ARNO DUVENHAGE

Software Engineer
+27 82 901 0949
aduvenhage@gmail.com

Skills Summary

- Software Development:
    - C++ (ISO C++11/14/17): 10+ years' experience
    - Python: 2 years' experience
    - Java-script: 2 years' experience
    - PostgreSQL, 5+ years' experience
    - Django: 1 years' experience
    - Front-end development: 2+ years' experience (bootstrap, plotly.js, google maps, etc.)
    - AMQP (RabbitMQ): 2+ years' experience
    - Qt 4/5: 4+ years' experience, desktop application development
    - CMake: 5+ years' experience, cross-platform C++ development
    - Subversion & Git: 6+ *years' experience*
    - Bash Scripting: 3+ years' experience, server configuration, backup scripts, etc.
    - Docker: 2+ years' experience
    - QtCreator, Visual Studio and XCode: *cross-platform C++ development*

- Expertise
    - Web technologies and web-server development
    - Distributed and networked system development
    - System integration
    - Concurrent and high-performance system development
    - Real-time mathematical modelling and system simulation

- Knowledge of / Prior Experience
    - C#, Java
    - DirectX, OpenGL, OpenSceneGraph, GLUT
    - MFC, wxWidgets

Education

Degree(s)

- Software Engineering Masters, MEng (with distinction), University of Pretoria, 2011
  A Software Framework to Support Distributed Command and Control Applications
- Software Engineering Honours, BEng (Hons), 2007
  Specialising in Distributed Systems and Artificial Intelligence
- Computer Engineering, BEng (1st class), University of Pretoria, 2004

Short Courses / Training

- Enterprise Architect Training, 2016, Pretoria
- AnyLogic Advanced Training, 2011, Blue Stallion Technologies, Pretoria
- Multi-Sensor Fusion, 2005, Johns Hopkins University, Washington DC, USA
- CCNA & CCNP (done as part of BEng course work)

Experience

- *Council for Scientific and Industrial Research (CSIR), Meraka (2017 – present)*
  - o Principle Engineer

- *Council for Scientific and Industrial Research (CSIR), DPSS (2005 – 2017)*
  (Defence Peace Safety and Security – DPSS)
  - o Principle Engineer (2014)
  - o Senior Engineer (2011)
  - o Senior Engineer (2008)
  - o Researcher (2005)

- Roles and Responsibilities at CSIR
  - o System Integration of various commercial and proprietary systems:
    - ▪ NMEA, ADS-B, AIS, ASTERIX protocols
    - ▪ Spire Maritime data
    - ▪ GPS Trackers, Icom & Kenwood GPS Radios, Spidertracks
    - ▪ PostgreSQL data logging, playback and system integration
    - ▪ Military Search Radars and Mission Control Systems
    - ▪ Fighter aircraft and their data-links
    - ▪ Military command and control systems
    - ▪ UAV video and data links
    - ▪ AMQP (RabbitMQ) based systems

- Technical Lead on Technology Demonstrators and Operational Systems
  - Backend for integrating and distributing vessel data for a web-based real-time vessel tracking system
  - In-situ sensor development framework (embedded, video, AIS, ADS-B, GPS, LoRa)
  - Simulation framework used for Ground Based Air Defence system evaluation and doctrine evaluation
  - Simulation framework used for air-to-air and air to ground fighter tactics evaluations and doctrine evaluation (co-developed by multiple DPSS areas)
  - Interoperability gateway used to integrate various sensors and equipment during CSIR and South African National Defence Force (SANDF) experiments and field trials
  - Fighter / mission controller training and evaluation environment for South African Air Force (SAAF)
  - SAAF Gripen tactical data-link ground station and reference implementation
  - Original proof of concept for Advanced Fire Information Service (AFIS)

- Embedded Development:
  - Raspberry Pi
    Completed various camera and sensor projects (C++ & Linux).
  - Arduino, ESP, Xbee and LoRa
    Completed monitoring and control applications (C++ mostly).

- C++ coach and training
  - Presents on C++ and new C++11/14 features to co-workers
  - Presents on web backend technologies to co-workers
  - Supervises vacation students

- Technical support and maintenance of software development infrastructure.
- Integration support during experiments, demos and field trials.
- Setup and maintenance of application servers.

Research Outputs

- Conference Papers
  - *A Layered Distributed Simulation Architecture to Support the C2 Enterprise*, SISO Fall SIW 2009.
  - *The Evolution of a C2 Protocol Gateway*, SISO Euro SIW 2008.
  - *A State Estimation Approach for Live Aircraft Engagement*, SISO Fall SIW 2007.

- Co-authored Papers
  - *A Data-Centric C4I Testbed*, C Malan and A Duvenhage, SAJADS, 2011.
  - *Joint Command and Control (JC2) capability development Utilising a Modelling and Simulation Framework,* P Ramadeen, D Uys, A Duvenhage, 2010.
  - *Experiences form Constructing a Command and Control Simulation Using a Data-Link Standard*, DC Uys and A Duvenhage, SISO Fall SIW 2009.
  - *Effectively Using a 3rd Party visualisation Component in a Discrete Event Simulation Environment for Joint Command and Control*, P Ramadeen, B Duvenhage and A Duvenhage, SISO Fall SIW 2009.
  - *An Alternative to Dead-reckoning for Model State Quantisation when Migrating to a Quantised Discrete Event Architecture*, B Duvenhage and A Duvenhage, ECMS 2008.

Awards and Acknowledgements

- CSIR Awards
  - Outstanding Contribution by a Research Team, 2016
    Rhino Poaching Prevention Team (CMORE)

- *Meraka Awards*
  - *Outstanding Contribution by a Team, 2018*
    Oceans and Coasts Information Management System (OCIMS)

- DPSS Awards
  - Outstanding Impact Award, 2015
    Technology to Combat Poaching Team (CMORE)
  - Outstanding Contribution by a Team, 2011
    Mission Simulation Framework Team

- DPSS, CCIW (Competency Area) Awards
  - Established Researcher, 2016
  - Technical Support, 2015
  - RGL Special Award: *Macadamia Border Safeguarding Team*, 2014
  - RGL Special Award, *GBADS Team*, 2013
  - Outstanding Technical Work by a Senior Researcher, 2013
  - Technical Leadership, 2012
  - Outstanding Contribution by a Team, 2011
  - Outstanding Contribution by a Team, 2010
  - Outstanding Contribution by an Individual, 2009
  - Outstanding Contribution by a Team, 2009

References

- Waldo Kleynhans (co-worker), +27 84 807 2419, w.kleynhans@gmail.com