

Sano Computational Medicine Seminars

Monday, 29 June 2020, 14.00-15.30

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Automatic classification of antinuclear antibodies in diagnosis of autoimmune diseases

Mateusz Szpyrka and Maciej Malawski
Sano Centre and ACK Cyfronet AGH, Kraków, PL

Abstract:

Identification of antinuclear autoantibodies (ANAs) within HEp-2 cells images is a golden standard in diagnosis of autoimmune diseases. This process involves analysing slides through a microscope and classifying characteristic staining patterns indicating the presence of certain autoantibodies. If done manually, such classification is highly time consuming, prone to errors and requires well trained medical specialists. Automating the process of ANA staining patterns classification has been an active field of research in recent years [1,2]. In this talk we will present the pros and cons of our recent solutions based on deep neural networks [3], point out the challenges that are yet to be solved, and shortly describe the status of our project addressing the task of automatic ANA classification.

References:

- [1] Hobson, Peter. 2016. "Computer Aided Diagnosis for Anti-Nuclear Antibodies HEp-2 Images: Progress and Challenges." *Pattern Recognition Letters* 82 (October): 3–11. <https://doi.org/10.1016/J.PATREC.2016.06.013>.
- [2] Rodrigues, Larissa Ferreira, Murilo Coelho Naldi, and João Fernando Mari. 2020. "Comparing Convolutional Neural Networks and Preprocessing Techniques for HEp-2 Cell Classification in Immunofluorescence Images." *Computers in Biology and Medicine* 116 (January): 103542. <https://doi.org/10.1016/J.COMPBIOMED.2019.103542>.
- [3] Jan Gołda and Mateusz Szpyrka "Automated image analysis to determine the type of antibodies present in serum in the diagnosis of immunological diseases", BSc Thesis at the Faculty of Computer Science, Electronics and Telecommunications AGH, under supervision of Maciej Malawski in collaboration with Sabina Lichołai, Best Thesis Award: <http://dice.cyfronet.pl/news/best-bachelor-thesis>

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