

# TAN Yee Fan

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**OBJECTIVE** To seek a position that allows me to architect and implement software systems, where I can apply my skills and experience for the advancement of the organization.

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

**SUMMARY** *Overall Experience*

- At least four years of work experience in an industrial environment, and at least seven years of work experience in a research environment<sup>1</sup>.
- Involvement and contributions to a variety of software projects, ranging from research demonstration systems to commercial production systems.
- Presently the key person in charge of the architecture design and implementation of ACV Framework, as well as the overall architecture design of the upcoming VCA Open Platform. (See the “Current Projects” section for more details.)

### *Software Development*

- Participated in projects through the entire software development life cycle, including requirements analysis, architecture design, implementation, deployment, integration, testing, and maintenance.
- Able to architect software applications in a modular way, such as by designing software frameworks, thereby facilitating code reuse and minimizing the impacts of localized code changes on the entire system.
- 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 common data formats such as JSON and XML as well as custom data formats.
- 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, inclusive of cross-compilation for embedded systems.
- Has experience in writing technical documentation, including system architecture documents, user manuals, and test reports.

### *Data Processing*

- Has experience in text processing. Understand concepts in information retrieval and digital libraries, with experience in building a text search engine. Has experience writing systems that retrieves and processes web documents in English and Chinese languages.
- Has experience in video processing. Able to implement applications that perform object detection and tracking in video streams by using libraries such as OpenCV and Dlib.
- Has experience in applying artificial intelligence concepts such as classification and clustering to applications. Able to implement software that performs machine learning tasks.

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<sup>1</sup>Includes years spent as a Ph.D. candidate.

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

EMPLOYMENT HISTORY

**KAI Square Pte Ltd**

Senior Software Architect (May 2016 – Present)

- Person in charge of the architecture design and implementation of ACV Framework.
- Overall architect of the upcoming VCA Open Platform.

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

Research Associate (May 2014 – May 2016)

- Design and implement the overall architecture of the SENSE system, for demonstration during various events such as SeSaMe Workshop and InnovFest unBound.

**KAI Square Pte Ltd**

Senior Consultant (May 2013 – April 2014)

- Participation in the entire software development life cycle for KAI Square OSIA, a project that uses machine learning techniques to mine text content from social websites.

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

- Main developer for KAI Square Unified Platform, including architecture design and implementation of backend services.

CURRENT PROJECTS

**KAI Square Pte Ltd**

ACV Framework (May 2016 – Present)

Analytics of Content of Video (ACV) is the component of KAI Square Unified Platform that deals with video analytics. It will be the workhorse in Video Content Analytics (VCA) Open Platform, an upcoming key 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). Video analytics developers now use ACV Framework to implement required analytics functionality in plugins, which improve their productivity as they now focus on the algorithmic aspects. ACV Framework succeeds the previous monolithic video analytics component.

- Spearhead and complete implementation of ACV Framework, which 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 and re-architecture of the code, implement a number of new features and numerous bug fixes.

- Implement significant portions of ACV Framework in such a way 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 couple of 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 governmental project, the first to employ ACV Framework in production.
- Take over and maintain the legacy monolithic video analytics component.

## PAST PROJECTS

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

#### Social Enhanced Sensor Analytics System (SENSE) (May 2014 – May 2016)

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. It 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). SeSaMe Research Centre uses the SENSE system to showcase both its research output as well as its system building capabilities.

- Design and implement the overall architecture of the SENSE system, including the platform and video analytics parts.
- 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 a team of people<sup>2</sup> 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.

### **KAI Square Pte Ltd**

#### KAI Square Open Source Intelligence Analytics (OSIA)<sup>3</sup> (May 2013 – April 2014)

KAI Square OSIA is a project that uses machine learning techniques to mine text content from social websites for events of interest. It provides part of the required e-sensing capabilities in a much larger project by a consortium led by Cassidian<sup>4</sup> and NCS as part of their participation 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, and to realize the Smart Nation vision.

- Main developer for KAI Square OSIA, with participation in the entire software development life cycle.
- Requirements analysis and overall architecture for KAI Square OSIA, working closely with partners for interfacing between systems and modules.

<sup>2</sup>Includes undergraduate final year project students and interns. Most of the interns were undergraduate students from Thailand, with varying proficiencies in English.

<sup>3</sup>In this project, *open source intelligence* refers to information collected from publicly available sources.

<sup>4</sup>Now known as Airbus Defence and Space.

- 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 machine learning 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).

KAI Square Unified Platform (December 2010 – December 2012)

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 installed in various locations.

- Main developer for KAI Square Unified Platform. Also the leader of a small team for development of 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.
- Maintenance and feature additions for entire system, backend and frontend 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.

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. All of them involve some form of artificial intelligence or machine learning.
- Publications available at: [wing.comp.nus.edu.sg/~tanyeeafa/publications/](http://wing.comp.nus.edu.sg/~tanyeeafa/publications/)

*Projects*

- Implemented record matching component in *ForeCite*, and provided testing and feedback of system. (June 2008 – June 2010)
- 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. (January 2007 – March 2007)
- Undergraduate honours project on the identification of *light verb constructions*, supervised by Dr. Kan Min-Yen. (May 2004 – April 2005)

- Undergraduate research assistant for participation in the *Text Retrieval Conference (TREC) Question Answering (QA)* task, supervised by Prof. Chua Tat-Seng. (May 2003 – July 2003, May 2005 – July 2005)

*Professional Services*

- Peer review for academic conferences: PRICAI 2010, AIRS 2010, and IJCNLP 2013.
- Peer review for academic journals: IJAIT (2010), LRE (2015).

TEACHING  
EXPERIENCE

**School of Computing, National University of Singapore**

- *CS3243 Foundations of Artificial Intelligence* (August 2007 – November 2007): Setting and grading of assignments, covered tutorial sessions when the lecturer was unavailable.
- *CS1102C Data Structures and Algorithms* (August 2004 – November 2004): Teaching assistant for a laboratory group, with 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.

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