

230721 - SNET - Social Networks: Theory and Implementation

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
 Teaching unit: 739 - TSC - Department of Signal Theory and Communications
 Academic year: 2019
 Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Optional)
 MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Teaching unit Optional)
 ECTS credits: 5 Teaching languages: English

Teaching staff

Others: Enric Monte Moreno

Prior skills

None

Requirements

Knowledge of linear algebra and probability

Teaching methodology

blackboard classes, individual work and simulations in python

Learning objectives of the subject

The aim of this course is to train students in understanding the techniques and tools for describing social networks and www. The course will teach techniques for ranking (ex. google?s pagerank for web pages), recommender systems (ex. amazon?s recommendations of similar products), Auctions of advertisements (i.e. googles adwords), Finding influencers in social networks, finding communities in social networks, finding text similarity between documents by meaning (i.e. similarity between posts in blogs). In addition, a web search engine will be designed in python, and then the social graph will be created and the techniques explained in theory will be applied in a practical way.

Study load

Total learning time: 125h	Hours large group:	26h	20.80%
	Hours small group:	13h	10.40%
	Self study:	86h	68.80%

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Content

<p>Ranking Systems.</p>	<p>Learning time: 15h Theory classes: 6h Practical classes: 3h Self study : 6h</p>
<p>Description: Description algorithms for sorting websites by relevance. Algorithms for graphs made of links between pages: Google's Pagerank and HITS. Practical examples.</p> <p>Related activities: Individual Deliverable. Laboratory activities.</p> <p>Specific objectives: Understanding google's Pagerank and HITS equations from different points of view; flow graph, random walk, probability of visiting a node. Understand the application examples.</p>	
<p>Social Networks as graphs</p>	<p>Learning time: 15h Theory classes: 6h Practical classes: 3h Self study : 6h</p>
<p>Description: Techniques for finding influencers and communities in graphs. Specific properties of twitter type graphs and facebook type graphs. Practical examples.</p> <p>Related activities: Individual Deliverable. Laboratory activities.</p> <p>Specific objectives: Understand the techniques to perform the partition of graphs in communities, techniques to find nodes of influence, techniques to model the effects of propagation of information in a viral manner. Practical applications</p>	

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<p>Finding text similarity between documents by meaning. Application to twitter and blogs.</p>	<p>Learning time: 15h Theory classes: 6h Practical classes: 3h Self study : 6h</p>
<p>Description: Bag of words model for texts, stemming and word-term matrix. Latent semantic analysis. Application to twitter and blog data.</p> <p>Related activities: Individual Deliverable. Laboratori Practices.</p>	
<p>Recommender systems. Amazon/Netflix cases</p>	<p>Learning time: 10h Theory classes: 4h Practical classes: 2h Self study : 4h</p>
<p>Description: Description of the recommender systems based on Collaborative and content based. Description of different recommender systems; amazon, netflix.</p> <p>Related activities: Individual Deliverable. Laboratory activities.</p> <p>Specific objectives: Be able to adapt the general methods of recommender systems to specific situations.</p>	
<p>Auctions of web advertisements. Google Adwords case.</p>	<p>Learning time: 10h Theory classes: 4h Practical classes: 2h Self study : 4h</p>
<p>Description: Description of systems for making auctions of online advertisements. Summary of the modified Vickrey auction system used by google's adwords.</p> <p>Related activities: Individual Deliverable. Laboratory activities.</p>	

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Qualification system

Individual assessments: 40%

Final examination: 60%

Bibliography

Basic:

Easley, D.; Kleinberg, J. Networks, crowds, and markets: reasoning about a highly connected world. New York: Cambridge University Press, 2010. ISBN 9780521195331.

Skillicorn, D.B. Understanding complex datasets: data mining with matrix decompositions. Boca Raton: Taylor and Francis : CRC Press, 2007. ISBN 9781584888321.

Langville, A.; Meyer, C.D. Google's pagerank and beyond: the science of search engine rankings. Princeton, N.J. [etc.]: Princeton University Press, 2006. ISBN 0691122024.