James Hortle

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Profile

James is a young engineer whose mathematical training gives his solutions a rigorous theoretical basis and whose practical experience makes him a solid candidate for technically challenging roles. He has primarily used Python 2 & 3, Javascript and Java in order to wrangle data into forms ready for analysis/use, build and deploy robot applications and websites, train ML models for NLP and leverage APIs and cloud computing all while communicating with clients to achieve their vision. He is a multilingual Honours graduate with dual degrees in Advanced Mathematics (Applied) and Japanese and French studies. His Honours thesis was concerned with early detection of Alzheimer's disease using SVMs and NNs. He is particularly interested in NLP and has shown he is a capable employee after working for 2 years in Tokyo.

Employment

Feb '18–Feb '20 **Systems engineer, AI/Robotics Team**, *Xware Corporation*, Tokyo.

- Training/testing of ML models.
- Data collection and preparation for ML models.
- Full-stack website and robot application development.

Projects

2019 **Anxiety prediction**, *Xware Corp.*, Tokyo, {Python 3}.

- Realtime prediction of anxiety-related features from facial video data based on Giannakakis *et al* (2017).

2019 **TM-RoBo**, *IP-RoBo* & *Xware Corp.*, Tokyo, {Python 3, C++, CUDA, PostgreSQL 11, AWS}.

- Registration service for new trademarks (商標) in Japan.
- Integration of Eng3Kat (below) as an API for transcription of English trademarks.
- Calculation of "distinctiveness" (識別力) for proposed trademarks given type of product/service (商品・役務).
- Reduced code complexity by translating mix of low-level C++, CUDA and some Python to high-level Python 3 as measured by reduction of LOC from 7218 to 1057 (85% reduction) with negligible slow-down in calculation speed (+0.1 s per calculation on average).
- Reduced memory footprint and maintenance burden by deduplicating and moving data from binary data files to PostgreSQL 11 as measured by filesize reduction from 3.5 GB to 302 MB (−3.2 GB).

2019 **Bayesian hidden Markov models**, *Open Source*, {Python 3}.

- Contributor to Python package for non-parametric Bayesian hidden Markov models library (*aka* hierarchical Dirichlet process hidden Markov models).
- Improved code stability by adding static type hinting as measured by reduction of static type errors from MyPy.
- Improved model by enforcing narrower types leading to a reduction in logical/type errors.

2019 **UnicodeHover**, *Open Source*, {TypeScript, Node, Webpack}.

- VS Code extension that shows corresponding glyphs of and provides information for Unicode escape sequences in source code.

2019 **Emotion recognition**, *Xware Corp.*, Tokyo, {Python 3, Tensorflow}.

- Trained convolutional neural network classifier to label images of human faces as displaying one of seven emotions (happy, angry, sad, surprised, fearful, disgusted, neutral) which was then simplified and integrated with MobileNetV2 for feature extraction.
- Merged model with another detecting age and gender to output all three results simultaneously.
- Converted model to Tensorflow.js and Tensorflow Lite.
- Achieved 60% correct classifications (random chance gives 14%) on test data.

2019 **ICPepper**, *Xware Corp.*, Tokyo, {Python 2, JS, Java, AWS}.

- Robot application to ensure patients at a hospital can give informed consent to procedures by analyzing their facial expressions.
- AWS Rekognition to process video images to produce numerical data for analysis.
- Lead developer, front- and back-end of the website (video and data up/downloads, encryption of patient data, data visualization with D3, *etc.*), video/image processing, robot application development, helpdesk.

2018 **Pepper Q&A**, *Xware Corp.*, Tokyo, {Python 2, JS, HTML, CSS, Dialogflow, Firebase, Choregraphe}.
- Lead developer/maintainer of multilingual humanoid chatbot robot application for Pepper.
- Front-end web development for tablet, Choregraphe SDK for robot, Dialogflow, Firebase and Google STT, bugfixes, quality assurance.
- Improved maintainability/stability of product by employing stable Google Cloud products early in development as measured by reduction of LOC and reduction of bug reports.
- Widened user base by introducing English and Simplified Chinese localizations.
- Successfully introduced core service of Pepper as measured by market adoption.

2018 **TalkQA for Pepper**, *Xware Corp.*, Tokyo, {Python 2, JS, HTML, CSS, Choregraphe}.
- Developer/maintainer of prize-winning Pepper robot application version of TalkQA chatbot service.
- Front-end web development for tablet, Choregraphe SDK for robot.
- Feature development, maintenance, bugfixes, quality assurance.

2018 **Eng3Kat**, *Xware Corp.*, Tokyo, {Python 3, PyTorch, GCP}.
- Lead developer for command line utility to transcribe English words into Japanese katakana in a "natural" way.
- Required close cooperation with clients, creativity and flair to find/make training data, high degree of experimentation for RNN.
- Created large corpus by using web scraping and semi-manual data creation to obtain English-katakana pairs as measured by token count (382,451 unique pairs).
- Achieved good results by employing teacher forcing and ensemble methods with GRU RNN as measured by Jaro-Winkler similarity on strings ($\mu = 0.85, \sigma = 0.15, N = 963,521$).

Publications/Theses

Company blog **人工知能と機械学習の違い "The difference between artificial intelligence and machine learning"**, *(2019) TalkQA.*

Company blog **チャットボットとは "What is a chatbot?" (Part 1) & (Part 2)**, *(2019) TalkQA.*

Journal publication **Alzheimer's Disease and Support Vector Machines: An Introduction to Machine Learning**, *(2018) Parabola 54 (2).*

Education

2012–2017 **BSc with Honours (Adv. Mathematics: Applied Mathematics)**, *UNSW*, Sydney.

2012–2017 **BA with Distinction (Adv. Japanese studies (maj.), Adv. French studies (min.))**, *UNSW*, Sydney.

2003–2010 **Higher School Certificate (ATAR 97.5)**, *St Aloysius' College*, Sydney.

Additional Experiences

2015 **Semester Abroad**, *Dōshisha Uni.*, Kyoto, Japan.

2011 **Youth Ambassador for Long-Term Rotary Youth Exchange Program**, *Rotary Int'l*, Nantes, France.

2005–2010 **Cadet Under Officer for Australian Army Cadets**, *St Aloysius' College*, Sydney, Australia.

Additional Languages

Japanese Native-level *JLPT N1 (2017).*

French Native-level *Approx. CEFR B2/C1.*

Referees and transcripts available upon request.