John Cai

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Education

- **Princeton University** — Princeton, New Jersey, USA
  Master in Finance, Financial Engineering; GPA: 4.00/ 4.00 — *Aug 2019 – Jun 2020*
  - **Relevant Courses**: Machine Learning and Pattern Recognition, Natural Language Processing, Deep Learning Networks (PhD), Advanced Computer Vision (PhD), Reinforcement Learning (PhD), Statistical Analysis of Financial Data, Computational Finance in C++, Stochastic Calculus, Financial Econometrics, Corporate Finance

- **University of Cambridge** — Cambridge, UK
  Bachelor of Arts, Economics; Triple First Class Honours — *Oct 2016 – Jun 2019*
  - **Relevant Courses**: Econometrics, Mathematics, Statistics, Functional Programming (PKU Exchange)
  - **Dissertation**: I use NLP to study if economic uncertainty can predict recessions. I program web-scrapers to retrieve news using Selenium/ BeautifulSoup and quantify uncertainty using Maximum Entropy models.

Research Publications and Projects

- **Cross-Domain Few-Shot Learning (CVPR 2020 VL3)**: 2nd in the CDFSL Challenge against established AI teams. Developed a meta learning algorithm that generalized well on diverse image domains. Oral Presentation at CVPR VL3
- **Domain Agnostic Meta Score-based Learning (CVPR 2021 L2ID)**: Introduced a novel transfer-learning algorithm using a score-based metric space that beats state-of-the-art methods on medical and satellite images.
- **Visual Question Answering**: Multi-modal question answering for open-ended questions that integrates deep residual networks for image feature extraction and bidirectional LSTM for natural language feature extraction.
- **NLP Event-Driven Stock Price Prediction**: Utilized OpenIE to parse relation tuples followed by a deep CNN to extract short-term and long-term features from news articles, which are then used to predict stock price movements.
- **PDE Pricing Barrier Options in C++**: Extended a high-performance C++ Library using partial differential equations, and estimated convergence rates of the Crank-Nicholson scheme. Created an interface from C++ to Excel.

Work Experience

- **Government Technology Agency** — Singapore
  Machine Learning Engineer Intern, Artificial Intelligence Platforms — *May 2020 - Aug 2020*
  - Engineered new data fields and performed analysis in PySpark to forecast the labour market during COVID.
  - Performed back-testing and A/B testing and deployed a content-based improvement to the ML recommender system that would improve click through rate by around 3%.
  - Utilized LDA and NLP to automatically extract insights from user search trends and skills in demand, and used SQL to produce a Redshift dashboard that automated policy-maker workflows.

- **Smart Nation and Digital Government Office** — Singapore
  Digital Strategy Intern — *Jun 2018 – Aug 2018*
  - Devised a framework to rank all governments apps. Presented a proposal that will make $100m of cost savings.
  - Formulated policies on digital payments by liaising with financial institutions and the central bank.
  - Analyzed financial transaction data to identify policies that can reduce cost and improve E-payment adoption.

- **Faculty of Economics, University of Cambridge** — Cambridge, UK
  Econometric Research Assistant — *Dec 2017 - Jan 2018*
  - Performed econometric research for Prof Toke Aidt on the Fiscal Implications of Voting Patterns in the UK.

- **Arcstone Incorporated** — Singapore
  Business Operations and Strategy Intern — *Jul 2017 - Sep 2017*
  - Conducted competitor and cashflow analysis in Excel that helped secure an official partnership with McKinsey. Arcstone was chosen out of 200 digital manufacturing start-ups that applied to provide the IoT SaaS product.

Skills and Interests

- **Programming:** Python, R, C++, Haskell, SQL, LaTeX **Technologies:** PyTorch, TensorFlow, Spark
- **Interests**: Boxing (Trained with Uni Team), Theatre, Skiing, Hiking, Data Science