Equipe 2

[5]  **[arXiv:1705.03917](https://arxiv.org/abs/1705.03917" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03917)**]**

**Online Calibration of Phasor Measurement Unit Using Density-Based Spatial Clustering**

[Xinan Wang](https://arxiv.org/find/cs/1/au:+Wang_X/0/1/0/all/0/1), [Di Shi](https://arxiv.org/find/cs/1/au:+Shi_D/0/1/0/all/0/1), [Zhiwei Wang](https://arxiv.org/find/cs/1/au:+Wang_Z/0/1/0/all/0/1), [Chunlei Xu](https://arxiv.org/find/cs/1/au:+Xu_C/0/1/0/all/0/1), [Qibing Zhang](https://arxiv.org/find/cs/1/au:+Zhang_Q/0/1/0/all/0/1), [Xiaohu Zhang](https://arxiv.org/find/cs/1/au:+Zhang_X/0/1/0/all/0/1), [Zhe Yu](https://arxiv.org/find/cs/1/au:+Yu_Z/0/1/0/all/0/1)

Comments: Accepted by IEEE Transactions on Power Delivery, this version is the preprint

Subjects: **Systems and Control (cs.SY)**

Data quality of Phasor Measurement Unit (PMU) is receiving increasing attention as it has been identified as one of the limiting factors that affect many wide-area measurement system (WAMS) based applications. In general, existing PMU calibration methods include offline testing and model based approaches. However, in practice, the effectiveness of both is limited due to the very strong assumptions employed. This paper presents a novel framework for online bias error detection and calibration of PMU measurement using density-based spatial clustering of applications with noise (DBSCAN) based on much relaxed assumptions. With a new problem formulation, the proposed data mining based methodology is applicable across a wide spectrum of practical conditions and one side-product of it is more accurate transmission line parameters for EMS database and protective relay settings. Case studies demonstrate the effectiveness of the proposed approach.

[6]  **[arXiv:1705.03919](https://arxiv.org/abs/1705.03919" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03919)**, [ps](https://arxiv.org/ps/1705.03919" \o "Download PostScript),**[**other**](https://arxiv.org/format/1705.03919)**]**

**A Minimal Span-Based Neural Constituency Parser**

[Mitchell Stern](https://arxiv.org/find/cs/1/au:+Stern_M/0/1/0/all/0/1), [Jacob Andreas](https://arxiv.org/find/cs/1/au:+Andreas_J/0/1/0/all/0/1), [Dan Klein](https://arxiv.org/find/cs/1/au:+Klein_D/0/1/0/all/0/1)

Comments: To appear in ACL 2017

Subjects: **Computation and Language (cs.CL)**

In this work, we present a minimal neural model for constituency parsing based on independent scoring of labels and spans. We show that this model is not only compatible with classical dynamic programming techniques, but also admits a novel greedy top-down inference algorithm based on recursive partitioning of the input. We demonstrate empirically that both prediction schemes are competitive with recent work, and when combined with basic extensions to the scoring model are capable of achieving state-of-the-art single-model performance on the Penn Treebank (91.79 F1) and strong performance on the French Treebank (82.23 F1).

[7]  **[arXiv:1705.03921](https://arxiv.org/abs/1705.03921" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03921)**]**

**Why & When Deep Learning Works: Looking Inside Deep Learnings**

[Ronny Ronen](https://arxiv.org/find/cs/1/au:+Ronen_R/0/1/0/all/0/1)

Comments: This paper is the preface part of the "Why & When Deep Learning works looking inside Deep Learning" ICRI-CI paper bundle

Subjects: **Learning (cs.LG)**

The Intel Collaborative Research Institute for Computational Intelligence (ICRI-CI) has been heavily supporting Machine Learning and Deep Learning research from its foundation in 2012. We have asked six leading ICRI-CI Deep Learning researchers to address the challenge of "Why & When Deep Learning works", with the goal of looking inside Deep Learning, providing insights on how deep networks function, and uncovering key observations on their expressiveness, limitations, and potential. The output of this challenge resulted in five papers that address different facets of deep learning. These different facets include a high-level understating of why and when deep networks work (and do not work), the impact of geometry on the expressiveness of deep networks, and making deep networks interpretable.

[2]  **[arXiv:1705.03998](https://arxiv.org/abs/1705.03998" \o "Abstract) (cross-list from cs.LG) [[pdf](https://arxiv.org/pdf/1705.03998" \o "Download PDF), [other](https://arxiv.org/format/1705.03998" \o "Other formats)]**

**Mining Functional Modules by Multiview-NMF of Phenome-Genome Association**

[YaoGong Zhang](https://arxiv.org/find/cs/1/au:+Zhang_Y/0/1/0/all/0/1), [YingJie Xu](https://arxiv.org/find/cs/1/au:+Xu_Y/0/1/0/all/0/1), [Xin Fan](https://arxiv.org/find/cs/1/au:+Fan_X/0/1/0/all/0/1), [YuXiang Hong](https://arxiv.org/find/cs/1/au:+Hong_Y/0/1/0/all/0/1), [Jiahui Liu](https://arxiv.org/find/cs/1/au:+Liu_J/0/1/0/all/0/1), [ZhiCheng He](https://arxiv.org/find/cs/1/au:+He_Z/0/1/0/all/0/1), [YaLou Huang](https://arxiv.org/find/cs/1/au:+Huang_Y/0/1/0/all/0/1), [MaoQiang Xie](https://arxiv.org/find/cs/1/au:+Xie_M/0/1/0/all/0/1)

Subjects: **Learning (cs.LG)**; Quantitative Methods (q-bio.QM)

Background: Mining gene modules from genomic data is an important step to detect gene members of pathways or other relations such as protein-protein interactions. In this work, we explore the plausibility of detecting gene modules by factorizing gene-phenotype associations from a phenotype ontology rather than the conventionally used gene expression data. In particular, the hierarchical structure of ontology has not been sufficiently utilized in clustering genes while functionally related genes are consistently associated with phenotypes on the same path in the phenotype ontology. Results: We propose a hierarchal Nonnegative Matrix Factorization (NMF)-based method, called Consistent Multiple Nonnegative Matrix Factorization (CMNMF), to factorize genome-phenome association matrix at two levels of the hierarchical structure in phenotype ontology for mining gene functional modules. CMNMF constrains the gene clusters from the association matrices at two consecutive levels to be consistent since the genes are annotated with both the child phenotype and the parent phenotype in the consecutive levels. CMNMF also restricts the identified phenotype clusters to be densely connected in the phenotype ontology hierarchy. In the experiments on mining functionally related genes from mouse phenotype ontology and human phenotype ontology, CMNMF effectively improved clustering performance over the baseline methods. Gene ontology enrichment analysis was also conducted to reveal interesting gene modules. Conclusions: Utilizing the information in the hierarchical structure of phenotype ontology, CMNMF can identify functional gene modules with more biological significance than the conventional methods. CMNMF could also be a better tool for predicting members of gene pathways and protein-protein interactions. Availability: https://github.com/nkiip/CMNMF

[1]  **[arXiv:1705.03958](https://arxiv.org/abs/1705.03958" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03958)**, [ps](https://arxiv.org/ps/1705.03958" \o "Download PostScript),**[**other**](https://arxiv.org/format/1705.03958)**]**

**Eternal inflation and the quantum birth of cosmic structure**

[Gabriel Leon](https://arxiv.org/find/gr-qc/1/au:+Leon_G/0/1/0/all/0/1)

Comments: 9 pages plus references

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**; Cosmology and Nongalactic Astrophysics (astro-ph.CO)

We consider the eternal inflation scenario with the additional element of an objective collapse of the wave function. The incorporation of this new agent to the traditional inflationary setting responds to the necessity of addressing the lack of an explanation for the generation of the primordial anisotropies and inhomogeneities, starting from a perfectly symmetric background and invoking symmetric dynamics. We adopt the continuous spontaneous localization model, in the context of inflation, as the dynamical reduction mechanism that generates the primordial inhomogeneities. Furthermore, when enforcing the objective reduction mechanism, the condition for eternal inflation can be bypassed. In particular, the collapse mechanism incites the wave function, corresponding to the inflaton, to localize itself around the zero mode of the field. Then, the zero mode will evolve essentially unperturbed, driving inflation to an end in any region of the Universe where inflation occurred. Also, our approach achieves a primordial spectrum with an amplitude and shape consistent with the one that best fits the observational data.

[2]  **[arXiv:1705.04008](https://arxiv.org/abs/1705.04008" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.04008)**,**[**other**](https://arxiv.org/format/1705.04008)**]**

**Optimal follow-up observations of gravitational wave events with small optical telescopes**

[Tatsuya Narikawa](https://arxiv.org/find/gr-qc/1/au:+Narikawa_T/0/1/0/all/0/1), [Masato Kaneyama](https://arxiv.org/find/gr-qc/1/au:+Kaneyama_M/0/1/0/all/0/1), [Hideyuki Tagoshi](https://arxiv.org/find/gr-qc/1/au:+Tagoshi_H/0/1/0/all/0/1)

Comments: 10 pages, 5 figures

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**

We discuss optimal direction for follow-up observations by 1-3 m class optical/infrared telescopes which target optical/infrared counterparts of gravitational wave events detected with two laser interferometric gravitational wave detectors. The probability maps of transient sources, such like coalescing neutron stars and/or black holes, determined with two laser interferometers generally spread widely. They include the distant region where it is difficult for small aperture telescopes to observe the optical/infrared counterparts. For small telescopes, there is a possibility that it is more advantageous to search for nearby region even if the probability inferred by two gravitational wave detectors is low. We show that in the case of first three events of advanced LIGO, the posterior probability map, derived by using a distance prior restricted to a nearby region, is different from that derived without such restriction. This suggests that the optimal direction for small telescopes to perform follow-up observation of LIGO-Virgo's three events are different from what has been searched so far. We also show that, when the inclination angle of the binary is nearly edge-on, it is possible that the true direction is not included in the 90% posterior probability region. We discuss the optimal strategy to perform optical/infrared follow-up observation with small aperture telescopes based on these facts.

[1]  **[arXiv:1705.03918](https://arxiv.org/abs/1705.03918" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03918)**, [ps](https://arxiv.org/ps/1705.03918" \o "Download PostScript),**[**other**](https://arxiv.org/format/1705.03918)**]**

**Causal Inference with Two Versions of Treatment**

[Raiden B. Hasegawa](https://arxiv.org/find/stat/1/au:+Hasegawa_R/0/1/0/all/0/1), [Sameer K. Deshpande](https://arxiv.org/find/stat/1/au:+Deshpande_S/0/1/0/all/0/1), [Dylan S. Small](https://arxiv.org/find/stat/1/au:+Small_D/0/1/0/all/0/1), [Paul R. Rosenbaum](https://arxiv.org/find/stat/1/au:+Rosenbaum_P/0/1/0/all/0/1)

Subjects: **Methodology (stat.ME)**

Causal effects are commonly defined as comparisons of the potential outcomes under treatment and control, but this definition is threatened by the possibility that the treatment or control condition is not well-defined, existing instead in more than one version. A simple, widely applicable analysis is proposed to address the possibility that the treatment or control condition exists in two versions with two different treatment effects. This analysis loses no power in the main comparison of treatment and control, provides additional information about version effects, and controls the family-wise error rate in several comparisons. The method is motivated and illustrated using an on-going study of the possibility that repeated head trauma in high school football causes an increase in risk of early on-set dementia.

[4]  **[arXiv:1705.03909](https://arxiv.org/abs/1705.03909" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03909)**,**[**other**](https://arxiv.org/format/1705.03909)**]**

**Interplay of valley polarization and dynamic nuclear polarization in 2D transition metal dichalcogenides**

[Girish Sharma](https://arxiv.org/find/cond-mat/1/au:+Sharma_G/0/1/0/all/0/1), [Sophia E. Economou](https://arxiv.org/find/cond-mat/1/au:+Economou_S/0/1/0/all/0/1), [Edwin Barnes](https://arxiv.org/find/cond-mat/1/au:+Barnes_E/0/1/0/all/0/1)

Comments: 5 pages +7 page supplement

Subjects: **Mesoscale and Nanoscale Physics (cond-mat.mes-hall)**

The interplay of Ising spin-orbit coupling and non-trivial band topology in transition metal dichalcogenides (TMDs) produces anomalous transport and optical properties that are very different from a regular 2D electron gas. The spin-momentum locking of optically excited carriers near a valley point can give rise to an anomalous spin-valley Hall current under the application of an in-plane electric field. TMDs also exhibit strong electron-nuclear hyperfine interactions, but their effect on spin-valley-locked currents remains unknown. Here, we show that hyperfine interactions can create a feedback mechanism in which spin-valley currents generate significant dynamical nuclear polarization which in turn Zeeman shifts excitonic transitions out of resonance with an optical driving field, saturating the production of spin-valley polarization. We propose an experimental signature of dynamic nuclear polarization which can be detected via measurements of the anomalous Hall current. Our results help to elucidate the interplay of valley polarization and nuclear spin dynamics in TMDs.

[5]  **[arXiv:1705.03910](https://arxiv.org/abs/1705.03910" \o "Abstract) [**[**pdf**](https://arxiv.org/pdf/1705.03910)**,**[**other**](https://arxiv.org/format/1705.03910)**]**

**Doublon-holon origin of the subpeaks at the Hubbard band edges**

[Seung-Sup B. Lee](https://arxiv.org/find/cond-mat/1/au:+Lee_S/0/1/0/all/0/1), [Jan von Delft](https://arxiv.org/find/cond-mat/1/au:+Delft_J/0/1/0/all/0/1), [Andreas Weichselbaum](https://arxiv.org/find/cond-mat/1/au:+Weichselbaum_A/0/1/0/all/0/1)

Subjects: **Strongly Correlated Electrons (cond-mat.str-el)**; Mesoscale and Nanoscale Physics (cond-mat.mes-hall)

Dynamical mean-field theory (DMFT) studies frequently observe a fine structure in the local spectral function of the SU(2) Fermi-Hubbard model at half filling: in the metallic phase close to the Mott transition, subpeaks emerge at the inner edges of the Hubbard bands. Here we demonstrate that these subpeaks originate from the low-energy effective interaction of doublon-holon pairs, by investigating how the correlation functions of doublon and holon operators contribute to the subpeaks. DMFT calculations using the numerical renormalization group (NRG) as an impurity solver and a mean-field analysis of the low-energy effective Hamiltonian provide consistent results. In the SU(3) and SU(4) Hubbard models, the subpeaks become more pronounced due to the increased degeneracy of doublon-holon pair excitations.

[3]  [**arXiv:1705.03894**](https://arxiv.org/abs/1705.03894)**[**[**pdf**](https://arxiv.org/pdf/1705.03894)**,**[**other**](https://arxiv.org/format/1705.03894)**]**

**Accretion driven turbulence in filaments I: Non-gravitational accretion**

[Stefan Heigl](https://arxiv.org/find/astro-ph/1/au:+Heigl_S/0/1/0/all/0/1), [Andreas Burkert](https://arxiv.org/find/astro-ph/1/au:+Burkert_A/0/1/0/all/0/1), [Matthias Gritschneder](https://arxiv.org/find/astro-ph/1/au:+Gritschneder_M/0/1/0/all/0/1)

Subjects: **Astrophysics of Galaxies (astro-ph.GA)**

We study accretion driven turbulence for different inflow velocities in star forming filaments using the code RAMSES. Filaments are rarely isolated objects and their gravitational potential will lead to radially dominated accretion. In the non-gravitational case, accretion by itself can already provoke non-isotropic, radially dominated turbulent motions responsible for the complex structure and non-thermal line widths observed in filaments. We find that there is a direct linear relation between the absolute value of the density weighted velocity dispersion and the infall velocity. The turbulent velocity dispersion in the filaments is independent of sound speed or any net flow along the filament. We show that the density weighted velocity dispersion acts as an additional pressure term supporting the filament in hydrostatic equilibrium. Comparing to observations, we find that the projected non-thermal line width variation depends strongly on the inclination of the filament due to the non-isotropic nature of the driven turbulence.