Jiedong Hao

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⚙ Professional Skills

- Languages and tools

  - Language: Python, Lua, C++, Matlab, LaTeX, shell script
  - Packages: PyTorch, Scikit-Learn, XGBoost, NumPy, Pandas, OpenCV, PIL, Matplotlib, Flask, uWSGI, PySpark
  - Databases: MySQL, PostgreSQL
  - Tools: Bash, Zsh, Git, Vim/Neovim, Docker, Make, FFmpeg

- Machine learning

  - traditional classification, logistic regression, clustering, decision trees
  - text detection and recognition, object detection, document layout analysis, image classification, image retrieval, deep metric learning

👥 Professional Experience

Video deduplication system for video feed – vivo   Jan. 2021 – present

machine learning engineer project owner

- Designed and implemented the system evaluation metric, and the offline evaluation framework.
- Developed the frame feature model via **self-supervised deep metric learning**, and developed a **video frame sequence matching** algorithm with pybind11 and C++.
- Reduced the video frames used per video by **75%**, using FFmpeg for **key frame extraction**.
- Developed and deployed several HTTP API services, via **Flask**, **uWSGI** and **Docker**.
- Increased the system recall from 0.7 to 0.93 (**+33%**). The system can process over **1m** videos daily.

PPT image layout analysis and reconstruction – vivo   Oct. 2019 – Dec. 2020

machine learning engineer project owner

- In charge of the whole project, from data collection, quality goal, model development, QA test to model deployment.
- Built an **object detection** model to detect various document image elements.
- Designed and implemented a sophisticated **post-processing** pipeline for document layout parsing.
- Created a module for converting the parsed image info to PPT document, using python-pptx and libreoffice.
- Boosted the PPT reconstruction accuracy from 60% to 90%+ (**+50%**).

Smart WiFi recognition – vivo   Jun. 2019 – Dec. 2020

Junior machine learning engineer project owner

- Created a flexible and accurate WiFi info parsing module based on OCR result.
- Developed and deployed the system as a HTTP API service using Flask, Docker and uWSGI.
- Improved the recognition accuracy for WiFi account from 77.8% to **90%**, and accuracy for password from 74.6% to **85.9%**.

Business card and general OCR – vivo   Oct. 2018 – Jun. 2019

Junior machine learning engineer

- Developed a Python package to generate synthetic vertical text images for training text recognition models.
- Built and trained **CRNN** model to recognize vertical text images, and reduced character error rate (CER) for business card OCR and general OCR by more than 50% and 45%, respectively.
- Built a jdocument orientation classification model with weighted cross entropy, accuracy: **0.99**.
- Built a text line orientation classification model, accuracy: **0.97**.

🎓 Education

Institute of Automation, the Chinese Academy of Sciences, Beijing, China   2014 – 2018
Master in Pattern Recognition and Intelligent Systems

Central South University, Changsha, China   2010 – 2014
B.S. in Automation

Selected Open-Source Projects & Contributions

- Author of nvim-config: A modern Neovim config distribution with extensive documentation, **1.6k** stars.

📑 Publication

- Hao, Jiedong, et al. "DeepFirearm: Learning discriminative feature representation for fine-grained firearm retrieval." ICPR 2018 (**Best Scientific Paper Award**)
- Jiedong Hao, et al. "EEM: An End-to-end Evaluation Metric for Scene Text Detection and Recognition." ICDAR 2021

🛈 Miscellaneous

- Stack Overflow: **180+** answers, **19.5k+** reputation, **top 0.09%** among all users, impacted **11.1m** people.
- Tech Blog: https://jdhao.github.io/ (total PV: **3.45m**, monthly PV: **40k**)