

# TindArt, an application to understand cultural tastes

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**Abstract.** In this paper an Android application called TindArt is presented. It has been developed to investigate a way to profile the user in cultural contexts, with future applications to Recommender Systems for museum visits. The purpose of this research also includes the study of the User Experience with this application to understand how it could be used in a real museum context. Two pilot studies are also presented.

**Keywords:** Recommender System · User Profiling · Cultural Heritage · Museum · User Experience

## 1 Introduction and Motivation

One of the most important institutions in our society is the museum. Since its foundation this entity made a fundamental contribution to the preservation, conservation and communication of Cultural Heritage. Inside museums we can find artworks, ruins of the human and natural past, and many other examples of items that are the bearers of human knowledge.

There are many museums in the world, in Italy alone we can enumerate nearly five thousand<sup>1</sup> of them. Despite this, Italy does not have a museum on the top ten visited in the world<sup>2</sup>, although this country is one of the most popular tourism destinations. There are many reasons for this discrepancy, one of these is that museums are not very attractive to tourists and citizens, and unfortunately they are seen as boring places<sup>3</sup>. This perception might be caused by the problem of the transmission of the *cultural message* that is intrinsic to the objects inside, especially for art and archaeological museums. In general we find panels with,

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<sup>1</sup> ISTAT, I musei, le aree archeologiche e i monumenti in Italia. Anno 2015.

<sup>2</sup> Global Attractions Attendance Report, Themed Entertainment Association (TEA) and the Economics practice at AECOM, 2018, <https://www.aecom.com/content/wp-content/uploads/2019/05/Theme-Index-2018-5-1.pdf>

<sup>3</sup> European Report CULTURAL ACCESS AND PARTICIPATION, 2013: [http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs\\_399\\_en.pdf](http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_399_en.pdf)

too often, walls of text, as well as museum layouts that are easily understood by experts but not for the average visitor. To tackle these problems, I would like to reduce this gap by connecting the visitor's necessities with the museum entity. The instrument with which I choose to do so is the Recommender System.

Recommender Systems (RSs) are powerful tools to understand the tastes and the profile of a user and, using this information, we can suggest to him the item from a set of items [1] [9]. Recommender Systems are used in several areas, in particular in the commercial field, but they can be used in many different situations. Amazon.com [6], that suggests us what we can buy, is one of the main examples, Netflix and Facebook are others.

In this paper, I propose a way to use these techniques to create personalised museum visits, starting with the problem of profiling users from a cultural standpoint. The general idea is to use RSs to adapt the museum for the user without losing the content expressed by the museum.

The concept of visit is not limited to visitor's itinerary inside a museum but it also includes the interaction with the items on display, the manner of transmitting the *cultural message* to the visitor, and so on.

For this scope I developed an Android application, called TindArt, to collect information about users and an another application to test it. I do not want only to try to understand the single user profile; another objective is to investigate the possibility of classifying users, which could be used as a starting point for personalising museum visits. In addition to collecting information about user preferences, I collect data about the user experience with TindArt.

The paper is organised as follow: Section 2 is a short corpus of examples of applications of RSs in museums, Section 3 is a description of the application and its use, and Section 4 contains the conclusions and proposed avenues of future work.

## 2 Related Works

The use of personalised, mostly mobile, museum guides to improve visitor experience [8] and, consequently attract new visitors [11], are used in an increasing number of museums around the world. There are different approaches to capturing visitor's preferences and tastes: asking them directly [3], using them indirectly during or after a visit to an exhibition [2] [5]. In general the applications of Recommender Systems to museum contexts are important case of studies [12] [10] [4] and also their impact on the museum entity is of interest [7].

## 3 An application for all *tastes*

The motivations about the realisation of the mobile application TindArt are twofold: the first one is to create an instrument that can be used from profile users from a cultural point of view, and the second one is to study the interaction and the experience of users with this type of instrument, with the intent to use

it in a museum *pre-visit*<sup>4</sup>.

Although these two aims appear different, it is important for my research to investigate not only if this method will be a good instrument to obtain the user's cultural profile, and generate relevant suggestions, but also to investigate if this instrument will be really applicable to a real situation as well. This section is therefore divided into three parts: in Section 3.1 I describe how the app works and what kind of data it gathers, in Section 3.2 I presents two pilot studies, and in Section 3.3 I list the specific information collected to analyse user behaviour.

### 3.1 How TindArt works

TindArt is developed for the Android system and it can be downloaded, at the date of this publication, in beta version from Google Play<sup>5</sup>. The application mimics the famous app Tinder<sup>6</sup> by using a *swipe*<sup>7</sup> gesture to express preferences regarding not a person, but in this case, an artwork. The goal is to give the user an instrument that is easy to use and fairly well-known.

After downloading it, the user creates an account using an email<sup>8</sup>, and so a session is created. In the main screen (see Figure 1.b) we find four implicit buttons and one not implicit button:

- **Logout**: used to disconnect from actual session;
- **Guida**: a small tutorial of the application;
- **Progetto**: shows information about the project;
- **Inizia**: starts the artworks evaluation;
- **PERSONAL INFORMATION** (not implicit): the logo in the centre of the upper task bar, only used for the pilot study described in 3.2

In Figure 1(a) we can see the main screen of the application. The application randomly shows an artwork from a set of artworks previously selected, taken from The Met's Collections site<sup>9</sup> and from The Met's Heilbrunn Timeline of Art History<sup>10</sup> (more details about this choice are in sections 3.2), and user can only rate it positively or negatively. There are two ways to generate the preference:

- using the green button for *Like* or the red button for *Nope*;
- using the swipe gesture, left to right for *Like*, right to left for *Nope*.

There is also a button in the upper right corner named **Chat**, but it is reserved for future experiments.

<sup>4</sup> *Pre-visit* is the time between the choice to go in museum and the visit.

<sup>5</sup> [https://play.google.com/store/apps/details?id=tindart\\_evo.meeple.tindart](https://play.google.com/store/apps/details?id=tindart_evo.meeple.tindart)

<sup>6</sup> <https://play.google.com/store/apps/details?id=com.tinder>

<sup>7</sup> It represents a linear motion of fingers to a screen in order to move onto the next page, choose something, etc.

<sup>8</sup> The user account management is relegated to Google Firebase, <https://firebase.google.com/>

<sup>9</sup> <https://www.metmuseum.org/art/collection/>

<sup>10</sup> <https://www.metmuseum.org/toah/>

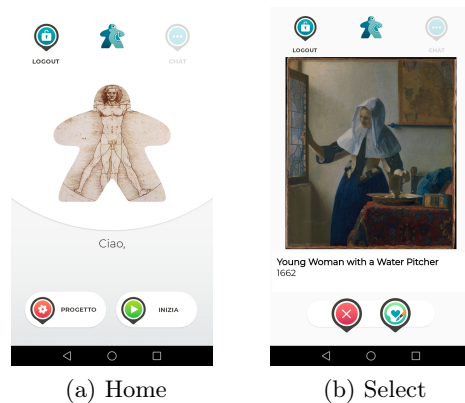


Fig. 1: Home and Main screen of TindArt

A rating session can be stopped at anytime by the user and it is possible to restart the session a second time. An artwork can be rated more than one time but the total number of artworks are not known by user and when he completes all available choices a farewell screen is shown. At the time of this publications the total number of artworks loaded is 352.

### 3.2 TindArt for user profiling

As I wrote *supra* one of the main objectives of TindArt is to collect information about user's cultural preferences and, starting from this data, developing a Recommender System for museum visits.

At the end of the two pilot studies described below I will start considering two main routes to follow: the first one is create a typical Neighbourhood-based Collaborative Filtering RS, in which users are compared with a similarity function. In the second one I would like to use the classification methods to group users by their cultural tastes and from that, understand if it is possible to make suggestions not for a single user but for a class of users.

**Pilot study without application** The first pilot study was conducted before publishing TindArt. 61 undergraduate students in the course in *History and Conservation of the Artistic and Musical Heritage* each chose five artworks from the above-mentioned website, The Met's Heilbrunn Timeline of Art History. The choice of this archive is due to the fact that it is well-realised, and moreover, its metadata is uniform facilitating database entry. In my research group we are going to first create a user classification based on the artworks selected by the students. The idea is to group several art movements into smaller subsets to understand if students selected artwork from same art movements, and starting from there, to classify the users. The analyses are still ongoing and the results will be presented in future publications.

**Pilot study** The second pilot study is about the collection of user preferences using TindArt. A group of undergraduate students in *Design and Management of Cultural Tourism*<sup>11</sup> are using the application and storing all information gathered from the app in a database. The idea is to collect user preferences and use these to make an RS for the visit to a villa-museum situated in Abano Terme (Padua). Another application, called *Ospiti in Villa Bassi*<sup>12</sup>, designed to explore this location was developed by me and my research group and will be upgraded for this scope.

On the other hand, TindArt is available to a large set of users<sup>13</sup> and all information that will be gathered from it will be used for my research.

### 3.3 User Experience of TindArt

Another important aspect of this research is to understand if an application like TindArt could be used in a real museum context and, at the same time, could investigate the behaviour of the user when he using this tool. To determine whether the app can be use in real context a set of variables is stored in a database during the application use. These variables are reported for every single rated artwork:

- *Swipe*: a boolean flag that represents if the user rated using the buttons or the swipe gesture.
- *Date*: the information about the date could be used to analyse the number of votes that a user gives in a specific period of time. It also could be a measure of how many times a user uses the app. This information is a reliable marker of user decision making.
- *Time of choice*: the timing expended by the user to vote.
- *Resolution of smartphone*: I included this passive information to investigate if different devices could influence the user's choice.

The number of artworks for which a user gives his preferences before dismissing the application is another marker that will be considered.

## 4 Conclusion and future works

In this paper I described an Android application called TindArt with the intent to develop a tool that could be a base for the creation of a Recommender System for museum visits. The two pilot studies are ongoing and the information obtained from these will be an important index for this research. For the user profiling problem the next steps will be the application of classification techniques: the first candidate is the Bayesian Machine Learning methods. Simultaneously

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<sup>11</sup> The application is available for everybody in Play Store but I'm promoting it especially to students.

<sup>12</sup> <https://play.google.com/store/apps/details?id=com.meeples.villabano>

<sup>13</sup> The applications is available for 2000 users for the beta version.

another Recommender System-oriented method will be analysed to tackle the development of a museum visit RS, in particular our attention will be focused on item-based RS methods. The other important aspect discussed is user behaviours when he using the application, which could give considerable information about his profile, as well as the possibility to use an application like TindArt in real situation. As previously written, a case of study in a villa-museum is scheduled.

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