Capitole Speciale de Teoria Grafurilor

2024

Explicatii

- Clarificari, legate de materie, note va rog sa scrieti pe KB. Multumesc.
- Notare, Upload si activitati doar cont: @student.utcluj.ro [cine nu are cont: sesizari.utcluj.ro/]
- Carnet student - Colocviu (inainte: recuperari, clarificari) ultima sambata din semestru: ora - sala Restanta...sambata sala L20
- prezenta curs nu este obligatorie; anuntati: conferinte/articole/credite master similar in domeniu
- Recontracatare: fara nici un fisier tema upload la sfarsit 14 saptamani semestru; restanta: minim un fisier tema upload la sfarsit 14 saptamani semestru
- Proiect (la alegere) (echipa max. 2 studenti) Obligatoriu colocviu: in sala cate 3 echipe in ordine upload proiect; cu carnet de student, SCRIS: Concluzie individualizata proiect; UPLOAD (1 zi inainte sau in timpul examenului): PDF tabel Autoevaluare (Table 1); upload proiect: ipynb si obligatoriu PDF (max.12 pagini)

Laborator: Upload-5 teme obligatorii individuale (30% nota finala)

- Teme individuale 5 fisiere upload laborator (1, 5 identice; 2,3,4 particularizate:1 graf la alegere)
- Laborator NetworkX: Google Colab fisiere ipynb in Google Drive testare date particularizate/aceleasi; explicatii/comments rezultate, imagini tema 1 si 5 (facebook) exact cum sunt rulati/testati; includeti ipynb, PDF cu explicatii (carti, cursuri) si detalii grafuri, algoritmi si rezultate in lb. romana.
- Fixare cunostinte TEME toate functiile din fisier aplicate pe 1 un graf similar cu cele din fisiere:
    - Notiuni: tema respectiva: definitia (ex.graf orientat/hamiltonian etc.)
    - Algoritm-descriere pe scurt (ex. ShortestPath)
        * 'FindPath (Laborator/2-PathFind/FindPath.ipynb) aplicati toate functiile (shortestPath, APSP, SSSP, SSSP Djikstra, MST) pe 1 singur graf similar: GT particularizare noduri, muchii SAU particularizat fara cost G
        * Centrality: (Laborator/3-Centrality/centrality.ipynb) Graf random SAU similar cu G2 Directed graph
        * Community: (Laborator/4-Community/comm.ipynb) graf similar cu G: Graf Karate SAU G2 complete_graph(5) SAU G3 = nx.DiGraph(...) SAU G4 = nx.Graph(...))

Task	punctaj maxim	punctaj realizat
oficiu	1	1
Cerinta Problemei definire	0.50	
Notiuni utilizate definitii	0.50	
4 Metode (4 tehnici x 0.10=0.40)		
Metode utilizate.Descriere	0.40	
Cand se utilizeaza metoda?	0.40	
Analiza datelor	0.40	
MST versiune la alegere	0.40	
Shortest path versiune alegere	0.40	
RandomWalk versiune la alegere	0.40	
2 functii de baza la alegere	0.40	
1 alg. Centrality sau Community la alegere	0.40	
Rezultate		
vizualizare rezultate	0.40	
Concluzie:		
Concluzii individualizate (nume student)		
detaliate: metode, rezultate		
(4 tehnici x 0.25=1)	1	
Bibliografie min.3 referinte	0.40	
Max Total=0.40*10+0.50*2+1*2=4+3=7	7	
Punctaj=0.40* +0.50* +1* =		punctaj

Table 1: Autoevaluare proiect final; studentii completeaza punctaj task realizat.

Colocviu Proiect (70% nota finala)

- Proiect echipa (max. 2 studenti): la Concluzii specificati individual (nume student: concluzie) ce concluzii are legat de proiect (problema, metoda, parametrii, etc.) in special despre partea de proiect unde ati lucrat majoritar (F.Important!)
- Obligatoriu colocviu: in sala cate 3 echipe in ordine upload proiect; cu carnet de student, SCRIS: Concluzie individualizata proiect; UPLOAD (1 zi inainte sau in timpul examenului): PDF tabel Autoevaluare (Table 1); upload proiect: ipynb si obligatoriu PDF (max.12 pagini)
- similar Facebook_Notebook.ipynb; Set date la alegere gratuite
- Continut: conform Table 1: Autoevaluare proiect final; studentii completeaza punctaj task realizat.
- Explicatii similar **facebook_notebook.ipynb** (detalii lb. romana: VII-A-App-Facebook-Detalii.pdf) FaceBook_nx:
    - Notiuni utilizate definitia (ex. graf orientat/conex/hamiltonian etc.);
    - Metode/Algoritm-descriere pe scurt (ex.. ShortestPath); functia utilizata (ex. number of edges)
    - Cand se utilizeaza metoda? (minin din curs; si/sau alte surse specificate) (ex. Când se utilizează Gradul de centralitate? pag.8 curs V-A-Centrality-Teorie.pdf)
- Optional pt.feedback: sapt. 13 versiuni proiect ex.

URL Seturi DATE Gratuite exemple

- Google: https://snap.stanford.edu/data/ego-Gplus.html; Twitter: https://snap.stanford.edu/data/ego-Twitter.html
- SNAP-Stanford Large Network Dataset Collection; Univ.Duke; Univ,Michigan; NYC Taxi Trip Data; British Films; Network-Repository
- **Kaggle (K) include ipynb (Download code), dataset: input; Kaggle: optiunea: open with Google Collab(Notebooks)**
- **(K)** Shortest path on Mars; **(K)** ComplexGraph (Shortestpath etc.); (Vienna_subway.csv)
- **(K)** StudentPrediction_EDA+PredictiveAnalysis (ShortestPath, etc.)
- **(K)** GitHub Social Network Analysis (Centrality)
- **(K)** Community Detection & Social Network Analysis (nayaData30.csv (Centrality etc.)
- **(K)** NetworkX - Plotly EDA; **(K)** NetworkX Tutorial
- **(K)** Game of Thrones (PageRank, Centrality); **(K)** Starter: Explore Youtube8M sample data
- **(K)** Recommendation engine (Clustering); **(K)** Pokemon complete analysis; **(K)** Network centrality
- **(K)** Thematic text analysis using spaCy(Similarity); **(K)** EDA: Tag Network Analysis(networkx+gephi
- Trasee Parc montan Sleeping Giant; cod (shortest-path); Dataset:nodelist.csv; edgelist.csv
- Solving the Travelling Salesman Problem for Germany: NetworkX in Python (shortest route, MST, Kruskal, Cristofides alg.) (Github) (ipynb)
- Connecting the Dots: Understanding Social Media Dynamics through Network Science (Git) (data: generated network)(ipynb)(shortestpath, centrality, community...)
- Visualizing Prim's algorithm with Networkx and matplotlib (MST, Prim)
- Random Walk Method — Page Rank Algorithm using networkx.(RandomWalk, Pagerank)
- NetworkX-Ingrediente alimentare (ipynb, dataset:csv) (Network Analytics)
- NetworkX: Social Network Analysis in Python (Dataset: actors IMDB)
- Recenzii: Social Network Analysis of Yelp & Twitter Users (Centralitate: Degree, Betw., closeness, similarity)
- Analyzing Trade Networks Using NetworkX and Plotly (Analiza, Centrality)
- Karate-Graph-NetworkX(Analiza, Community)
- Graph Data Science Python NetworkX
- Understanding Community Detection Algorithms With Python NetworkX
- Free to use: Spatial data science for sustainable development (Aalto Univ.) (United Nation's 2030 Agenda for Sustainable Development. (Tutorial 2.1-Shortest path analysis)
- **Advanced:**
- Papers-With-code: Dataset: SNAP
- 2023-Accelerating NetworkX on NVIDIA GPUs (Betw. centrality (SNAP dataset: influential U.S. patents); other code, Benchmarks: nx-cugraph backend) (ArcGIS API for Python) Safe Streets to Schools (code samples zip) Other related
- PLANS and NetworkX in modeling power grid system failures (no data set available)
- A Global Feature-Rich Network Dataset of Cities; (Global Urban Network dataset)