ZHIYING LU

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SUMMARY

Data scientist with a strong foundation in math and programming logic, proficient in data statistical analysis, data visualization, machine learning, computer vision and cloud computing.

US Permanent Resident that does not need work authorization sponsorship.

EDUCATION

M.S. in Computer science	*University of Alabama at Birmingham*	2020-2022
Ph.D. in Environmental Science	*University of Chinese Academy of Science*	2009-2015
B.S. in Biotechnology	*South-Central University for Nationilities*	2005-2009

TECHNICAL SKILLS

- **Programming Languages**: Python, R, SQL, Unix shell, Java, C/C++, JavaScript, Racket,
- **Framework/Library**: Sklearn, Tensorflow, Pytorch, Flask, Apache Hadoop, Pandas, matplotlib, Bootstrap, JQuery
- **Database**: PostgreSQL, MySQL, DynamoDB, Redis, MongoDB
- **Others**: Git, Unix/Linux, Amazon Web *Services*, Docker, Kubernetes html5, CSS, Jinja, Jenkins

EXPERIENCE

University of Alabama at Birmingham(UAB)   Researcher IV   01/2020-present

- Collaborated with a professor from computer science department to conduct histology images recognition by deep learning and optimizing a pre-trained hover-net model.
- Implemented Next-Gen-Sequence analysis for whole gene sequencing and mutation analysis in Linux and in cloud computing environments.
- Built a python-based pipeline to automatically calculate, statistically analyze the mutation and visualize mutation analysis results.
- Complete the whole process of RNA-seq and Gene differential expression analysis, including RNA extraction, rRNA removal, NGS raw data alignment in a supercomputer, and visualization in R.
- Present the results in the scientific meeting and publish it in scientific journals.

Duke University   Postdoctoral associate   10/2017-12/2019

- Used python, R and SPSS to analyze the daily environmental and growth data, visualized and presented it on the international meetings.
- Designed online data acquisition system by LabVIEW to study algae harvesting by ultrafiltration.
- Performed Techno-Economic analyses on algae production system and use machine learning to optimize the algae cultivation system. This work was published in *Algal research*.

PROJECTS

- AI against Cancer, Data science Hackathon, 2021-**Natural Language Processing System for Retrieving Information about Cancer Phenotypes from Published Articles (AI and Cancer Hackathon).**
  - **>** Develop a pipeline to identify cancer-related genes and Human Phenotype ontologies (HPO) in given cancer research article by searching similar HPO definition for each relevant sentences of a document.
  - **>** Using the a pre-trained deep learning model BioBERT, 1183 papers were analyzed in PubMed, and identified 2 times more genes than that HPO represents.
  - **>** Significantly improved the accuracy in screening the relevant genes.
- **Object Detection with Mask R-CNN: Drone Images of Transmission Tower Components**

> Annotated images using VGG Image Annotator, and parsed the annotation JSON files into a coco-like format for model training, validation and testing.
> Model training: Matterport's implementation of Mask R-CNN, running on a TensorFlow and Keras backend on Google Colab. mAP score was calculated to evaluate the model performance, and our model showed a mAP score of 0.972.

- **Music Genre Recognition with VGG16**.
  > Established a method to classify music genres using audio spectrograms created from original soundtracks, and convert an voice recognition to well-studied image recognition problem.
  > Spectrograms were used as visual representation for feature extraction using by a deep learning model VGG-16 with the Adam optimizer.
  > Model performance: an accuracy of > 80% for genre classification in both training and testing.
- **Build a Bookstore management system by Java GUI (Source: CS205 OOP)**
  > Book information was read into ArrayList objects, and visualized by Java swing JTable and JList
  > The class to create Jtable was inherited from AbstractTableModel
  > Gui inherented JFrame and implements ListSelectionListener, establishing JList, JButton, JTextField and JLabels.
- **Design an online Amazon-like bookstore store website**
  > Back end: Python-based framework flask was used for main structure. Sqlite and SQLAlchemy were used to build the database. Jinja script was used for communication between backend and frontend.
  > Front end: HTML, CSS, Bootstrap, and JavaScript was used to create static website. Inheritance is used simply the code. Functions including user login, sign up and interacting with database were also included.
- **Design an Amazeriffic website**
  > HTML, CSS Bootstrap, and JavaScript was used to create static website.
  > JQuery, Node.js, NoSQL and MongoDB were implemented to make the web server hosted in a cloud platform by docker and Kubernetes.
- **Implement the PageRank algorithm in Racket**
  > Wrote a graph algorithm to insert a graph (represented as a list of links), calculate the PageRank score for a given graph, save the score in a hash set, sort the hash set based on its hash value and give the order of nodes.
- **Build a usable VPN through Amazon AWS cloud platform and Pritunl client.**
  > Started a EC2 Oracle Linux virtual machine on AWS, and install pritunl and MangoDB on it.
  > Routing on AWS, setup Mango Database, configure server and update security group.

OTHER SKILLS
- Technical writing and presenting, published more than 10 papers in scientific journal (*[Full list]*).
- Patent application: have 2 grant patents, and know the process for patenting.

SELECTED AWARDS
- [AI against Cancer, Data science Hackathon, 2021]-Natural Language Processing System for Retrieving Information about Cancer Phenotypes from Published Articles, received 3rd prize.
- [Duke Postdoctoral Professional Development Award,] 2019 (Highly competitive, 5 winners per year and I am the only one who received the Ph.D. degree from outside of US).
- The Dory Postdoc Award 2021 from University of Alabama at Birmingham, Sep 2021.
- Prize for oral presentation of 2021 UAB Postdoc Research Day, 3RD place.

MENTORING & COOPERATION
- Organized the monthly postdoctoral professional development workshop at Duke marine lab, 2019.
- Mentor 2 graduate and 2 undergraduate students at Duke university and University of Alabama at Birmingham for research project.
- Mentor for the Data science hackathon 2021.