Seminar on Computer Science and Applied Mathematics

Mathematical Institute (http://www.mi.sanu.ac.rs)

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PROGRAM

ὅδε οἶκος, ὦ ἑταῖρε, μνημεῖον ἐστιν ζῴων τῶν σοφῶν ἀνδρῶν, καὶ τῶν ἔργων αὐτῶν

Matematički Institut SANU, Beograd
Knez Mihajlova 36
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Jove Ilica 154
IEEE Chapter Computer Science (CO-16) Belgrade, Republic of Serbia

SEMINAR ZA RAČUNARSTVO I PRIMENJENU MATEMATIKU

MI SANU, Knez Mihailova 36, sala 301f

Upravni odbor Matematickog instituta SANU je na nedavnoj sednici doneo odluku da se dosadasnji Seminar za primenjenu matematiku, sada nazove Seminar za racunarstvo i primenjenu matematiku, a u cilju potenciranja znacaja racunarstva kao jedne od oblasti delatnosti Instituta. Istovremeno, Upravni odbor doneo je odluku o osnivanju Odeljenja za racunarstvo i primenjenu matematiku i vezao rad novog odeljenja za rad Seminara za racunarstvo i primenjenu matematiku.

PLAN RADA SEMINARA ZA JUN 2017. GODINE

UTORAK, 06.06.2017. u 14:15, Sala 301f, MI SANU, Kneza Mihaila 36 ()
Jelena Šuh, Fakultet organizacionih nauka
INFRASTRUKTURA ZA E-OBRAZOVANJE ZASNOVANA NA SOFTVERSKI DEFINISANIM MREŽAMA
Predmet istraživanja je razvoj modela infrastrukture za e-obrazovanje, koji je zasnovan na konceptu i tehnologijama softverski definisanih mreža (SDN), kao i razvoj obrazovnog modula za učenje softverski definisanih mreža. Predstavljena je struktura predloženog modela koji obuhvata elemente infrastrukture i arhitekture i mogućnosti integracije infrastrukture sa obrazovnim servisima. Opisan je proces projektovanja cloud infrastrukture zasnovane na konceptu SDN, kao i modeliranja ključnih indikatora performansi obrazovne infrastrukture. Imajući na umu važnost edukacije u oblasti informaciono-komunikacionih tehnologija, predstavljen je i proces projektovanja obrazovnog modula za učenje softverski definisanih mreža korišćenjem razvijene infrastrukture. Evaluacija modela je izvršena u Laboratoriji za elektronsko poslovanje Fakulteta organizacionih nauka Univerziteta u Beogradu. Rezultati pokazuju da predloženi model unapredjuje proces učenja u oblasti softverski definisanih mreža. Model se može na jednostavan način prilagoditi i primeniti u procesu edukacije u različitim oblastima, a posebno je pogodan za edukaciju u oblasti novih informaciono-komunikacionih tehnologija.

UTORAK, 13.06.2017. u 14:15, Sala 301f, MI SANU, Kneza Mihaila 36 ()
Aleksandar Jovanović, Visoka Inženjerska Škola Strukovnih Studija Tehnikum Taurunum
UPRAVLJANJE SAOBRAĆAJNIM TOKOVIMA PRIMENOM METODA VEŠTAČKE INTELIGENCIJE
Jedan od najvećih problema sa kojim se suočavaju vlasti velikih gradova širom sveta su saobraćajna zagušenja. Gradovi izdvajaju značajna sredstva kako bi rešila ovaj problem, koji utiče na razne aspekte života stanovnika. Negativne posledice saobraćajnih zagušenja ogledaju se pre svega u povećanim vremenskim gubicima učesnika u saobraćaju. Pored toga, posledice mogu biti ekonomske (veća potrošnja goriva), ekološke (dodatno zagadjenje vazduha) i razne druge. Ovo predavanje je posvećeno razvijanju novih matematičkih modela za rešavanje problema upravljanja saobraćajnim tokovima u gradovima. Rešavan je problem prezasićene izolovne raskrsnice u fiksnom režimu rada pomoću dinamičkog programiranja, BCO metaheuristike i genetskih algoritama. Problem upravljanja radom prezasićene izolovane raskrsnice u realnom vremenu rešavan je primenom fazi logike. Posebno, predstavljena je višekriterijumska postavka problema upravljanja radom izolovane signalisane raskrsnice. Problem je rešavan primenom interaktivne metode. Na kraju, data je nova matematička formulacija za problem upravljanja zonom raskrsnica u fiksnom režimu rada. Problem je rešavan primenom BCO metode i simuliranog kaljenja.

UTORAK, 20.06.2017. u 14:15, Sala 301f, MI SANU, Kneza Mihaila 36 ()
Vladimir Filipović, Matematički fakultet, Univerzitet u Beogradu
SOLVING THE MAXIMUM BETWEENNESS PROBLEM WITH ELECTROMAGNETISM METAHEURISTIC
An electromagnetism (EM) metaheuristic for solving NP hard Maximum Betweenness Problem (MBP) is presented. Presentation describes elements of the proposed solution: new encoding scheme with appropriate objective functions, specific representation of the individuals (which enables the EM operators to explore the searching space in a way that achieves high quality solutions) and effective 1-swap based local search procedure (improved by the specific caching technique is performed on each EM point). Designed algorithm is tested both on real and artificial instances from the literature. Obtained experimental results and statistical analysis indicates quality of the proposed EM approach.
This is joint work with A. Kartelj, D. Matić.

UTORAK, 27.06.2017. u 14:15, Sala 301f, MI SANU, Kneza Mihaila 36 ()
Nataša Pržulj, Computer Science Department, University College London
DATA-DRIVEN MEDICINE

We are faced with a flood of molecular and clinical data. Various biomolecules interact in a cell to perform biological function, forming large, complex systems. Large amounts of patient-specific datasets are available, providing complementary information on the same disease type.
The challenge is how to mine these complex data systems to answer fundamental questions, gain new insight into diseases and improve therapeutics. Just as computational approaches for analysing genetic sequence data have revolutionized biological understanding, the expectation is that analyses of networked “omics” and clinical data will have similar ground-breaking impacts. However, dealing with these data is nontrivial, since many questions we ask about them fall into the category of computationally intractable problems, necessitating the development of heuristic methods for finding approximate solutions. We develop methods for extracting new biomedical knowledge from the wiring patterns of large networked biomedical data, linking network wiring patterns with function and translating the information hidden in the wiring patterns into everyday language. We introduce a versatile data fusion (integration) framework that can effectively integrate somatic mutation data, molecular interactions and drug chemical data to address three key challenges in cancer research: stratification of patients into groups having different clinical outcomes, prediction of driver genes whose mutations trigger the onset and development of cancers, and re-purposing of drugs for treating particular cancer patient groups. Our new methods stem from network science approaches coupled with graph-regularised non-negative matrix tri-factorization, a machine learning technique for co-clustering heterogeneous datasets. We apply our methods to other domains, including tracking the dynamics of the world trade.

RUKOVODIOCI SEMINARA

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