Ayush Kaushal

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Academics

2017-2021	B.Tech in **Computer Science and Engineering, IIT Kharagpur**
GPA	**9.45**/10.0 (Ongoing)

Experience

May 19	**Google Summer Of Code 2019, Student Developer**	**The Julia Language**
Aug 19	- Added support for Linear Chain Conditional Random Fields in the Flux Machine Learning Library and implemented Viterbi Decode algorithm. - Explored state of the art end-to-end deep learning models for practical sequence labelling APIs using CNNs for Character Embeddings, Word Embeddings, Bi-LSTMs and Conditional Random Fields. (link) - Built well tested usable APIs for Named Entity Recognition and Part of Speech Tagging with Neural sequence labelling models as backend.	

Projects

- **JuliaText: Open-source package ecosystem for Natural Language Processing in Julia**
  - **WordTokenizers.jl:** Wrote variety of lexers for the TokenBuffer API leading to the novel package features of creating high-speed custom tokenizers. Added tweet tokenizer, improved multilingual tokenizer among numerous fixes and features.
  - **TextAnalysis.jl:** Fixed statistical summarizer, part of speech tagger, naive bayes classifier and sped ROUGE score. Ported BM-25, LSA model and wrote API for conversion between tagging schemes for sequence. Added docstrings, major documentation revamp as various fixes to the software codebase with over 250 stars of GitHub.
  - **CorpusLoaders.jl:** Added lazy loaders for Senseval, CoNLL and WikiGold corpora. Made numerous significant fixes to the codebase in form of documenting, CI Tests and codebase.

- **Speeding up Weak Adversarial Networks for PDEs using Neural ODEs -** Implemented a Weak Adversarial Neural Network approach for solving Partial Differential Equations (PDEs) in Julia using Tracker.jl and explored speeding it up using the adjoint method of backpropagation through neural-ODEs.

- **DigiCon -** The project intelligently parses a doctor's hand-written prescription using OpenCV, Flask, CoreNLP, bash scripting and Docker. Worked majorly on the backend, using Natural Language Processing and Image Processing techniques for extracting and parsing the medical prescription. This project entry bagged gold in the intra-university opensoft competition.

- **Connect All -** Developed in 36 hours during Hack-A-BIT 2019, ConnectAll is a platform that enables specially-abled to use technology with equal ease as everyone else and offers Zulip integration for corporate usage. Worked on the Zulip chatbot integration, notes and book narrations.

- **Hobby Projects and Open Source Contributions -** Numerous Hobby Projects available on GitHub :- a wikibot, a webapp for coursework-grades amongst others. Contributed to open source projects in Organisations including metakgp, FluxML, JuliaIO

- **Coursework Projects -** A Rental Store Software using Java and MySQL, a tiny-C compiler using Flex and Bison, a Single Cycle CPU in Verilog and interpreter in Julia, an E-tourguide app powered by Semantic Web.

Publications

- **WordTokenizers.jl: Basic tools for tokenizing natural language in Julia:** **A. Kaushal**, L. White, M. Innes, R. Kumar
  Journal of Open Source Software, 5(46), 1956.

Coursework

Completed	Algorithms, Discrete Structures, Software Engineering, Probability And Statistics, Formal Languages, Algorithms-II, Linear Algebra, Compilers, Knowledge Modelling, Computer Organization Architecture
OnGoing	Operating Systems, Computer Networks, Machine Learning, Principles of Programming Languages
Online	Deep Learning Specialization, CS224n:NLP with Deep Learning, CS231n: Convolutional Neural Networks

Technical Skills

Programming Languages	*Proficient:* Python | Julia | C/C++ *Competent:* JavaScript | Octave | Java | Verilog | Haskell | Lisp
Libraries / Frameworks	OpenCV | Numpy | Pandas | Scikit-Learn | Tensorflow | Keras | PyTorch | Flux.jl
Systems / Platforms	Git | Linux | Bash | Heroku | Azure | LaTeX

Extra Curricular and Achievements

- **Mentor:** Guided freshers towards open source, in Google Code-In, 2019 and Kharagpur Winter of Code.
- **Maintainer, MetaKGP** and **Executive, KOSS IIT Kharagpur:** Conducted various activities and workshops to promote open source hacker culture and collaboration on campus.
- Student Par Excellence Award for Academic Performance by Dept. of Computer Science and Engineering, IIT Kharagpur.
- Part of the contingent to win the General Championship Technology, 2018 in the intra campus event.