

JIEDONG HAO

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👤 PROFESSIONAL EXPERIENCE

Video deduplication system – vivo

Jan. 2021 – present

machine learning engineer

- Designed and implemented a video deduplication system that processes over **1m** videos daily.
- Designed and implemented the system evaluation protocol, and the offline evaluation framework.
- Reduced the extracted video frames per video by 75% percent, using **FFmpeg** for key frame extraction.
- Built the frame feature model via deep metric learning, and developed the video frame sequence matching algorithm using pybind11 and C++.
- Developed and deployed various video-deduplication related services, and video frame feature extraction service via **Flask**, **uWSGI** and **Docker**.
- Improved the system recall from 0.7 to 0.93 (**+33%**), and precision from 0.9 to **0.92**.

PPT document image analysis and reconstruction – vivo

Oct. 2019 – Dec. 2020

machine learning engineer

- Designed and implemented a system that turns PPT images to an editable PowerPoint document. Lead the whole project, from data collection, quality goal, algorithm development, testing, to deployment.
- Built an object detection (maskRCNN) model to detect various document image elements.
- Designed and implemented a sophisticated pipeline for **post-processing** object detection and OCR results.
- Created a module for converting parsed image info to PPT document, using python-pptx and libreoffice.
- Boosted the document reconstruction accuracy from only 60% to 90%+ (**+50%**).

Smart WiFi recognition – vivo

Jun. 2019 – Dec. 2020

Junior machine learning engineer

- Lead the whole project, from data collection, quality goal, algorithm development, testing to deployment.
- Created a flexible and accurate WiFi info parsing module based on OCR result.
- Developed and deployed the system as a web 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 OCR 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 document orientation classification model with weighted cross entropy, accuracy: **0.99**.
- Built a text line orientation classification model, accuracy: **0.97**.

⚙️ PROFESSIONAL SKILLS

- Programming
 - Language: Python, C++, Lua, shell script
 - packages: PyTorch, Scikit-Learn, XGBoost, NumPy, Pandas, OpenCV, PIL, Matplotlib, requests, Flask, uWSGI
 - tools: Bash, Zsh, Git, FFmpeg, Make, Docker, Vim/Neovim
- Pattern Recognition and Machine Learning
 - text detection and recognition, object detection, document layout analysis, video fingerprinting, image classification, image retrieval, deep metric learning

- traditional classification, regression, clustering, decision trees
- English: proficient in writing tech docs, listening, and speaking

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

- [nvim-config](#): A modern Nvim config distribution with extensive documentation.
- [better-escape.vim](#): A Nvim plugin to help the users escape insert mode without lagging.

PUBLICATION

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

i MISCELLANEOUS

- GitHub: <https://github.com/jdhao>
- [Stack Overflow](#): **170+** answers, **17.8k** reputation, **top 0.09%** among all users, impacted **10.5m** people
- Tech Blog: <https://jdhao.github.io/> (total PV: **3m**, monthly PV: **40k**)