Jiří Spilka

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EDUCATION

- **Ph.D. – Artificial Intelligence, CTU in Prague** — Czech Republic
  Department of Cybernetics, Faculty of Electrical Engineering — *2009 – 2013*
  Thesis: Complex approach to fetal heart rate analysis: A hierarchical model

- **Master studies – Biomedical Engineering, CTU in Prague** — Czech Republic
  Faculty of Electrical Engineering, Czech Technical University in Prague — *2006 – 2009*
  graduated with honors, diploma thesis awarded by Deans prize

- **Erasmus exchange program – Biomedical Engineering** — Sweden
  Institute of Technology, Linköpings University — *2007 – 2008*

- **Bachelor studies – Cybernetics and Measurement** — Czech Republic
  Faculty of Electrical Engineering, Czech Technical University in Prague — *2003 – 2006*

EXPERIENCE

- **Concerto.ai** — Prague, Czech Republic
  R&D Engineer — *07/2017 – Present*

  Work on conversational AI solution that is capable of question answering from structured and unstructured data, appointment booking, and other cool stuff. The platform consists of several modules such as intent recognition, data mining, dialogue management, and analytics. The following services were implemented from scratch and deployed for production in cloud.

  - **NLP package**: Implemented natural language processing pipeline such as intent recognition (semantic sentence similarity), entity recognition and question answering from structured data. Created an Elastic Search wrapper for extraction of answers from unstructured data.
  - **Analytics**: Implemented package that provided insights into user behaviour. It saved conversational data into MongoDB and computed statistics for monitoring, management, and debugging purposes.
  - **Automatic FAQ**: Algorithm to parse any FAQ page and extract questions and answers.
  - **Scraping**: Implemented and maintained several spiders to crawl news website and sport events and extracted data that were used in a dialogue system.
  - **News articles classification and entity extraction**: Created a pipeline that scraped news articles and identified entities (people and companies) and classified them into several categories (as required by investment companies).

- **CIIRC, Czech Technical University in Prague** — Prague, Czech Republic
  Researcher — *01/2015 – 07/2017*

  Biomedical signal processing and machine learning. Created a new independent fetal heart rate database, used a sparse linear model for cross-database evaluation. Implemented CTGViewer (Python, QT framework) for data visualization and annotation. Mainly used Matlab and SQL DB. Teaching in Artificial Intelligence course in 2015 – 2020.

- **ENS Lyon** — Lyon, France
  PostDoc, Signaux, Department of Physics, ENS Lyon — *12/2013 – 01/2015*

  Analysis of dynamical system with application to fetal heart rate. Use of scale-invariance methods like Hurst exponent, multifractal analysis together with methods from information theory (entropy) for a better understanding of fetal behaviour. Created a database of fetal heart rate records, implemented pre-processing, feature engineering and used sparse machine learning models for fetal well-being classification. Most of the time spent in Matlab.

- **BTL Medical Technologies CZ**   Prague, Czech Republic
  R&D Engineering (part-time)   *5 years, 07/2008 – 02/2013*
    - **ECG diagnostics**: Implemented an algorithm for atrial fibrillation classification in Holter ECG and an algorithm for classification of myocardial infarction in resting ECG (embedded).
    - **Medical database**: Created and maintained a large (700k) database of resting ECG and Holter ECG records. The database was used for training and testing purposes (both signal processing and machine learning)
    - **Analog front-end for Holter ECG**: Worked on A/D converter with ADS1298 chip. Implemented data acquisition, storage, and basic signal pre-processing (embedded).

Scientific visits

- **2013**: ENS Lyon, France, 1 month
- **2012**: Epirus, Arta, Greece, 1 month.

Publication record

- Author of 11 journal papers and more than 40 conference papers
- Citations: 443 (WOS)
- h-index: 11 (WOS)

Teaching

- **Artificial Intelligence**: 2015 – 2020 (2017 and 2018 awarded as one of the best teachers at the Department of Cybernetics – based on student's poll)
- **Medical Informatics**: 2012

Other

- **Languages:**: Czech (native), English (fluent)
- **Computer skills:**: experienced in Python, SQL, MongoDB, LaTeX, Matlab, used to code in C/C++, C#, Java, experienced user of Linux, familiar with Microsoft's products (Windows, Office)
- **Interests**: sport in general (running, ice-hockey, floor-ball), machine learning and signal processing

Selected publications

P Abry, J Spilka, R Leonarduzzi, V Chudáček, N Pustelnik, and M Doret. Sparse learning for intrapartum fetal heart rate analysis. *Biomedical Physics & Engineering Express*, 4(3):034002, 2018.

J. Spilka, J. Frecon, R. Leonarduzzi, N. Pustelnik, P. Abry, and M. Doret. Sparse support vector machine for intrapartum fetal heart rate classification. *IEEE Journal of Biomedical and Health Informatics*, 21(3):664–671, May 2017.

M. Doret, J. Spilka, V. Chudáček, P. Gonçalves, and P. Abry. Fractal Analysis and Hurst Parameter for intrapartum fetal heart rate variability analysis: A versatile alternative to Frequency bands and LF/HF ratio. *PLoS ONE*, 10(8):e0136661, 08 2015.

J. Spilka, V. Chudáček, P. Janků, L. Hruban, M. Burša, M. Huptych, L. Zach, and L. Lhotská. Analysis of obstetricians' decision making on CTG recordings. *Journal of Biomedical Informatics*, 51(0):72–79, 2014.

J. Spilka, V Chudáček, M. Koucký, L. Lhotská, M. Huptych, P. Janků, G. Georgoulas, and C. Stylios. Using nonlinear features for fetal heart rate classification. *Biomedical Signal Processing and Control*, 7(4):350–357, 2012.

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