Social Event Scheduling

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Introduction

> Events' Organizers
event planning companies, EBSN users, organizations

> Social Events
festivals, conferences, promotion parties, fashion shows

> Social Event Success
"**attendance**" is the most common metric used to capture the success of social events

> Challenge
Determine the date/time for each event so that the overall attendance is maximized

The event scheduling process needs to consider:
user preferences & **habits**, **events' spatiotemporal conflicts** and **competing events**

Motivating Example

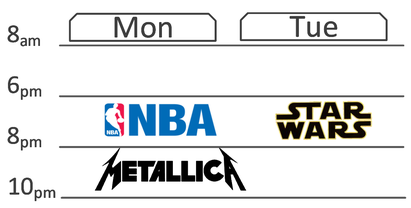
Task: Schedule a Rock concert

Users preferences & habits

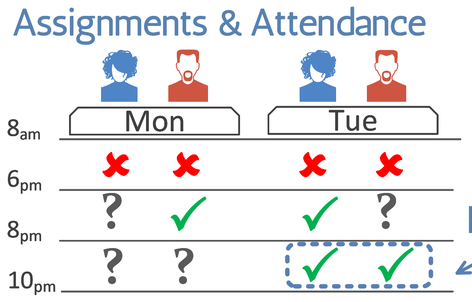
> Basket
> Rock music
> office: 9am-5pm

> Sci-fi movies
> Rock music
> office: 9am-5pm

Intervals & Competing events



Assignments & Attendance



Very probable to attend
Moderately probable to attend
Improbable to attend

Result: Schedule the concert on Tuesday at 8-10pm

Social Event Scheduling Problem

> Problem Definition
Social Event Scheduling Problem (SES):
given an **integer** κ, and a set of: **candidate events**; **time intervals**; **users**; and **competing events**

> Question: How to assign κ events on the time intervals, so that the total event participation is maximized ?

> Problem Input
> κ the number of events to be scheduled
> **Organizer** (available resources)
> **Candidate Events** (location, required resources)
> **Time intervals**
> **Users** (preferences over events, social activity probabilities over time intervals)
> **Competing events** (scheduled time interval)

> Problem Hardness
> **Theorem**: The SES problem is strongly NP-hard
> **Reduction**: Multiple Knapsack Problem with Identical bin capacities

A Greedy Solution

1. **Compute the scores** for each time-to-event assignment α_t^e

The **score of an assignment** α_t^e is the **gain** in the attendance if e is scheduled to take place at t

2. At each step, **select the assignment** with the largest score

3. After assignment selection, a subset of the assignment's scores is **updated**

The assignment's score is defined w.r.t. the events assigned in the assignment's interval. Hence, when an assignment α_t^e is selected, then the scores of the assignments referring to interval t need to be updated.

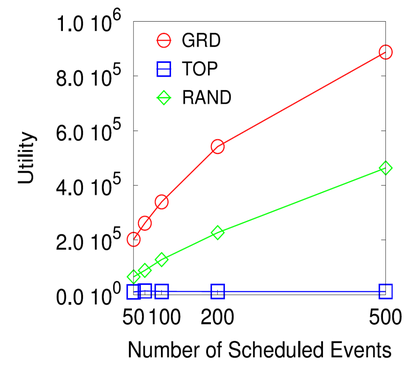
Experimental Analysis

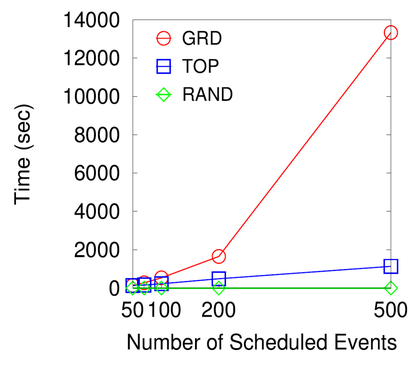
> Data
California Meetup Dataset
42K Users & **16K** Events

> Parameters
> #scheduled events (κ): $\mathbf{50 \sim 500}$ [default: $\mathbf{100}$]
> #candidate events: $\mathbf{200}$
> #time intervals: $\boldsymbol{\kappa/5 \sim 3\kappa}$ [default: $\boldsymbol{3\kappa/2}$]

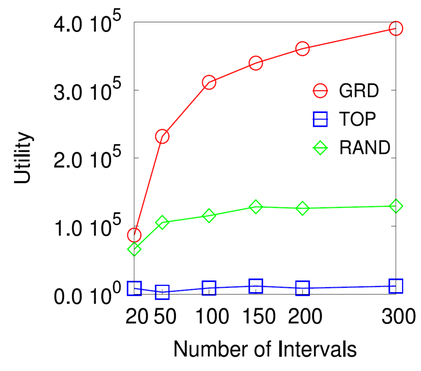
> Baselines
> **RAND**: Random assignments selection
> **TOP**: top-k assignments selection

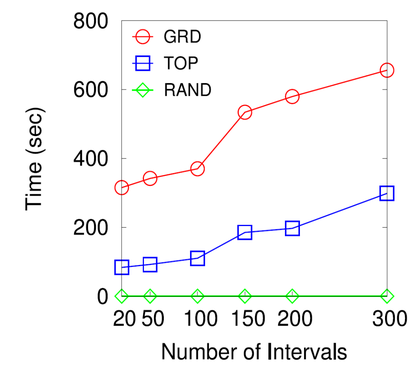
> Varying the number of scheduled events





> Varying the number of time intervals





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