "we analyse a [tune](#), and we say what it is similar to—in other words, which genre we can classify it into," said Goienetxea.

These clusters are also used to generate new melodies in the "style" of the melodies in these clusters. "These new melodies are similar to the original ones," said Goienetxea.

"And by including more than one music model, a new [melody](#), a new version, which will be the blending of them, will be generated," added Sierra.

To develop her work, the researcher used a corpus or collection comprising bertso tunes. "We are proposing a way in which bertso tunes can be represented and then how these tunes can be classified. We have come up with a method which can then be applied to another kind of corpus, to another kind of music," said Goienetxea. According to the researcher, they have managed to automatically generate new bertso tunes, "but the [method](#) also lends itself to [music](#) therapy applications, musical composition learning or composing programs, among other things."

More information: Izaro Goienetxea et al. Towards the use of similarity distances to music genre classification: A comparative study, *PLOS ONE* (2018). [DOI: 10.1371/journal.pone.0191417](https://doi.org/10.1371/journal.pone.0191417)

Provided by University of the Basque Country

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