Jiedong Hao

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👥 Professional Experience

video fingerprinting/deduplication – 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 from over 60 to 15, a **75%** decrease in storage space.
- Built the frame feature model via deep metric learning. Implemented the video frame sequence matching algorithm using longest common subsequence (LCS).
- 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 reconstruction from a single image – 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, deployment to bug fixes.
- Built a **maskRCNN** model to detect document image elements.
- Designed and implemented a sophisticated pipeline for object detection and OCR results **post-processing**.
- Implemented the PPT document generation and preview feature using python-pptx, 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 and manage the whole project, from data collection, quality goal, algorithm development to bug fixes.
- Designed 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, NumPy, Pandas, Scikit-Learn, XGBoost, Matplotlib, requests, Flask, uWSGI
    - tools: Bash, Zsh, Git, FFmpeg, Make, Docker, Vim/Neovim, PyCharm, VS Code
- Pattern Recognition and Machine Learning
    - OCR: text detection and recognition, object detection, document layout analysis, video fingerprinting, image classification, image retrieval, deep metric learning
    - traditional classification, regression, clustering, decision trees

- Language: English (working level)

🎓 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

- better-escape.vim: A Nvim plugin to help the users escape insert mode without lagging.
- nvim-config: A modern Nvim config distribution with extensive documentations.

🗐 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

ℹ MISCELLANEOUS

- GitHub: https://github.com/jdhao
- Stack Overflow: **170+** answers, **17k** reputation, **top 0.09%** among all users, impacted **10.3m** users
- Tech Blog: https://jdhao.github.io/ (total PV: **2.95 million**, monthly PV: **40k**)