

It Takes Two, Baby: Style and Tangibles for Recommending and Interacting with Videos

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Abstract. Children, nowadays, are great consumers of media for them [6], and there is growing interest towards novel mechanisms that can consider their specific needs and improve both the recommendation process and output of videos for them. Children, in fact, have unique characteristics, which change with age. In particular, in the 8–12 age range, they like challenging interactions with systems, they enjoy exploring and “to feel the experts”. The majority of current recommendation solutions are unable to leverage on such specific features of children, and others, when interacting with them and recommending adequate videos. In this paper, we introduce ITTuB, an exploratory project, set at the intersection of recommender system and interaction design for children. Starting from previous research in the two areas, it plans to introduce tangibles for enhancing the interaction of children with videos, and to leverage stylistic features of videos in order to deliver recommendations that are optimized for children. This workshop paper presents the main ideas of ITTuB.

1 Introduction

The majority of existing movie-sharing applications tend to combine collaborative filtering techniques with semantic features, such as the video genre, director, cast, or tags and textual reviews, for recommending videos [12]. We conjecture that such solutions are not sufficient for generating video recommendations for children. Visual stylistic features are not taken into account in the recommendation process of videos. However, stylistic features of videos are perceivable for children and hence they can have a huge impact on the formation of children’s preferences for videos. We sustain that video recommender systems meant for children should consider such information so as to deliver a quality video recommendation experience to children.

More in general, careful considerations of children’s characteristics is necessary for designing recommender systems that can effectively interact with children. Moreover, children are not a homogeneous group, e.g., their characteristics change with age. While children become adults, they go through a number of

stages, which include unique cognitive, emotional, social and physical challenges, that developers of interactive recommender systems for children must take into consideration in order to make truly engaging systems for children. In particular, tweens, in the age range 8–12, have their own specific characteristics. For example, richer interactions are preferred by tweens than by younger children, but a large number of choices, which could be adequate to adults, still confuses tweens and affects the perceivability of the interactions; at the same time, play is still a fundamental component of the design of interactions for tweens [11].

ITTuB is a project that, by carefully analysing the characteristics of tweens, seeks to investigate how to design an interactive recommender system of videos for them. The research around ITTuB is novel from two convergent viewpoints. The design of the interaction of the system with tweens will itself be novel because it will explore innovative interaction modalities based on playful tangible objects (briefly, tangibles) for tweens. Fig. 1 shows an example of a playful tangible progression board for 8–10 year tweens, using different micro-electronics components for interacting with children [9]. The recommendation process design will also be novel because it will investigate and use adequate stylistic features of videos for tweens. The result is a new line of interdisciplinary research investigations that have so far received almost no attention from the community [4].



Fig. 1. A tangible progression board

The paper is organised as follows. It starts with related work and background in the two areas converging into ITTuB: recommender system design and interaction design and children. The paper then moves on explaining the main ideas of ITTuB. It does so by giving the main context scenarios of the project and its research goals.

2 Background and Related Work

Traditional video recommender systems rely mainly on the assumption that users' preferences may related to the semantic features of videos (*e.g.* [15, 8], plot, genre, director, and actors) and, to a less extent, by the stylistic properties of videos [2, 5] (*e.g.*, color, motion, lighting key). Recommendations are

automatically computed using implicit or explicit preferences of users on those attributes [8]. However, recent work on recommender systems suggested that, when choosing a product, users' choices may be influenced more by the stylistic visual aspect of items and less by their semantic or syntactic properties [3, 10, 14, 5].

In ITTuB, we make a different assumption. We still believe that traditional video attributes are important to be used in information retrieval applications, where the goal is to provide a way of indexing multimedia content so that users can explicitly (i.e., manually) query that content at the semantic level. However, we wish to investigate if this assumption holds also for recommender systems which aim at automatically finding contents that the user prefers, without the user querying the system.

Therefore, our goal is to leverage the stylistic features automatically extracted from video content and complement them with the semantic features so as to deliver video recommendations. For this purpose, we explore and evaluate a recent approach for movie recommendations that integrates traditional semantic attributes, such as genre, director and cast, with stylistic features, such as lighting, colors, background, and movements. Such aesthetic features are likely to matter for recommending videos to tweens, who are 8–12 year olds with specific characteristics [11]; according to recent research findings for multimedia stories, aesthetic features of multimedias affect tweens' recommendations highly, more than other syntactic features such as titles [13].

More in general, tweens tend to enjoy systems which are highly interactive. They are growing up expecting things to give them immediate feedback about their choices; compared to other generations, they are more skilled about technologies, and have differing abilities to express their ideas and to follow structured tasks [11]. In ITTuB, the focus is on tweens, who are believed to belong to the concrete operational stage, when intelligence starts to be logical but still refers to concrete things. Another reference child development theory for ITTuB is constructivism (e.g., [7]). According to this, a child should be given tangible physical objects and tools to construct knowledge, thereby activating different senses. Several studies have shown the effectiveness of tangible interaction models when adopted in recommender systems. For instance, it has been shown that users' engagement is significantly improved when tangible interaction has been employed through the materiality dimension of objects, e.g., [1]. In spite of such promising studies, the full application of tangible interaction in video recommendations for tweens, with novel forms of recommendations, has not been yet very explored and needs further investigation, as considered in ITTuB.

3 Scenarios and Research Goals

Hereby, we give preliminary scenarios concerning the intended usage of the ITTuB recommender system, and the research goals of ITTuB presented below.

SCENARIO 1: Amirali wants quality video recommendations.

Amirali is a 12-year old boy, who often uses his iPad tablet for accessing videos over the Internet and posting his game play sessions. However, the recommended videos do not often satisfy his expectations. “If I watch a cartoon, it does not mean that I only want to watch cartoons all my life!”—thinks Amirali. Yet, that is what happens when he uses video recommender applications on his iPad.

SCENARIO 2: Lucrezia rates her preferred videos.

Lucrezia is an 8-year old child, addicted to musical movies; she is utterly in love with Frozen! She watches them online, but all existing recommender systems annoy her with their continuous boring questions. One day, Emily, her literature teacher, shows her the ITTuB app and the tangible toolkit of ITTuB. She is reasonable, but cautious, about how her pupils uses apps, and has done a great job of educating them about the people they might encounter online. Emily has chosen the ITTuB app because it guarantees ethical treatment of users data. Lucrezia opens it because she is attracted by the tangible toolkit that comes with the app. The app challenges Lucrezia to play with her preferred videos so as to give her better recommendations. The girl is immediately engaged and gives the app info on her preferred videos by using tangibles of the toolkit. The app recommender system learns about her choices and uses them to fine tune its recommendation mechanism.

The main goals of the research are related to the scenarios. The most ambitious goal is to nurture children’s knowledge of features of videos, recommended to them (e.g., colour, light, and motion). Thus, the system should be meant as an educational tool, which encourages children to reflect about what they watch. While the children may not be interested in understanding techniques, certain explanations with regard to the emotional aspects of the videos formulated by visual features, can be beneficial.

The other main goal is to investigate novel interaction approaches for children’s video recommendations, which can foster children’s curiosity to explore videos and their features. Being targeted primarily to younger children, the system should be playful, e.g., gamified, and mix tangible physical objects and traditional screen-based interfaces for videos, like in [9]. Towards the end, ITTuB will strive to investigate whether its results can cater for different populations, who may benefit from them.

4 Conclusions

The paper presents the ITTuB project, which explores how to design an interactive recommender system for tweens. It presents the background and related work on which ITTuB is based. In particular, the paper explains tweens’ main characteristics and why they matter for the design of the ITTuB system. Then the paper advances ideas for the design of the system: they aim to combine a novel recommendation mechanism, which exploits stylistic features of videos, with novel interaction modalities, which mix the virtual worlds of videos and the physical world of tangible objects for tweens.

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