

Apresentação dos Trabalhos-Destaque do PPGCC do DIP 2018

Mestrado Track 1 (professores revisores)

Título: Disentangling Privacy from Fairness in Machine Learning

Autor: Thiago Silva

Orientador: Mário Alvim

Abstract: The problem of making Machine Learning algorithms fairness-aware has gained attention in the literature. On the training process, machine learning algorithms may learn some social biases that are not supposed to be learnt. In order to produce non-discriminatory algorithms, some fairness measures were proposed. On this work, we show that there is a relation between fairness and privacy, and we present some bounds on their relation. We show that some fairness measures are actually capturing privacy, and we provide a formalization of the fairness problem through the Quantitative Information Flow theory.

Mestrado Track 2 (alunos revisores)

Título: Analysis and Automatic Generation of Music Playlists

Autor: Marcos Almeida

Orientadores: Renato Assunção e Pedro Olmo Vaz de Melo

Abstract: Music is present in our lives at almost every moment. We listen to music while driving, working out, at parties and even resting at home. Finding the songs best suitable to listen at each moment has become complicated and time-consuming. There are many constraints we impose when creating a playlist to listen to, like keeping a smooth transition between songs and satisfy everyone who will listen to it. The objective of this project is to propose algorithms to automatically generate music playlist based on the taste of a user or group of users. To accomplish that, we will first propose ways to calculate the similarity between songs based on acoustic characteristics of songs and their co-occurrence in users' playlists. Using this similarity measure we will construct a music space, where songs can be represented on a k-dimension Euclidean space. Given a user, we will construct his/her profile by identifying the regions of the music space he is most often in. Then, given a user's profile (or of a group of users) we propose to generate a music playlist by walking through the music space on the regions the user's of the group would most probably be.

Doutorado Track 1 (professores revisores)

Título: A Weighted Sparse Sampling for Semantic Fast-Forward First-Person Videos

Autor: Michel Silva

Orientadores: Erickson Nascimento e Mário Fernando Campos

Abstract: Thanks to the advances in the technology of low-cost digital cameras and the popularity of the self-recording culture, the amount of visual data on the Internet is going to the opposite side of the available time and patience of the users. Thus, most of the uploaded videos are doomed to be forgotten and unwatched in a computer folder or website. In this work, we address the problem of creating smooth fast-forward videos emphasizing the relevant content. We present an adaptive frame selection formulated as a weighted minimum reconstruction problem, which combined with a smoothing frame transition method accelerates first-person videos (FPV) emphasizing the relevant segments and avoids visual discontinuities. The experiments show that our method is able to fast-forward videos to retain as much relevant information and smoothness as the state-of-the-art techniques in less time.

Doutorado Track 2 (alunos revisores)

Título: Efficiency and Abstractions in Graph Pattern Mining

Autor: Vinicius Dias

Orientador: Dorgival Guedes

Abstract: Graph Pattern Mining (GPM) seeks to enumerate and understand the complex structures (subgraphs) of a graph. The combinatorial nature of GPM problems, coupled with the topological irregularity of modern-day graphs, make it difficult to implement such applications efficiently on a distributed platform. We propose a dynamic (auto-tuned) load-balancing based on a hierarchical and locality-aware work-stealing mechanism, allowing the system to adapt to different workload characteristics. We also improve memory efficiency by recomputing subgraph enumerations from scratch, alleviating the need to store large amounts of intermediate data during the process. With respect to programmer productivity, we offer an interactive, expressive and robust API for the implementation and composition of GPM algorithms. We demonstrate the effectiveness of our optimizations and substantial performance improvements against existing systemic solutions.