Agam Goyal

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Education

University of Wisconsin - Madison — Madison, Wisconsin Sep 2020 - May 2024
Bachelor of Science - Computer Science (Honors), Mathematics, Data Science **GPA: 3.98**
Courses: Advanced Data Structures, Algorithms, Neural Networks, Computer Vision, Digital Design and Machine Organization, Optimization, Statistical Data Modeling, Statistical Inference, Linear Algebra, Probability, Time Series Analysis, Econometrics

Skills

- **Languages**: Java, Python, R, C/C++, Numba/CuPy, MATLAB, HTML/CSS, JavaScript, Julia, LaTeX, STATA
- **Frameworks**: PyTorch, TensorFlow/Keras, XGBoost, MySQL, Django, Flask, Scikit-learn, NLTK, OpenCV
- **Platforms**: Git, Docker, Linux, Windows, MacOS, Tableau, DragonFly, GCP, AWS, QlikSense Cloud

Professional Experience

- **DeepLearning @ WISC** Madison, WI
  Research Intern - Dr. Sharon Li **Aug 2022 - Present**
  - **Open World ML**: Working on open world settings (OODD, OVD, OSR etc.) to make ML reliable and scalable
  - **Learning from ML**: Working with CNNs, transformers and pre-trained models and exploring architectural design
- **Machine Learning approaches to Oscillator and Clock Synchronization** Madison, WI
  Research Intern @ REU 2022 - PI: Hanbaek Lyu **Jun 2022 - Present**
  - **Clock Synchronization**: Developing the L2PSync framework to classify coupled oscillator models
  - **Feature Extraction and Dimensionality Reduction**: Working on a Supervised Dictionary Learning model based on the Non-negative Matrix Factorization (NMF) algorithm to analyze features crucial to our understanding of distributed computing systems
- **Institute of Clinical and Transnational Research** Madison, WI
  Data Analytics Intern **Sep 2021 - May 2022**
  - **DBMS**: Maintained & improved database workflows for large scale ($\sim$ 1M rows) clinical research records using MySQL
  - **API**: Worked with APIs to manage over 100,000 system calls to manage the contents of these databases
  - **Cloud Analytics**: Created 2 high quality interactive dashboards with QlikSense to minimize cognitive bias in healthcare
- **Camfyvision Innovations** Bengaluru, India
  Computer Vision Research Intern **May 2021 - Aug 2021**
  - **Development**: Worked on algorithm testing, product development and deployment for the Crime Department as client
  - **Products**: Developed and improved the Violence Detection and Image Colorization algorithms in PyTorch & OpenCV
  - **Image Enhancement**: Modified existing CNN architectures and used image processing to enhance blurred images

Mentorship Experience

- **UW-Madison Dept. of Electrical and Computer Engineering** Madison, WI
  Undergraduate Teaching Assistant — ECE 539: Artificial Neural Networks **Sep 2021 - Jan 2022**
  - **Course content**: Developed course homework assignments testing Deep Learning concepts in Python and MATLAB
  - **Lab Assistant**: Led coding sessions for groups of 100+ students to help with debugging and implementing efficient code

Projects

- **Low Vision Virtual Reality Toolkit (VRT) [https://github.com/AGoyal0512/VR-Toolkit]** :
  Developing a Virtual Reality Stack to address issues that low-vision people would face in the world of VR as we move towards the Metaverse. Implemented contrasting and magnification techniques on images along with OCR and a text-to-speech engine
  Tools: Image Processing, Optical Character Recognition, `OpenCV`, `tesseract`
- **Madison Metro Optimization [https://github.com/AGoyal0512/Madison-Metro-Optimization]** :
  Used the Minimum-Cost network flow problem and the Clp linear optimizer in Julia to model Madison Metro bus transit services and optimize it to reduce travel times and improve flow for passengers, while also reducing costs for the authorities
  Tools: Linear Programming, Network Flow, Julia `Clp` Optimizer
- **Helping Hands [https://github.com/AGoyal0512/Helping-Hands]** :
  Built a fully-deployed predictor model that uses Natural Language Processing techniques to analyze user texts, social media posts, other health assessment forms, etc. to predict suicidality with a certain level of confidence
  Tools: Natural Language Processing, Neural Networks, Flask, NLTK

Honors and Awards

- Awarded with the Dean's List recognition every semester for a semester GPA above 3.85
- NSF REU Grant DMS-2010035 (**$4000**) and Welton Honors Summer Sophomore Apprenticeship Grant 2022 (**$3000**)
- National Talent Scholar of India (NTS 2018), Qualified IIT-JEE Advanced 2020 and KVPY SA-1 2019 Examinations

Clubs and Societies

Google Developer Student Club (GDSC) Madison, WI
Vice President **Jun 2021 - Present**
- **Outreach**: Developed partnerships with firms like Google and Northwestern Mutual for sponsorships to conduct events
- **Treasurer**: Raised funds of $5000 to successfully conduct a 24-hr long hackathon - CheeseHacks, with 100+ participants
- **Workshops**: Hosting workshops introducing Data Science and Machine Learning tools and frameworks to club members