

TAN Yee Fan

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PERSONAL Gender: Male
Date of birth: 1980 June 16
Nationality: Singapore Citizen
Languages: English, Chinese

HIGHLIGHTS

- At least seven years of work experience in a research environment¹, and at least four years of work experience in an industrial environment.
- Understand concepts in text processing, information retrieval, and digital libraries. Able to build a text search engine using tools such as Lucene and Solr. Has experience writing systems that retrieves and processes web documents from search engines, including both English and Chinese texts.
- Understand artificial intelligence concepts such as classification and clustering, and able to apply such techniques to applications. Has experience in using machine learning tools such as Weka and LibSVM.
- Has experience in using video processing libraries such as OpenCV and Dlib to implement applications that perform object detection and tracking in video streams.
- Has experience in implementing communications with web services backends (e.g., search engine APIs) and hardware devices (e.g., IP cameras and GPS trackers), by using technologies such as REST-like APIs and SOAP, implementing vendor-specified network communications protocols (HTTP, TCP, or UDP server or client), or integration of third-party SDKs. Able to process data formats such as JSON and XML.
- Able to architect software systems in a modular way, facilitating code reuse and minimizing the impacts of localized code changes on the entire system.
- More than ten years of experience in the Java programming language. Recent experience in the C++ programming language on Linux, Windows, and OS X/macOS operating systems.

TECHNICAL SKILLS Numbers in parentheses denote proficiency level out of 10.

- *Programming languages*: Java SE (9), C/C++ (8), Python (5), Shell scripts / Batch files (7)
- *Tools and frameworks*:
 - *Web applications*: Play Framework (8)
 - *Text processing*: Lucene/Solr (7), OpenNLP (6)
 - *Video processing*: OpenCV (7), Dlib (6), FFmpeg (6)
 - *Machine learning*: Weka (7), LibSVM (7)
 - *Development*: Visual Studio (7), NetBeans (8), Maven (7), CMake/Make (7), Git (8)
 - *Testing frameworks*: Google Test (7), JUnit (7)
 - *Miscellaneous*: Boost (6), Qt (7), Protocol Buffers/GRPC (8), Thrift (6), SQL (7), MongoDB/Morphia (7)
- *Web technologies*: HTML (7), CSS (5), JavaScript/jQuery (5), JSON (9), XML (7)
- *Document processing*: Microsoft Office (8), L^AT_EX (8)
- *Operating systems*: Windows (8), Linux (8), OS X/macOS (6)

¹Includes years spent as a Ph.D. candidate.

KAI Square Pte Ltd

Senior Researcher²

May 2016 – Present

ACV Framework

Analytics of Content of Video, or ACV, is the component of KAI Square Unified Platform that deals with video analytics. It will be the workhorse in VCA Open Platform, an upcoming product of KAI Square. ACV Framework uses a plugin design to segregate out the actual analytic of the video stream, and itself deals with the ancillary tasks of handling the various kinds of video inputs and analytic outputs. By treating the input and output data of the plugins in a generic manner, ACV Framework supports the chaining of multiple plugins in a pipeline architecture (e.g., combining background subtraction, object detection, and object tracking plugins in a tracking by detection pipeline). Using ACV Framework, video analytics developers focus mainly on the algorithmic aspects and implement plugins. ACV Framework succeeds the previous monolithic video analytics component.

- Take over and complete a version of ACV Framework that is now deployed in production for multiple projects, thereby fulfilling a long-delayed initiative that previously went through multiple developers.
- Produce builds with necessary porting for several different platforms, including Linux, Windows, and embedded systems.
- Heavy modularization of the code, implement a number of new features and numerous bug fixes.
- Reimplement significant portions of ACV Framework to minimize its reliance on large third-party libraries, due to size constraints on embedded systems.
- Design and implement the pipeline architecture for plugins, including redesign of plugin interface.
- Design and implement a few microservices related to ACV Framework, such as communications with plugins deployed on remote servers.

Others

- High-level requirements analysis and project planning for VCA Open Platform, including user interviews, identification of components, usage workflow, task design, and implementation strategies.
- Implement a video analytic plugin that performs abandoned object detection for a project, the first to employ ACV Framework in production.
- Take over and maintain the legacy monolithic video analytics component.

SeSaMe Research Centre, Interactive and Digital Media Institute, National University of Singapore

Research Associate

May 2014 – May 2016

Social Enhanced Sensor Analytics System (SENSE)

The SENSE system is a platform for performing data analytics on data extracted from various kinds of sensors, such as CCTV cameras and social media networks. SeSaMe Research Centre uses SENSE as one of the core systems to showcase its research output; these are integrated as components in the platform, allowing SeSaMe Research Centre to demonstrate its systems building capabilities as well. The SENSE system is designed to facilitate data exchange between the various frontend and backend components, which may be implemented in different programming languages. The video analytics portion of SENSE is further architected in two layers: a toolkit containing a collection of video processing functionalities (e.g., background subtraction, object detection, and object tracking) implemented as libraries; and applications that call upon the libraries in the toolkit to produce demonstration systems (e.g., tracking by detection pipeline).

- Design and implement the overall architecture of the SENSE system, including the platform and video analytics parts.

²The position name is a misnomer. I prefer to call myself a software engineer.

- Investigate and integrate research systems produced by others into the SENSE system, and implement portions of the SENSE system in collaboration with other members of SeSaMe Research Centre.
- Manage undergraduate final year project students and interns³ who assist in the system development, providing advice for both research and systems implementation.
- Produce demonstration systems for showcasing during various events such as SeSaMe Workshop and InnovFest unBound.
- Perform systems administration for the computer systems within the SeSaMe Research Centre.

KAI Square Pte Ltd

Senior Consultant

May 2013 – April 2014

KAI Square Open Source Intelligence Analytics (OSIA)⁴

KAI Square OSIA is a project on mining text content from social websites for events of interest, providing part of the required e-sensing capabilities in a much larger project by consortium led by Cassidian⁵ and NCS which participates in the *Safe City Test Bed*. The Safe City Test Bed is an R&D initiative by the Ministry of Home Affairs (MHA) and the Economic Development Board (EDB) of Singapore, with the aim of integrating and analyzing data from various sensors and information sources for the purpose of improving public safety and security.

- Main developer for KAI Square OSIA.
- Requirements analysis and overall architecture for KAI Square OSIA, working closely with partners for interfacing between systems and modules.
- Implement modules for collection of text data from a heterogeneous set of social websites.
- Implement the overall text processing pipeline using a service-oriented architecture on top of an enterprise service bus.
- Develop and implement algorithms for mining the collected data for events of interest, based on use cases supplied by end-users of the system.
- Lead and manage two other developers who assist in the system development.
- Integrate KAI Square OSIA into KAI Square Unified Platform (see below).

Chief System Architect / Senior Technology Advisor **November 2010 – December 2012**

KAI Square Unified Platform

KAI Square Unified Platform is the core product of KAI Square. It is a multi-tenant web-based central monitoring platform for surveillance and tracking devices located in various places.

- Main developer for KAI Square Unified Platform.
- Architect and implement backend services for the Unified Platform, including inter-service communications.
- Testing and integration of hardware devices from various vendors (e.g., IP cameras, GPS trackers) into the Unified Platform. Includes a strategy for minimizing impact of integrating new devices on the remainder of the system.
- Implement Java applet for viewing live video from IP cameras.
- Implement deployment scripts that allow minimal downtime when updating Unified Platform in multi-server deployments.
- General maintenance and feature additions for entire system, backend and front-end included.

Others

- Software development for other projects, liaising with partners where necessary.
- Support the technical needs of the sales department, including assistance on server administration.
- Provide company-internal advice on technical requirements for potential projects.

³Most of the interns were undergraduate students from Thailand, with varying proficiencies in English.

⁴In this project, *open source intelligence* refers to information collected from publicly available sources.

⁵Now known as Airbus Defence and Space.

EDUCATION

National University of Singapore

Ph.D., School of Computing, December 2011

- Thesis: Cost-sensitive Web-based Information Acquisition for Record Matching
- Advisor: Dr. Kan Min-Yen

B.Comp., School of Computing, June 2005

- First Class Honours in Computer Science
- Minor in Mathematics

RESEARCH EXPERIENCE

School of Computing, National University of Singapore

Ph.D. candidate **August 2005 – December 2011**

- Research interests include: record matching and linkage, web data mining, information retrieval, and cost-sensitive selective acquisition of information.

ForeCite project **June 2008 – June 2010**

- Implemented record matching component in ForeCite.
- Testing and feedback of ForeCite system.

Web people search system **January 2007 – March 2007**

- Participated in the Web People Search (WePS) task, in collaboration with researchers from the Penn State University.
- Our system achieved third position out of sixteen teams.

Identification of light verb constructions **May 2004 – April 2005**

- Undergraduate honours project, supervised by Dr. Kan Min-Yen.

Question answering system **May 2003 – July 2003, May 2005 – July 2005**

- Undergraduate research assistant for participation in the Text Retrieval Conference (TREC) Question Answering (QA) task, supervised by Prof. Chua Tat-Seng.

TEACHING EXPERIENCE

School of Computing, National University of Singapore

CS3243 Foundations of Artificial Intelligence **August 2007 – November 2007**

- Assisted lecturer with the setting and grading of homework assignments.
- Covered tutorial sessions when the lecturer was unavailable.

CS1102C Data Structures and Algorithms **August 2004 – November 2004**

- Teaching assistant for a laboratory group, as partial fulfillment for my undergraduate degree requirements.
- Received favourable teaching feedback from students.

AWARDS AND HONOURS

School of Computing, National University of Singapore

NUS Graduate Research Scholarship, August 2005 – July 2009.

Named to Dean's List for 4 out of 4 undergraduate academic years.

SOFTWARE

Available at: wing.comp.nus.edu.sg/~tanyeeffa/downloads/

PROFESSIONAL SERVICES

Reviewer for PRICAI 2010, AIRS 2010, and IJCNLP 2013.

Reviewer for IJAIT (2010), LRE (2015).

PUBLICATIONS

Available at: wing.comp.nus.edu.sg/~tanyeeffa/publications/

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