Ryan Chandler

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Develop technology products that improve human-computer interaction through natural language processing

Authorized to work in the US for any employer

Work Experience

Lead Data Scientist

Caterpillar Inc
2012 to Present

Ontology Development - Designed and implemented an ontology containing thousands of lexical entries supporting the successful interpretation (natural language understanding) of tens of millions of machine repair documents.

Natural Language Understanding - Performed statistical parsing of documents and represented them in graph. Performed natural language understanding in a highly scalable and flexible manner exposing value producing information from formerly inaccessible text documents. Presented at Neo4j Graph Connect 2017 NYC.

Dialog System Development - Built a human-computer dialog system to answer executive user questions posed in natural language (English). The system consists of a dialog interpreter employing compositional rewrite rules and a knowledge representation layer modeled in a Neo4j property graph. The system is able to successfully answer a multitude of question formulations in the domain of factory shipments, products, manufacturing facilities, products sales territories and marketing organizations.

Calculating Event Causal Potential - Performed statistical parsing and lexical semantic feature exploration for root cause analysis and calculation of causal potential between events using an event model within a Neo4j graph. This system allowed engineers to detect emerging systemic problems based on text data heading off large scale quality issues and potential warranty payments.

Information Extraction - Performed information extraction from legal contracts and master service agreements to support decision making during economic downturns. Built an information extraction pipeline that included dynamic optical character recognition, named entity extraction, and structural and heuristic document analysis. The system allowed the organization to save hundreds of thousands of dollars by gauging the impact of key features of thousands of legal agreements in time to meet contract renewal deadlines.

Virtual Reality Ontology Visualization - Built an immersive graph ontology visualization system in virtual reality using Oculus Rift, Unity 3D and Neo4j. This system was developed to allow knowledge engineers to interact within the ontological structure for the purposes of structural development and exploration.

Machine Learning - Performed machine learning development for a variety of natural language tasks including document, user intent, and utterance classification, topic modeling, sentiment analysis etc. Used F1-scores and cross-fold validation to measure model performance and robustness.

Time Series Prediction - Performed time series prediction of machine activity based on the effect of COVID-19 using a SARI MAX model.

Analytical Application Development - Lead teams of interns and employees at the Cat Data Lab to develop a range of analytical applications ranging from mobile apps, middleware, statistical tools and embedded systems.

Interface Design - Performed several user interface redevelopments of analysis applications representing around $4M in annual enterprise value.

Director of Business Intelligence

Consociate Health
2010 to 2012

Built a modern business intelligence environment on top of a legacy systems containing healthcare data. Performed data modeling of OLAP cubes, advanced SQL and MDX development, ETL, system integration, data mining, data warehousing and automated reporting.

Senior IT Analyst, Team Leader

Caterpillar Inc
2006 to 2009

Was a catalyst for major improvement to datacenter operations. Managed seven junior and senior IT analysts to support the ongoing operation of the datacenter supporting a $4B/year manufacturing operation including the deployment of virtualized infrastructure; monitoring; disaster recovery and the installation of high-performance computing cluster within a mixed, UNIX, Linux and Windows environment.

Engineering Application Administrator

Caterpillar Inc
2004 to 2006

Handled performance tuning, advanced SQL query creation, backup, restoration, replication, and forensic analysis. Architected infrastructure to facilitate the collaboration of offshore engineering resources enabling the company to save more than $17M

Education

PhD in Informatics

University of Illinois at Urbana Champaign - Urbana, IL
2021

MA in Informatics

University of Illinois at Springfield - Springfield, IL
2010

Skills

- Natural Language Processing
- NLP experience across a wide range of tools and applications: NLTK, Spacey, Stanford, CoreNLP, Gensim, SparkNLP
- Machine learning classification of documents, user intents and sentiment analysis using various methods including support vector machines, LSTM, transformers, max entropy, and deep learning models
- Information extraction from documents, named entity recognition
- Computational linguistic analysis including statistical parsing, corpus annotation and calculation of event causal potential in text
- Knowledge representation using graph ontology
- Vocal prosody analysis and synthesis models
- training a computer to recognized and synthesize how words are inflected to mean different things Data Science
- Led many successful data science project teams to deliver enterprise value
- Development of scalable analytical database and computing environments and infrastructure in the cloud and on premises
- Well-grounded in statistical principles and design of experiment
- Machine learning, deep learning, neural networks, model & feature selection, dimensionality reduction and the analysis of model quality, performance and robustness Product Development
- Full stack development of applications, web sites, services, and data
- Led and participated in Agile product development methodology
- I have participated at all levels of product development including: subject matter expert, DBA, architect, developer, interface design, product owner APPROACH I have focused my career and education on understanding the human aspects of the human-computer interaction well beyond UI and UX. By taking a research-oriented, knowledge-rich approach to linguistics and human cognition, I am able to develop products that are highly functional and a delight to use.
- AWS
- Data Warehouse
- Microsoft SQL Server
- Python
- MySQL
- SQL
- Git
- Ontologies
- Linux
- JavaScript
- XML