

## 1. Stepan Kozak

Recently, Kuzu et al. [1] proposed a secure similarity search index based on the locality sensitive hashing technique (secure LSH index). The advantage of the scheme is a provable adaptive semantic security (in the similarity search context). However, the technique cannot be directly used for an arbitrary metric space. It supports only those metric spaces for which there is a family of LSH functions. Based on the research of Novak et al. [2], we propose an extension of the secure LSH index method, using the M-Index technique as a generic family of LSH functions to allow direct use of the method of Kuzu et al. for an arbitrary metric space. The result is a secure LSH index for arbitrary metric spaces with provable adaptive semantic security.

## 2. Petr Bauch

There are three crucial requirements for automatic verification of parallel software against temporal specification. The verification procedure must (1) accept real code as input; (2) accept temporal specification as input; and (3) be exhaustive when verifying the execution, since the execution might be furcated by both control and data flows. This paper is concerned with the third requirement, using explicit model checking to handle the control and symbolic set representations to handle the data. The combination of explicit and symbolic approaches is first investigated theoretically and we report the requirements on the symbolic representation and the changes to the model checking process the combination entails. The feasibility and efficiency of the combination is demonstrated in two case studies and we report a marked improvement in scalability in the Simulink case study against previous solutions. The results described in this paper show the potential to meet all three requirements for automatic verification in a single procedure, combining explicit model checking with symbolic set representations.

## 3. Radek Cernoch

The birth of the Principate is one of the most important changes in the development of Roman Empire. This paper analyzes the main changes in the constitutional area that occurred during the reign of Octavianus Augustus. Republican offices still formally existed, however, the emperor accumulated the real power in the state and created new, imperial offices. The emperor and the lawyers honoured by him became later authority in the procedural law. Although all these changes were made gradually and very slowly, together they represent a truly revolutionary change.

#### 4. Jonáš Ševčík

This article deals with techniques suitable for indoor localization using mobile devices. First, several principles applicable to mobile devices are presented, e.g. Wi-Fi localization, step detection, and dead reckoning. Subsequently, these principles are used in demonstrative Android application, which combines them into working indoor localization prototype. Consequently, prototype application is used for gathering accurate results of the above mentioned principles. Results are accurate to 2.3 meters. All obtained results are presented in the last section of this paper.

#### 5. Jitka Bělíková

**Purpose:** To investigate the relationship between lens density in age-related cataract and best-corrected visual acuity (BCVA) and the impact of cataract grade, assessed via 3D lens densitometry by Pentacam Nucleus Grading System (PNS), on Phacodynamics (phaco-time and phaco-energy).

**Methods:** 55 patients with age-related cataract were evaluated. Lens density was assessed using the PNS. BCVA was tested with Snellen chart. Surgery was performed with no adjustment of parameters and phaco-energy-time was monitored.

**Results:** The correlations between the lens density, BCVA and phaco-energy/time were analyzed. A negative linear correlation was identified between lens density and BCVA and positive correlation was identified between density and total dissipated phaco-energy.

**Conclusion:** The cataract PNS grade negatively correlated with the visual function. A positive correlation was found between the lens density and phacoemulsification time and energy. Scheimpflug optical densitometry offers objective grading and can be used both for prediction and for monitoring of the condition. PNS enables prediction of phacodynamics and the most suitable phaco settings to minimize the disturbance of the eye during surgery.

## 6. Pavel Sindlar

The aim of this study is to identify factors that influence the integration process of Japanese people living in the Czech Republic. The research will include facts related to the overall integration process, which will account for the various reasons for coming to the Czech Republic. The research sample consisted of Japanese living in the Czech Republic with different motivations for immigration to this country. Perceptions will be noted on how the Japanese perceive their lives in the Czech Republic and how they evaluate their own social functioning at different levels. The name of Diploma Thesis and aim of the study determines the main research question „What are the main factors that influence the integration process of the Japanese living in the Czech Republic?“ The research material was obtained on the basis of in-depth semi-structured interviews.

## 7. Michal Struk

Municipal expenditures are distributed to a large variety of areas depending on, for instance, current policies, public priorities, or the will of the masses indirectly revealed through the elections. These expenditures account for a large portion of overall public spending, but it is not clear exactly where these expenditures go, and moreover, how they change in time. What becomes priority and what becomes less important than it used to be? And why is it so? The goal of this paper is to divide the sum of municipal expenditure into several strictly differentiated main areas, and then examine the development of expenditure amount spent in each of them, while considering both the absolute and relative changes, as well as the changes of ratios between the expenditure areas themselves. The examined data contains municipal expenditure of all 205 Czech municipalities with extended powers (ORPs) plus the capital city Prague, and thus covers around 60% of the Czech population. The examined period spans from 2001-2011, covering 11-years. The results of the paper provide a clear picture of which expenditure areas are growing, which are stagnating, and which are decaying. These changes are explained based on the socioeconomic development of Czech society during the examined period.

## 8. Veronika Zuskacova

Recent studies have shown that individual well-being of people is influenced by quality of community life. However, there is the crucial problem of many residents resigning themselves to social participation and losing their relationship with neighbourhoods. Contemporary art practices—especially in site specific art represented, for instance, by Katerina Seda's events—react to these tendencies and focus on community building and destruction of socio-spatial barriers.

From a geographical point of view, this study investigates how the quality of community life can be improved by means of site-specific art. In order to analyse the whole art process Seda's last project was reconstructed and semi-structured interviews were conducted with participating inhabitants of particular community. By using human geography research methods the socio-spatial impacts of events on their participants are assessed. The outcomes of this research acknowledge that site-specific art can help with inclusivity of people in community life and enhancement of the collective quality of life.

9. Jiri Hiess

Title: SPECIALISED ACCREDITED EDUCATION PROVIDED BY CAGI FROM 2006 AND 2012

From 2006-2012 the Czech Association for Geoinformation (CAGI) provided an accredited Long-Life Learning programme focused on public administration. It was for geoinformation users who need a postgraduate qualification in geoinformatics, and providing an essential set of practical skills. Using adequate methods and providing the extended qualification we filled a specific gap in the educational system. Six years of teaching and hundreds of completed qualifications brought experience and findings for subsequent improvements. These included specific educational content, logistics and learning management arrangements and modern teaching methods suitable for adult professionals. Relevant criteria are explained, through which stakeholders in public administration make significant decisions about measurable qualities in Human Resources and about the success of education processes in the public sector. Future user assignments will significantly influence the labour market for experts in geoinformatics in the public sector. The quality of next complex tasks and the factual return of investments to GIS and SDI could and should be influenced. The concluding set of recommendations explains how to improve the syllabuses, and teaching/learning process and how to harmonise it in accordance with the European Framework of Qualifications. The intended complex Learning Management System focused on applied geoinformatics in public administration will bring new economic benefits and synergies that are desired in crisis times.

**Keywords:** spatial information, geoinformation, geoinformatics, GIS (Geographical information system), SDI (Spatial Data Infrastructure). LLL (Long-Life Learning), PSI (Public Sector Information), smart administration]

## 10. Milan Sedlacek

This article deals with the question of whether subsidies from European funds have influenced competitiveness of industrial companies in the Czech Republic. The primary research was carried out on a sample of 144 enterprises, which answered several questions and provided financial statements from the past five accounting periods. These data were used as an input for financial analysis, cluster analysis and particular univariate and bivariate analyses, to divide the companies into three clusters. They are divided according to their financial performance and evaluate the impact of subsidies on their competitiveness. The conclusion provides evidence about different companies' attitudes to European subsidies and sums up the influence of the enormous financial support on their competitiveness.

## 11. Lenka Belanova

Cognitive impairment is a common feature in patients with Parkinson's Disease (PD), and hence the development of neuropsychological diagnostic methods fit for its description and quantification is needed. For the assessment of global cognitive efficiency, the use of Mattis Dementia Rating Scale (DRS) has been recommended. The main purpose of this research study is the validation of the sensitivity and psychometric properties of the Czech version of the DRS, in the assessment of cognitive impairment in patients with Parkinson's Disease. The DRS was administered to 31 normal control subjects (NC) screened for the absence of cognitive impairment, 42 patients suffering from PD – 12 cognitively impaired (PD-CI) according to the neuropsychological battery, and 30 who showed no, or minimal, cognitive impairment (PD-NI). Research findings, even though only preliminary due to insufficient number of cognitively impaired PD patients in the study, support the discriminant validity of the DRS in differentiating PD-CI and NC, with the cut-off score of 138 points showing maximum specificity (100%) and high sensitivity (83.3%). The Initiation/Perseveration, Conceptualization and Memory subscales discriminated better than the Attention and Construction subscales. The concurrent validity of the DRS was supported by positive and significant correlation with the MMSE. Reliability of the test failed to be supported in the study, possibly due to low variability of the measured trait in the sample. We are aware of the limitations of our research; nevertheless, we conclude that further investigation on the usefulness of the Czech version of the DRS in the assessment of cognitive impairment in PD is warranted.

## 12. Lenka Susilova

**Objectives:** Schizophrenia is one of the most expensive mental illnesses due to frequent and repeated hospitalizations. The aim of the study was to analyze the prescription of antipsychotic medication and in-hospital cost.

**Methods:** The data were retrospectively obtained from the medical records of patients with schizoaffective disorder and schizophrenia, hospitalized in a psychiatric clinic. Evaluations were made, which compared average daily doses of antipsychotic drugs, length of hospital stay and in-hospital costs in patients treated with antipsychotic monotherapy or polytherapy.

**Results:** A total of 730 medical records were analyzed, from which monotherapy was applied in 237 hospitalizations. The average length of hospitalization was 17 days with an average cost 16.877 CZK in patients with monotherapy. The average length of stay with polytherapy was 37.7 days with an average cost CZK 45 123 per in-patient stay. The shortest length of stay with monotherapy of atypical antipsychotic drugs was in patients treated by paliperidone (13.9 days, mean daily dose 8.6 mg; mean inpatient cost CZK 18 582 ), further by clozapine (15.5 days, average daily dose of 351mg , mean inpatient cost CZK 18 876), by olanzapine (16.4 days , average 19.6mg daily, mean inpatient cost CZK 20307) by amisulpiride (17.2 days, average daily dose 474.8 mg, mean inpatient cost CZK 16 357), by risperidone (17.7 days, mean daily dose 3.6 mg , mean inpatient cost CZK 20 254).

**Conclusion:** The shortest length of stay was for olanzapine, paliperidone, amisulpiride. The lowest hospital cost in monotherapy was in the case of treatment with amisulpiride.

### 13. Katerina Sedlackova

This study defines the creative principles of Michel Butor's lesser known texts, based on experiment, poetizing and interaction with fine arts. Based on analysis of hundreds of texts and art resources, it concentrates on the five part cycle, *Illustrations*, as the focus of Butor's most important creative techniques. Butor uses intertextuality to create an innovative way of using citations and to rewrite not only other authors' texts but especially his own texts. He also uses intermediality, based on an interaction between fine arts and literature with Butor transposing aesthetic effects, provoked by the art work, into poetic language. This poetic language becomes the textual equivalent of colours and shapes by emphasizing the physical aspect of the language in continuity of Mallarmé's tradition.

Analysis and theoretical treatise are discussed in the larger context of Butor's writings with emphasis on theoretical issues and continuity through his entire work.



## 14. Marek Mihai Abraham

### Materials and methods

Field work was carried out between 2006 and 2012 in the fishponds of South Moravia, Czech Republic: Mutěnice (48° 54' N, 17° 01' E) and Lužice (48° 50' N, 17° 04' E). Both locations are about 60km southeast of Brno.

Our sample consists of thirty nests which were marked, monitored and analyzed

### Data collection

Nests in the studied area were searched in the reed located in the shore side of the fishpond. When a potential nest of a great reed warbler was found, it was marked with sticky tape, on which the number of the nest was written. When the nest was 80-100% built, or in the egg lying period, we caught and ringed (with collared rings) both parents, in an attempt to know the amount of time spent at the nest. These ringed birds were checked on previous occasions before filming. All nests were monitored every second day. During those controls all eggs were numbered so that the exact lying date of every chick was known. While monitoring egg state, it was also necessary to keep track of the nests that were parasitized and in which parasitic eggs were not ejected from the nest. If a nest was found with a cuckoo chick already hatched we would determine its age from different morphological features. This ability to plan in advance helps with choosing specific nests at specific times. The majority of the nests were filmed between 8am and 2pm.

All the equipment was carried in the field, usually by bicycle, by the person responsible for filming. Before filming cuckoo chicks were measured (only at the beginning) and weighed on a special balance (exact type of balance) before and after filming. Because of the high rate of cuckoo mortality, monitored chicks varied in age between thirteen and nineteen days. After measurements were taken, a tripod and a camera were installed in a dense reed area, so that any movement at the nest could be caught on camera.

### Video recording analysis

Studied material was selected from videos between 2006 and 2012. Every video was evaluated after the first arrival of parent(s) at the nest. Length of parental presence was measured (in minutes) at the nest along with the dimension of food brought to the chicks.

Food brought by the parents consisted of different kinds of invertebrates and vertebrates (like small fish or frogs). All food items were tabulated according to dimensions of each item.

Feeding visits did not consist only of the bringing of the food but also of reorganizing the nest and disposal of chick excrement.

The point where measurement of begging began was half an hour after the arrival of the first parent. Cuckoo chick begging was divided into three types: active begging – where one of the parents was in immediate proximity to the chick, absent begging – where the chick was begging in the absence of its adoptive parents using its typical absent call (si si si) and active begging without parental initiation.

Cuckoo sex identification

During analysis sex of the chicks was unknown.

Statistical analyses

Ethical notes

Filming of each chick was conducted in dense reed areas, which afforded a good view over the whole nest, but which did not expose too much of the nest to potential predators. Not all the measurements of weight could be taken from all chicks because older chicks had a greater tendency to jump out of nests. Out of thirty filmed chicks, 96 % have successfully fledged. The study was carried out with the permission of the local conservation authorities (permit numbers 00312/PA/2008/AOPK and JMK20189/2010). Bird catching and ringing was conducted under licence (numbers 906 and 1058) and followed current rules issued by the Czech bird ringing centre. All manipulations adhered to the Animal Care Protocol of the Academy of Sciences of the Czech Republic (numbers 173/2008 and 128/2010) and were in compliance with current Czech Law on the Protection of Animals against Mistreatment (licence numbers V/1/2005/28 and 0008/98-M103).