Project Report

MIE1624H

Introduction to Data Science and Analytics

Instructor: Oleksandr Romanko

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Jonathan Adams: 1000623275
Syed Abdul Mannan: 1005485477
Dhruvil Anil Parmar: 1004589723
Sahil Saxena: 997421874
Sahil Narula: 1005099821
Ghufran Sulehri:

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Executive Summary

This report provides a comprehensive explanation of the analysis and decision making process which was used to complete the four project tasks. In this project, the team has completed a re-design of the course MIE 1624, Introduction to Data Science and Analytics using a variety of data sources and analysis techniques. The team also designed the curriculum for two professional Masters of Data Science and Business Analytics programs. Finally, the team developed a proposal for an educ-tech startup. For the analysis presented in this project, we relied on numerous data sources to provide information on important and in-demand data science skills and tools.

Datasets:

First, we performed a thorough analysis of the data contained in the "Kaggle Data Scientist Survey, 2018". This data contains multiple choice responses on questions related to Data Science. The survey data was analyzed to determine, amongst other factors, skillset trends across various jobs in data science and the most relevant and frequently used skills, languages and tools. In addition, we scraped job posting information from Indeed and Glassdoor in positions related to Data Science and Business Analytics.

Using hundreds of scraped course description and reviews from Class Central, we selected the best or most popular across a variety of data science topics. The team performed analysis of text to determine if skill keywords presented in Appendix F presented in the courses in order to "tag". The team also took data from the Purdue *Data Scientist Postings and Data Science Curriculum Datasets* [1], which provides numerous *csv* files with data describing data science university courses. Using the same set of keywords which was applied to the class central scraping, the classes were tagged for relevant skills.

Part 1: Redesign of MIE 1624 Introduction to Data Science and Analytics

By analyzing the current course content, the course is identified as an introductory one which teaches analytical models and various quantitative algorithms for solving engineering problems. It provides the understanding about various data science and analytical techniques like basic statistics, regression, machine learning etc. and its implementation in Python, as Appendix E1 demonstrates this is the most common data science programming language used in industry.

As the course was entirely designed in a way that most of the practical part of the course was to be implemented on Python and not all people come up with a programming or mathematical background, the team decided to have a prerequisite for the people willing to take this course. Two courses were decided which provides the overview about applying the concepts of Data Science in Python as well as the basic math needed to understand more complex algorithm as the course progresses. This also helped us to eliminate two lectures of the current course curriculum, which were later utilized to add few new topics founded on the trends in the job market.

Based on the topics that were included in the current course curriculum, the team felt that most of the contents were important, but the course could have been better with a more proper organization of the course content covered in specific lecture. It includes spending more time on the concepts that are more relevant to the current trends and market scenario. Hence, the team decided to be more concentrated

on organizing the course content in a way that a student can understand the fundamentals of data science and learn the skills necessary to acquire a job. Grounded on the exploratory analysis of the data obtained by web scraping Indeed and Glassdoor job portals along with manual analysis of similar course offered by various universities and Kaggle data, we came up with Appendix A, which shows that ai, machine learning, neural nets, regression were the top skills along with few others.

Hence the team decided to add these concepts in the current course curriculum with separate lecture on each of them. In addition to that, the team also came up with a lecture on Application of Data Science: Practical Perspective, which gives us the knowledge about how data can influence various sectors like health care, finance and manufacturing and help in making various business decisions. Appendix A shows the course structure for the redesigned MIE 1624 course based on our own experience while taking this course as well as the trends in the data science industry.

Curriculum Choice:

The MDS program and Masters of Business Analytics curriculums are designed using the same algorithm.

a. Job Description Analysis

Frequency analysis of the keywords, the results of which are presented in Appendix E1-E4 and Appendix G, was completed to determine in demand skills and tools for a variety of jobs related to the two masters degrees. For the MDS, the kaggle data was used to gain insights into three potential curricular streams, while the Glassdoor and Indeed skills were used to determine what topics were more relevant to the MDS of Business Analytics courses. A Ward clustering analysis was also performed using the keywords presented in Appendix F to determine similar topics to be covered in the foundational units. For the foundational course titles and descriptions, the important keywords found from the job analysis were applied to the course information dataset.

b. Similarity Analysis and Recommender system for Streams:

An analysis was performed on keywords within the Class Central and Purdue dataset to determine popular Data Science or Business Analytics course topics that should be included in the stream courses. The topics in the various streams are shown in Appendix B1 and B2 and were selected by matching key skills from the Kaggle and Indeed/Glassdoor dataset analysis to course descriptions and course titles.The key terms for each stream were then applied to determine a best-matching stream course. A k-NN and similarity analysis is then performed to determine the courses within the stream that are most similar to this best matching stream course and several of these nearest neighbour courses are selected to cover a broad range of topics in the stream. This similarity analysis and K-NN model provides a recommender system between various courses.

c. Course Descriptions:

The descriptions for the courses offered in the MDS and Business Analytics programs were built based of the Class Central and Purdue datasets. For a given course title, the most similar course by title and description contents was found from searching the keywords. The two course descriptions were then merged and key features picked out based on the keywords in the description and titles.

Part 2. Masters of Data Science Program:

The program curriculum consists of 10 courses taken in 8 months and a four-month internship. All students within the program complete the five foundational courses and then a business communications course and must select one of the specializations and three of the remaining four courses must be selected from this streams shown in Appendix B1. Students also have to finish a four-month internship in a data science related position.

All data scientists require foundational knowledge in Python, SQL and R as shown in (Appendix E2). The intro to machine learning course will touch on the three most popular libraries across Scikit-learn, Tensorflow and Keras (Appendix E4). A software fundamentals courses is also included as part of the foundational unit in the MDS course. As data science practice evolves, software development skills become more essential for producing useful data science results and products.

From the analysis of job titles in Kaggle and indeed datasets analysis and job function distribution analysis within Kaggle (Appendix E2 to E4) it is apparent that the main responsibilities of data analysts, engineers and scientist differ significantly. The team decided to design three areas of study in the program for students interested in becoming Data Scientist, Data Analyst, and Data Engineers Those streams are: "*Machine Learning*" with an emphasis in machine learning algorithm comprehension and research, "*Data Analysis and Decision Making*" area with an emphasis on identifying trends and patterns from data, and "*Data Organization and Scalability*" which emphasizes building useful and scalable data system (shown in Appendix E2).

Part 3: Business Analytics Program

The program consists of 9 courses covered in 8 months and a 4-month internship. The course curriculum covers the concept of data science, machine learning, as well as business and management skills. For each of the knowledge areas, the student will have the flexibility to choose an elective course of their interests. The curriculum enables students to understand the concept of data science and machine learning, and it enables the students to make strategic business decisions. The program also requires students to finish a 4-months long internship in data science management positions.

The foundational unit for the Masters of Business Analytics program includes several courses from the data science unit. As shown in the analysis in Appendix G1 and G2, business analytics professionals use a similar core set of skills to Data Scientists and Data Analysts including databases and SQL, programming using python for visualization and some statistical processes (i.e. regression). Both the Business Analytics and MDS also contain a foundational statistical analysis courses. The clustering

presented in Appendix H shows proximity between statistical analysis, machine learning, modelling, visualization. and specific machine learning tools.

As shown in Appendix G1, software like SAS, Tableau and SPSS are used by a much larger percentage of Business Analysts compared to Data Scientists. We introduced an analysis software and tools course that teaches the use of these core analysis tools. Appendix G2 and G3 shows, as expected, more emphasis on finding insights in business/financials and social media by business analyst compared to data scientist. This insight directed us to create stream related to financial analytics and social media analytics. The courses in these stream were again chosen using the similarity technique described previously and are shown in Appendix B2.

4. Ed Tech Bootcamp:

Overview:

The EdTech Boot Camp is a program designed with an aim to provide Data Science education people having a background of Engineering and Mathematics. A bootcamp was selected rather than an online platform as it is more focused and follows a proper schedule whereas for an online platform people often end up not completing the course as there are no deadlines. Bootcamps are also a better option as compared to university education due to smaller duration and lower costs. Our bootcamp is designed to provide people interested in Data Science with fundamental knowledge of the field with an application specific specialization. The duration of the program (as shown in Appendix I) is five months, which is essential to learn all the fundamental concepts along with practical application. The program has pre-requisites in programming and basic mathematics.

There are two core courses and one elective which is application specific. The first course is Python programming and basic mathematics which would provide students with basic knowledge required for understanding complex algorithms. The second course is Introduction to Data Science which is an introductory course explaining modeling techniques and various machine learning algorithms. The final course is an application specific elective which allows students to apply Data Analytics in fields like Finance, Healthcare, Logistics & Supply Chain Management, Manufacturing and Retail [3]. Appendix I shows the course outline with their descriptions. These specific fields of study were selected based on a study conducted on the potential of AI in various fields [2].

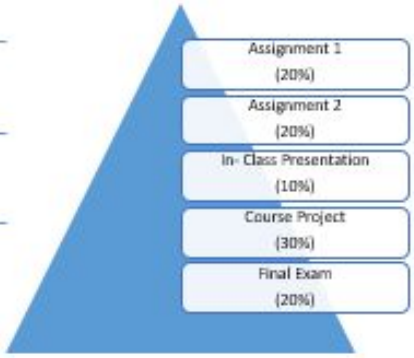
References:

1. Seliger, Corey S., (2018), "Exploring the Knowledge, Skills, and Abilities of Data Science Professionals", West Lafayette, IN: Purdue University.
2. Michael Chui (2018),"Notes from the AI frontier, Insights from hundreds of use cases", IN: Mckinsey & Global Institute.
3. Iqbal, R. (n.d.). WHAT ARE THE KEY SKILLS OF A DATA SCIENTIST. Retrieved from dataschiencedojo: https://datasciencedojo.com/key-skills-of-a-data-scientist/
4. Mittal, S. (2016, April 9). Soft Skills that the Most Successful Data Analysts Have. Retrieved from ANALYTIXLABS: https://www.analytixlabs.co.in/blog/2016/04/08/soft-skills-that-the-most-successful-data-analysts-have/
5. Shron, M. (2014). Thinking with Data.
6. Terdoslavich, W. (2017, March 15). Key Skills That Data Scientists Need. Retrieved from Dice: https://insights.dice.com/2017/03/15/key-skills-data-scientists-need/

Appendix A: Redesign of MIE 1624: Introduction to Data Science and Analytics

COURSE OUTLINE: MIE 1624: Introduction to Data Science and Analytics

PREREQUISITE	**Basic of programming in python for Data Science** - Fundamental programming concepts like logic check, basic problem-solving concepts, debugging techniques and syntax learning.
	Math for Data Science - Equations, Functions and Graph, Differentiation and optimization, Vectors and Matrixes, Linear Algebra Probability and Statistics



LECTURE SCHEDULE:

LECTURE 1: INTRODUCTION TO DATA SCIENCE

- Basics of Data Science, Areas and Application, Introduction to Basic Python Libraries, Numpy Pandas and Working with Jupyter Notebook

LECTURE 2: STATISTICS, LINEAR ALGEBRA AND MATRIX COMPUTATIONS

- Probability Distribution, Sampling, Hypothesis Testing, Matrix computations, Matrix Factorization, Convexity, Gradient vector, Hessian matrix

LECTURE 3: SUPERVISED MACHINE LEARNING – PART 1

- Introduction to Machine learning and relevant libraries, Multi- objective problems, Foundations of Linear and Logistic Regression

LECTURE 4: MODEL EVALUATION

- Diagnosing Bias VS Variance, Regularization (L1 and L2 Regularization), Hyperparameter Tuning, Cross Validation, Feature selection and Transformation

LECTURE 5: DATA VISUALIZATION

- Architecture and basic plotting with Matplotlib, Seaborn and Pandas Visualization

LECTURE 6: SUPERVISED MACHINE LEARNING – PART 2

- Ensembles of trees (Random forest, gradient boosted trees) and KNN with mathematical examples.

LECTURE 7: UNSUPERVISED MACHINE LEARNING

- Clustering: K-means, Hierarchical and DBSCAN

LECTURE 8: OPTIMIZATION AND SIMULATION MODELLING

- Constraint, Unconstraint optimization, Simulation modelling with mathematical examples

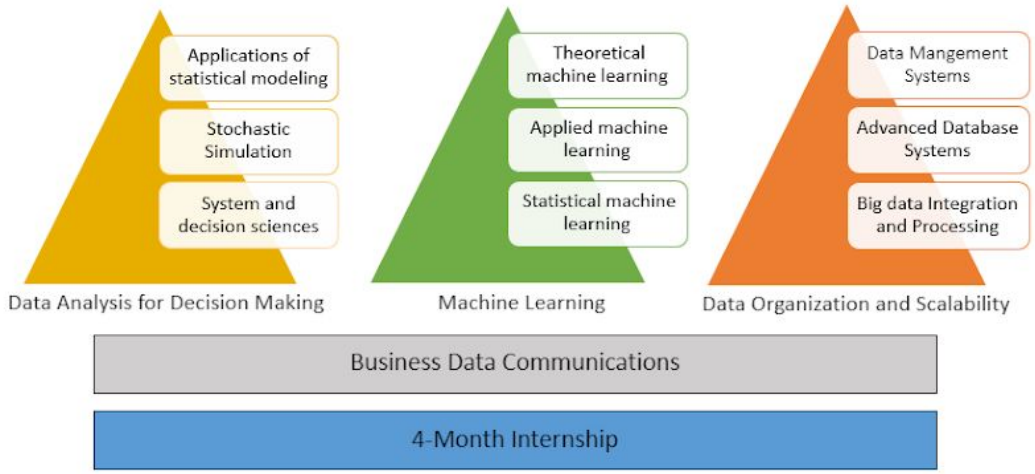
LECTURE 9: NEURAL NETS AND DEEP LEARNING AT A GLANCE

- Multilayer perceptron, Back propagation, MLP implementation, Introduction to Tensor flow and Keras, Overview of Deep Learning

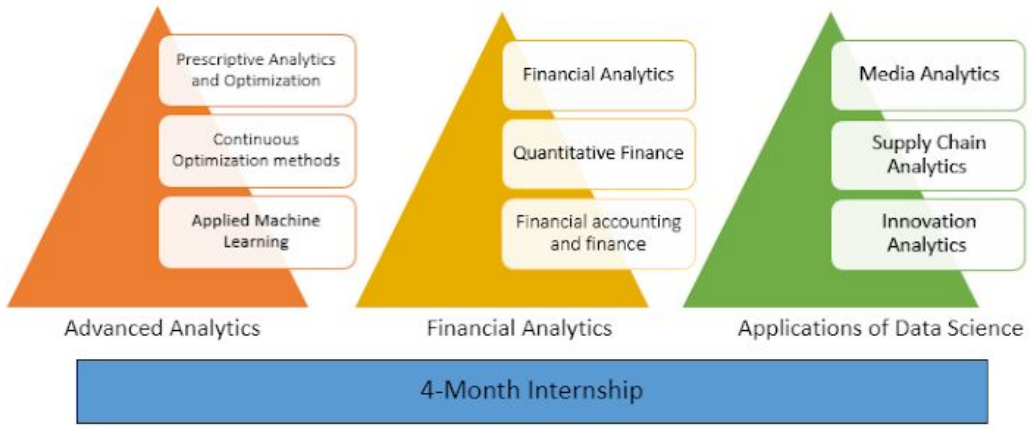
LECTURE 10: APPLICATION OF DATA SCIENCE: PRACTICAL PERSPECTIVE

- Influence of data in Finance and Healthcare sectors, making business decisions and ensuring efficient work and product flow

Appendix B: Masters of Data Science Stream Courses



Appendix C: Masters of Business Analytics Stream Courses



Appendix D: Course Descriptions

1. Intro to Data Analysis and Visualization (Using Python and R)
This course will introduce fundamental python and r programming techniques. The course will introduce data manipulation, cleaning and representation techniques and allow students to take tabular data, clean it, manipulate it, and run basic inferential statistical analyses. students will learn to use models for data and for images and will use common statistical design tools such as graphic methods in Python, interactive graphic methods such as bokeh, leaflet, and networkd3, the r package ggplot2, and tableau.

2. Intro to Machine Learning (Using Python and R)
This course provides a clear explanation of machine learning theory combined with practical scenarios and hands-on experience building, validating, and deploying machine learning models. Students will build and derive insights from these models using r, python, to build machine learning models with libraries Keras, and the Scikit learn toolkit. Student will explore classification, regression, supervised models, methods of dimensionality reduction, clustering models and recommender systems.

3. Intro to Descriptive and Inferential Statistics
This course covers foundational topics in statistical theory. The first half covers descriptive statistics including maximum likelihood estimation, non-parametric methods, introduction to optimality, goodness-of-fit tests, analysis of variance, bootstrap and computer-intensive methods and least squares estimation. The second half covers probability distributions; decision theory, bayesian inference, classification, prediction; law of large numbers, central limit theorem; point and interval estimation; multiple testing, false-discovery rates.

4. Software Fundamentals
This course will cover good programming principles and version control, high-level software development principles, software Testing and software Debugging in python and various front end languages.

5. SQL for Data Analysis (MySQl for Data Analysis)
This course introduces features and technologies for implementing a database. Topics include theory and application of databases, access methods and file systems to facilitate data access. Logical table design, ensuring data integrity, hierarchical, relational, and object-oriented data models will also be covered. Query languages for models and embedding query languages in programming languages. High-level interfaces including application generators, browsers, and report writers.

6. Data Management Systems
This course will introduce the database management Microsoft SQL server and will teach students the skills to perform data integration and transformation solutions, and load data into single or multiple destinations. Students will solve complex business problems using best practices and troubleshooting techniques

7. Advanced Database Systems
This advanced course on database systems and data management covers advanced relational query processing and optimization, OLAP and data warehousing, data mining, stream databases and other emerging database architectures and applications.

8. Big Data Integration and Processing
This course will teach skills (including Mongodb) to retrieve data from database and big data management systems, describe the connections between data management operations and the big data processing patterns needed to utilize them in large-scale analytical applications. Course also focuses on identifying when

a big data problem needs data integration and executing simple big data integration and processing on Hadoop and spark platforms.

9. Theoretical Machine Learning
This course will provide students with a rigorous and in depth understanding the mathematical underpinnings of machine learning. Topics include: Bayesian learning, evolutionary algorithms, instance-based learning, reinforcement learning, and neural networks.

10. Applied Machine Learning
Machine learning techniques and applications with emphasis on their application to systems engineering. Learning the components of deep learning, what it means, how it works, and develop code necessary to build various algorithms such as deep convolutional networks, variational autoencoders, generative adversarial networks, and recurrent neural networks.

11. Statistical Machine Learning
This course will study topics in statistical machine learning. Topics will include reinforcement learning, nonparametric classification and clustering methods, online learning, and deep learning. In the class, we will read textbooks and survey milestone papers. Students are expected to submit questions for the readings before each class and give presentations about the readings. The course will also include programming assignments focused on the mentioned topics.

12. Applications of Statistical Modeling
This course will provide exposure to applications of more advanced statistical modeling tools for both substantive and methodological investigations. Modeling techniques to be covered include multilevel modeling (with an application to methodological studies of interviewer effects), structural equation modeling (with an application of latent class models to methodological studies of measurement error), classification trees (with an application to prediction of response propensity), and alternative models for longitudinal data (with an application to panel survey data from the health and retirement study). the class will focus on essential concepts, practical applications, and software, rather than extensive theoretical discussions.'

13. Stochastic Simulation
This course is an introduction to Monte Carlo methods and computer modeling of stochastic systems. Monte Carlo topics that we will cover include random variable generation, expectation estimation with confidence interval formation, importance sampling, stochastic optimization, MCMC algorithms and sampling of Brownian motion. This course will also introduce the students to some fundamental stochastic processes such as discrete state Markov chains, Poisson processes, and Brownian motion; as well as an array of important stochastic models. Computer programming will be a central part of this course

14. System and Decision Sciences
Introduction to system and decision science with focus on theoretical foundations and mathematical modeling in four areas: systems (mathematical structures, coupling, decomposition, simulation, control), human inputs (principles from measurement theory and cognitive psychology, subjective probability theory, utility theory), decisions under uncertainty (bayesian processing of information, bayes decision procedures, value of information), and decisions with multiple objectives (wholistic ranking, dominance analysis, multiattribute utility theory)

15. Business Analysis Software and Tools
This course teaches students how to use data analytics to create value for businesses. Students will learn to perform data-analysis functions in SAS, Tableau, Excel and SPSS from real-world business process datasets. The course also covers learning how to communicate business-relevant implications of data analyses by designing business "data stories" by capitalizing on business-tested methods and design principles.

16. Business Data Communication
In this course, students will be exposed to numerous case studies and will learn to draw insights from data and form well-rounded data driven actions and strategic business decisions. Students will also learn and gain hands-on experience in presenting their recommendations using storytelling techniques.

17. Prescriptive Analytics and Optimization
This course covers formulations, applications and theory of optimization. The students will learn how to model decision problems using linear, integer and nonlinear programming techniques, how to implement these models using modern software, and finally how to interpret the results and gain business and managerial insights.

18. Media Analytics
This course covers the utilization of social media in marketing strategy and tactics. Topics include: the use of social media in building brand strength and equity, as a customer acquisition tool, and as a customer relationship management tool. The utilization of analytics tools for effective social media marketing and analysis will be covered in depth.

19. Continuous Optimization Methods
The goal of the course is to introduce the students to concepts and methods of constrained and unconstrained continuous nonlinear optimization. The course revolves around three issues in optimization: building optimization models of problems, characterization of their solutions, and algorithms for finding these solutions.

20. Financial Analytics
In this course, students will be applying data-analytic skills to finance applications. Topics include financial performance benchmarking; modelling and computation of financial risks; dynamic portfolio management; computational derivative pricing; and modelling fixed income securities. The focus of the component will be on both theoretical development and practical implementation, using contemporary data from the financial market.

21. Quantitative Finance
This course provides an introduction to financial risk management from a quantitative perspective. Topics include basic methods of bond pricing, derivatives, portfolio management, and risk management.

22. Financial Accounting
This is an introductory course covering basic principles of financial accounting, involving the consecution/interpretation of corporate financial statements.

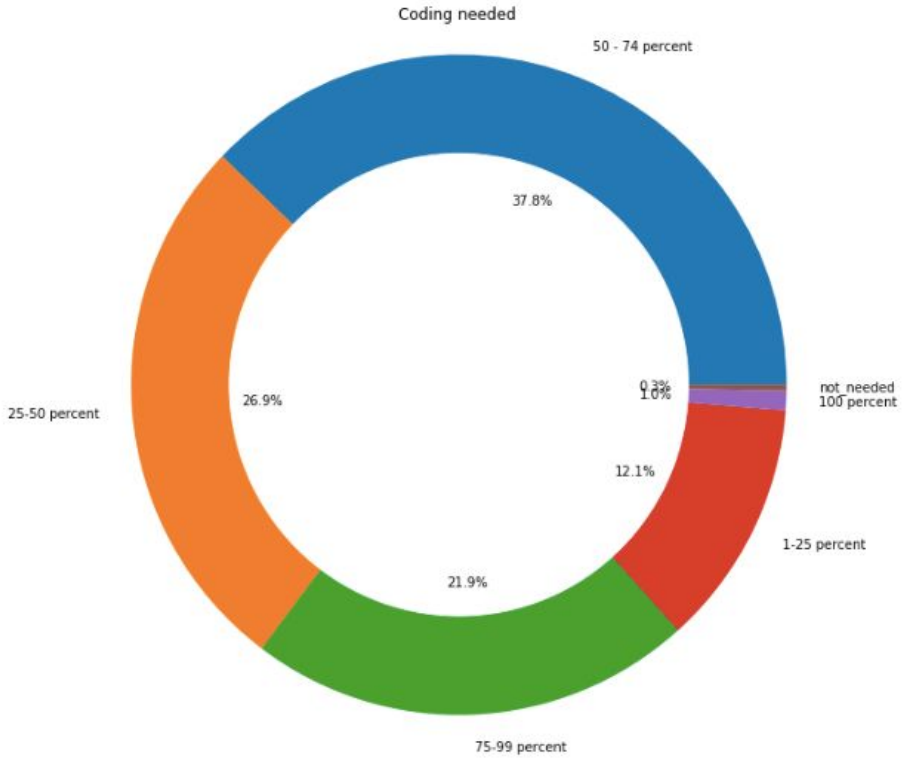
23. Supply Chain Analytics

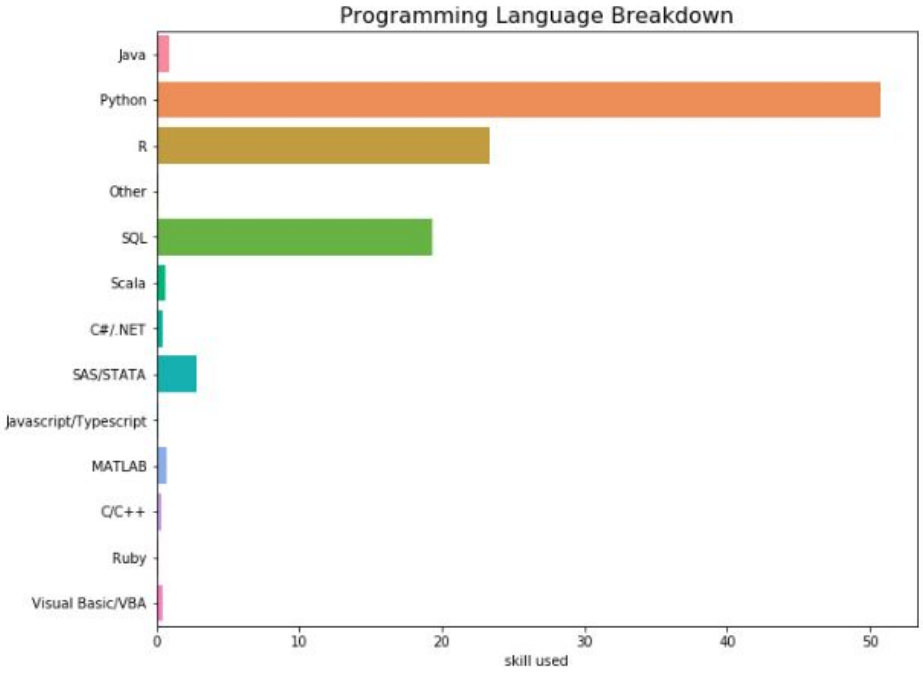
This component provides students with (i) knowledge of mathematical modelling and analytic tools, relating to logistics and supply chain optimisation problems, (ii) the ability to use these tools and techniques to analyse strategic, tactical and operational decisions, pertaining to inventory management, facility location, logistics and other supply chain, management-related decisions, and (iii) exposure to real world logistics and supply chain decisions through case studies.

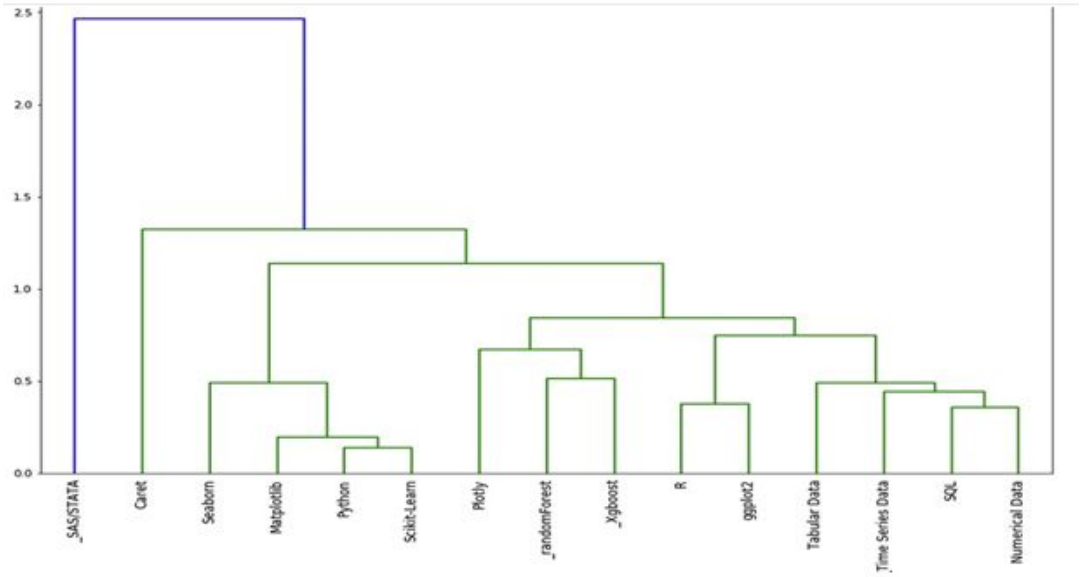
24. Innovation Analytics

The course focuses on the knowledge and skills required to manage digital technologies in the development and delivery of business innovations. It will equip you with an in-depth understanding of how to integrate digital technologies such as mobile computing, social media, and data analytics tools to innovate business practices.

Appendix E1: Industry use of skills and language from data






2.5
2.0
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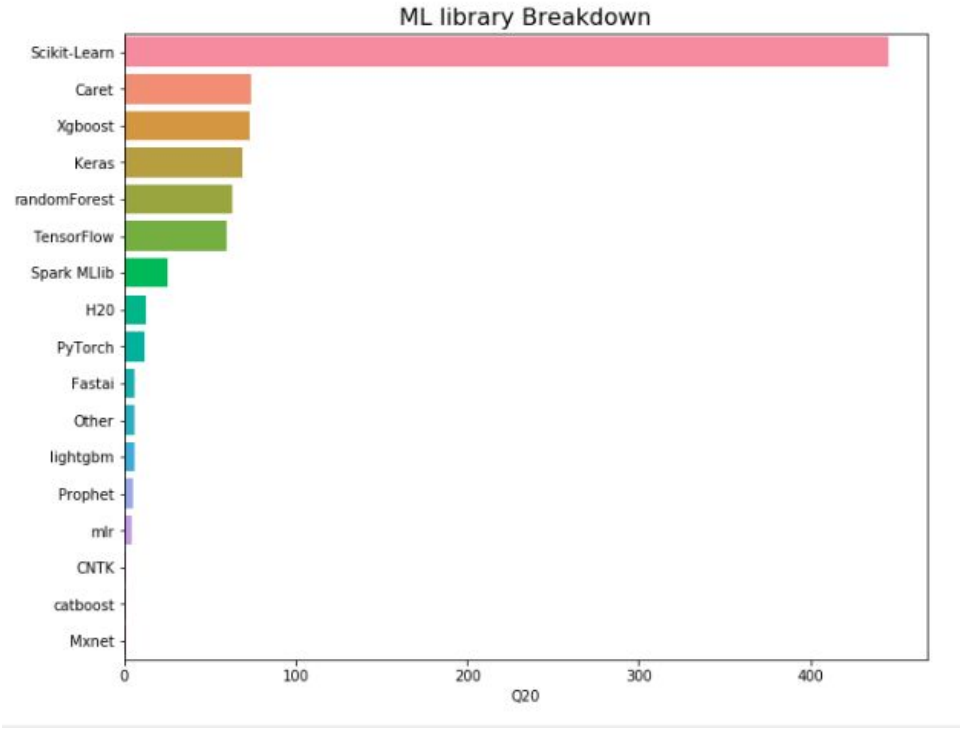
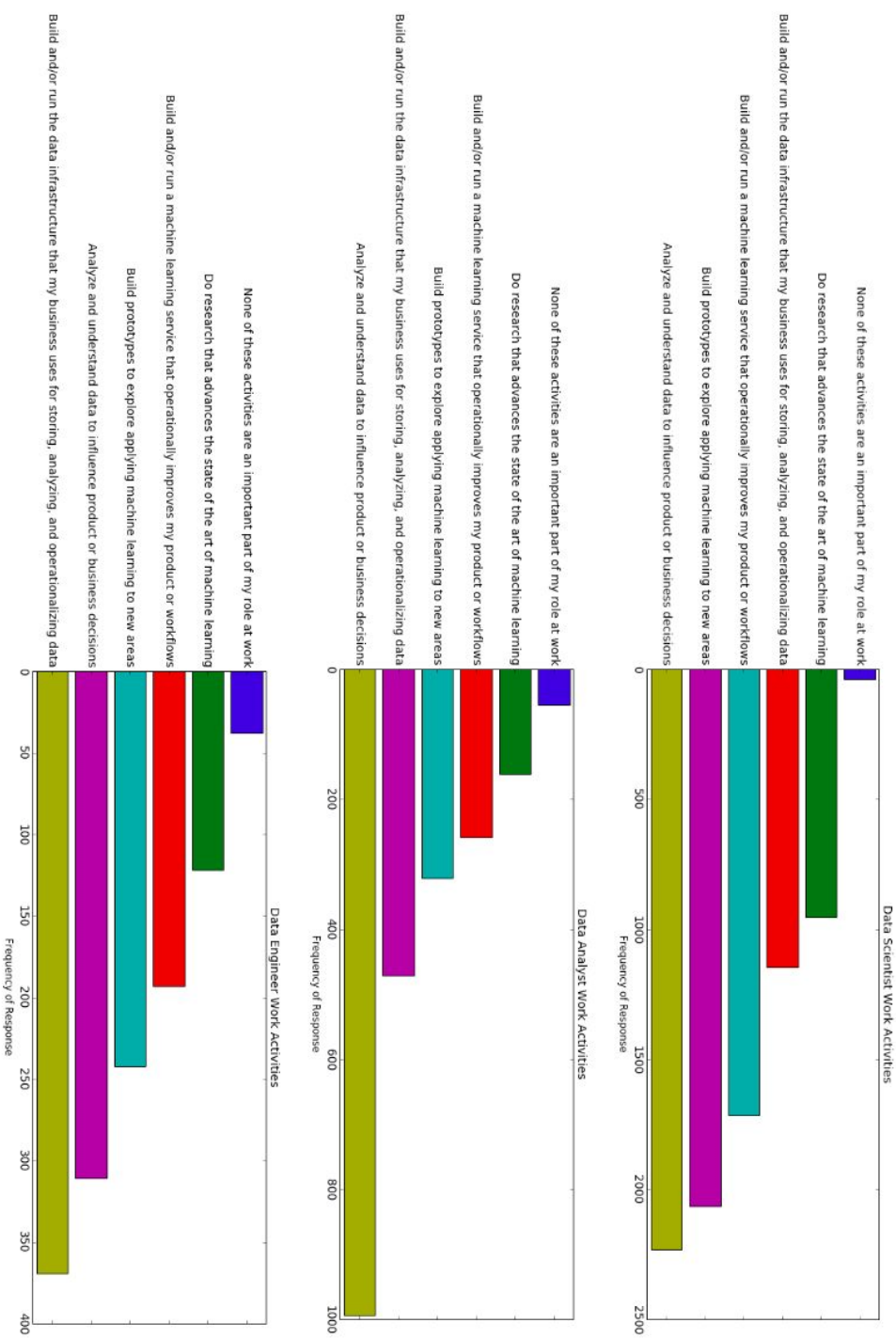
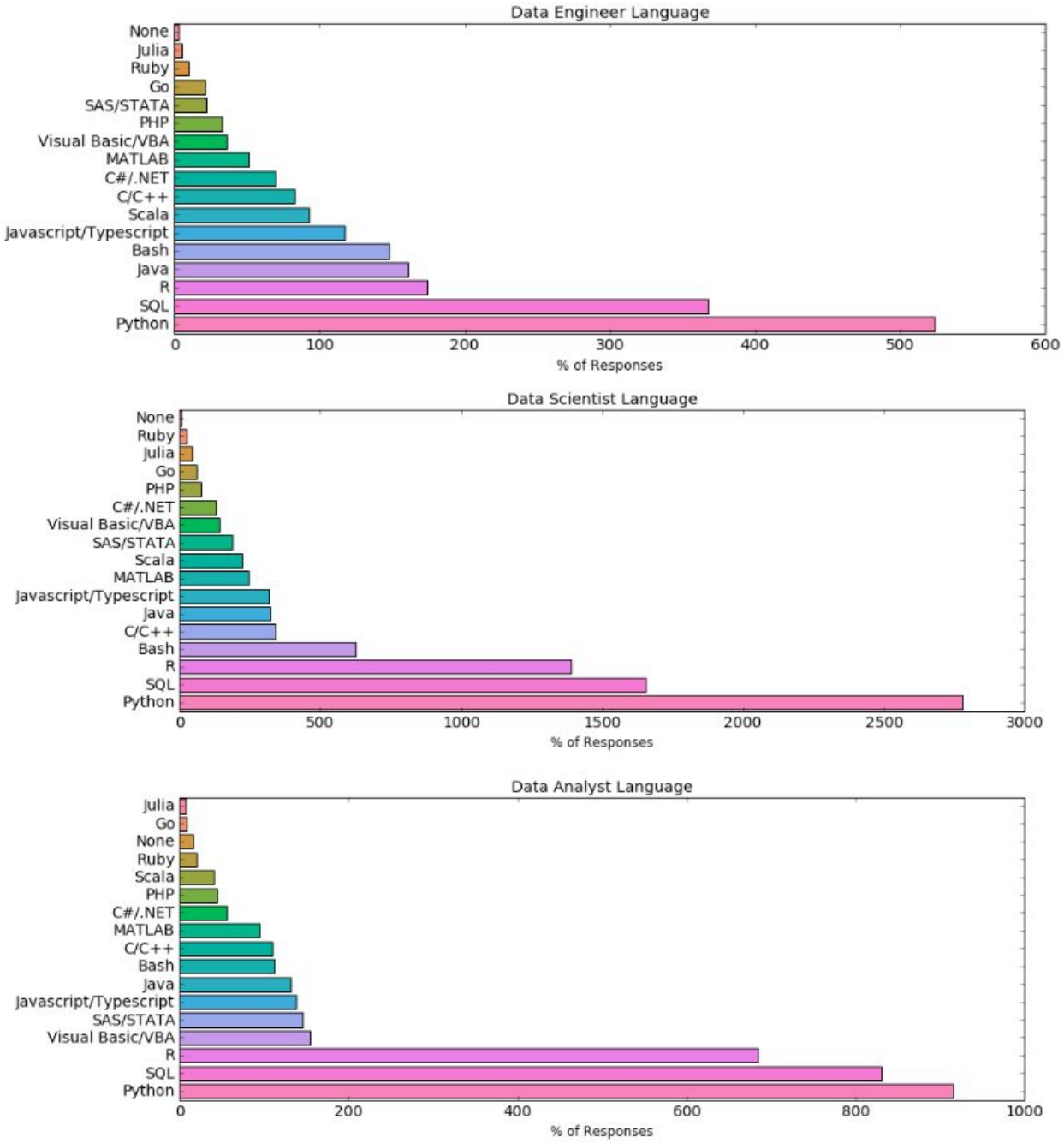
_SAS/STATA
Caret
Seaborn
Matplotlib
Python
Scikit-Learn
Plotly
_randomForest
_Xgboost
R
ggplot2
Tabular Data
Time Series Data
SQL
Numerical Data


ML library Breakdown
Scikit-Learn
Caret
Xgboost
Keras
randomForest
TensorFlow
Spark MLlib
H20
PyTorch
Fastai
Other
lightgbm
Prophet
mlr
CNTK
catboost
Mxnet
0
100
200
300
400
Q20

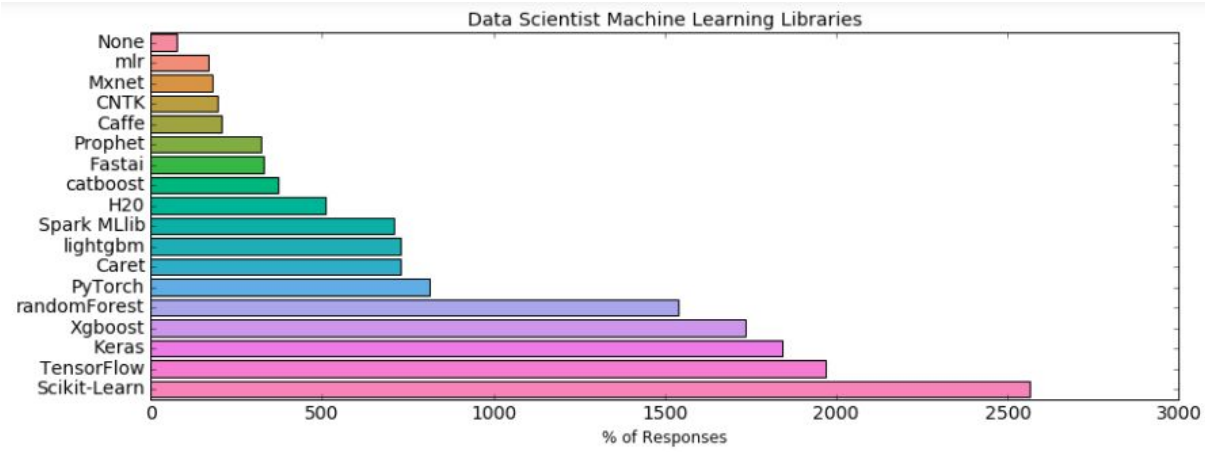
Appendix E2: Visualization of Three Data Science Roles

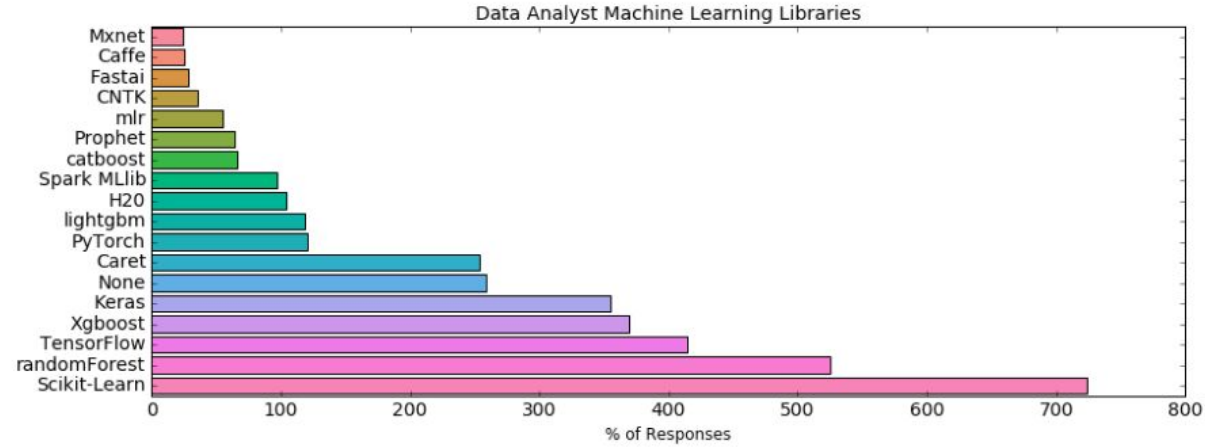


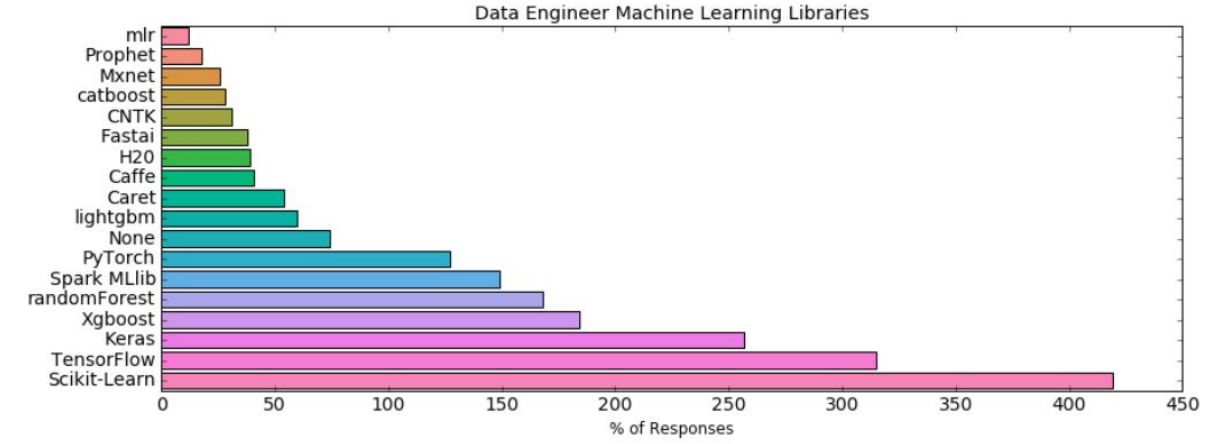
Appendix E3: Visualization of Three Data Science Languages



DE and Data Scientist also use scripting languages (Bash) and Java and C/C++. Data Analyst mostly use VBA. Less focus on ML libraries for Data analyst. For DS, much larger focus on applying a variety of data science tools.







Insights:

1. Generally touch on three most popular libraries: Scikit-learn, Tensorflow and Keras
2. Focus on Random forest for Data Analyst stream, less focus on applying and understanding ML libraries
3. Much larger focus on exposure to a variety of ML libraries and tools in Data Scientist and Engineers stream.

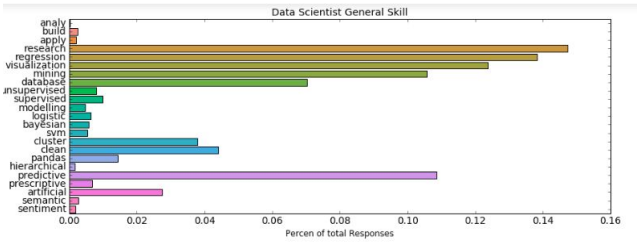
Appendix F: Master Feature Engineering List

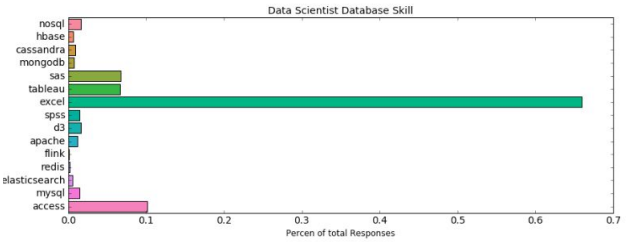
Segments	Key words
General Transferable Skills	Persuasion, consulting, innovation, lead, communication, presentation, writing, research
Technical Skills	Risk, operation, supply, program, simulation, decision, strategy, prediction, modelling, management, research, build, regression, visualization, mining, database, predictive, prescriptive, descriptive, semantic, sentiment, cluster, clean
Programming Languages	Excel, spss, tableau, rstudio, azure, python, sql, bash, java, javascript/typescript, vba, matlab, scala, julia, ruby, sas, bash, PHP, C#/.NET, visual basic/VBA, access, mysql, cassandra, hbase, apache, hadoop, elasticsearch,
Technical Tools	Regression, visualization, modelling, database, nosql, monogodb, sas, tableau, excel, spss, d3, apache, hadoop, hypothesis, inference
Math	Optimization, linear, integer, dynamic, projections, eigenvector, derivative, gradient, convex, matrix, composition, descent, taylor, stochastic, markov, time, series
Machine Learning	Topology, tuning, ensemble, supervised, unsupervised, reinforcement, regularization, convolutional
Machine Learning Libraries	MLR, Mxnet, CNTK, Caffe, Prophet, Fastai, catboost, H20, Spark MLlib, lightgbm, PyTorch, Caret, Keras, Xgboost, TensorFlow, randomforest, scikit-learn

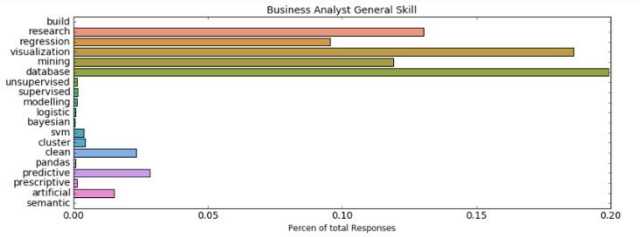
Appendix G: Comparison of Data Scientist and Business Analyst Skills

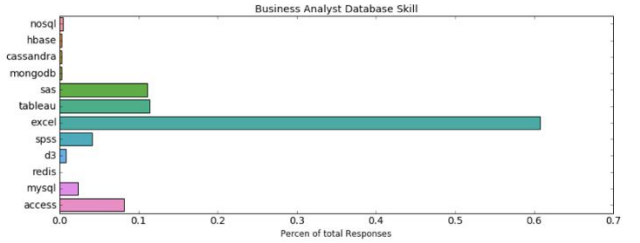
Data Scientist | Business Analyst

G1:

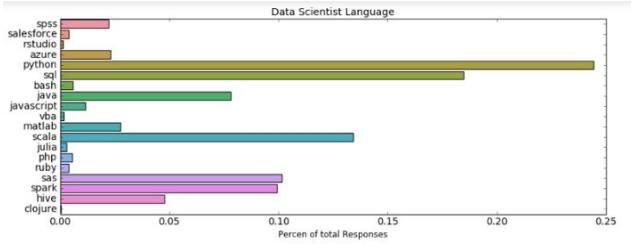


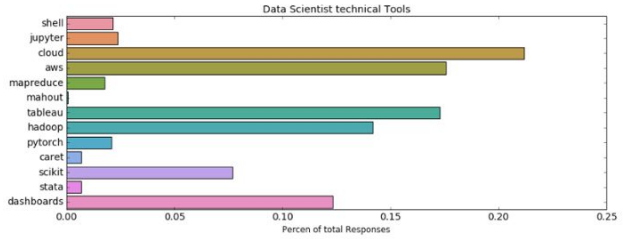


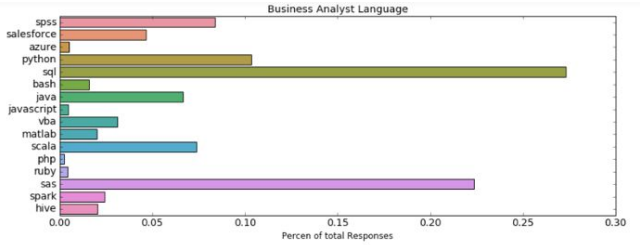


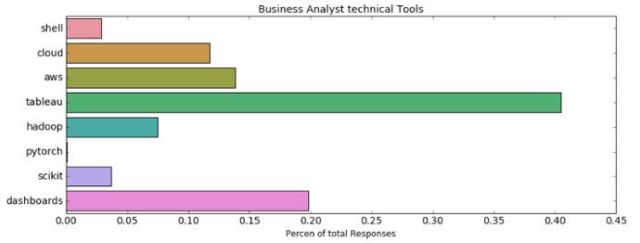


G2:

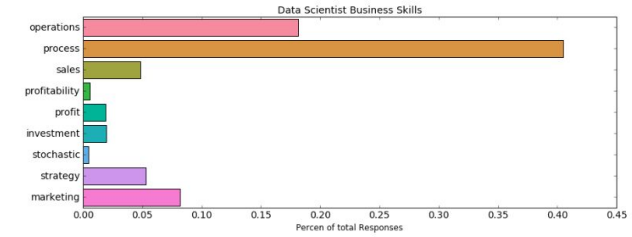


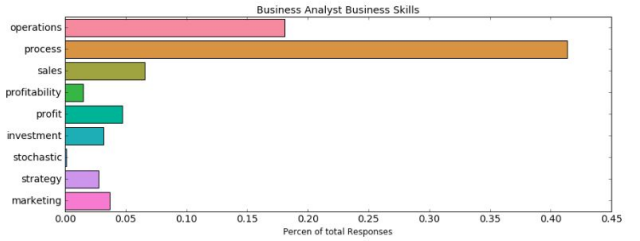




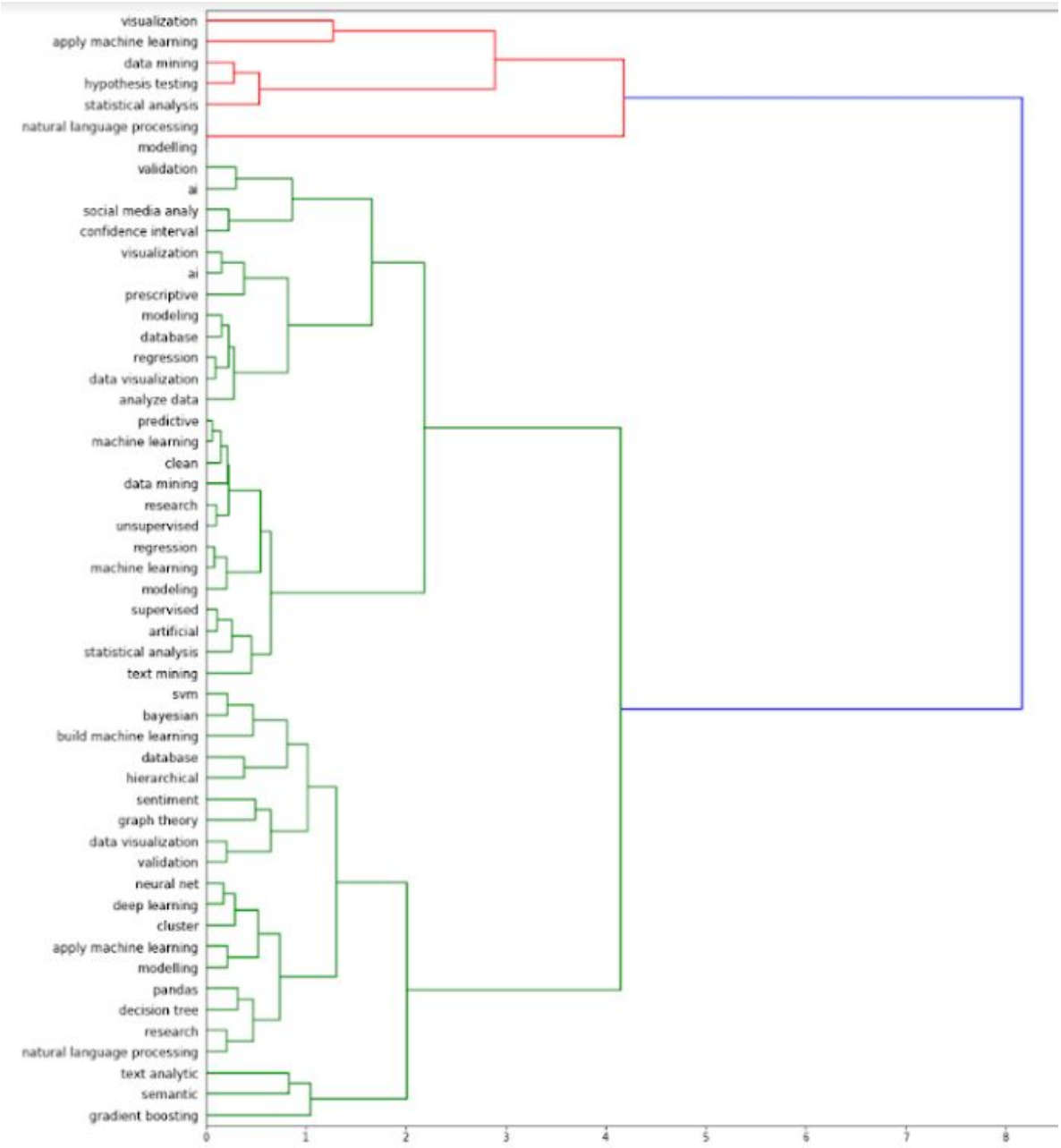


G3:





Appendix H: Clustering of Keywords from Kaggle Data



Appendix I: Ed Tech Bootcamp

CORE COURSES:

PYTHON PROGRAMMING AND BASIC MATH

- **Basic Introduction to Python**
  - List Manipulation, Functions and Variables, Datatypes, Control Structures, Data Analysis Packages (Numpy, Pandas etc.)
- **Basic Math**
  - Basic statistics, Probability distribution, Sampling, Hypothesis testing, Matrix computation and Factorization, Convexity, Gradient Vector, Hessian matrix

INTRODUCTION TO DATA SCIENCE AND ANALYTICS

- Introduction to Machine Learning, Linear regression and Logistic regression, Naive Bayes, Resampling and Model Selection, Cross Validation and Feature Selection, Regularization, SVM, Decision Tree, Bagging and Random Forest, Gradient Boost, Unsupervised Learning, Clustering.

APPLICATION SPECIFIC ELECTIVES:

DATA ANALYTICS IN FINANCE

- Finance Fundamentals, Rate of Return, Stocks and bonds, Covariance, Risk Management, Portfolio Management, Asset Pricing, Multivariate Regression Analysis, Monte Carlo Simulation (Applications including stock Pricing)

DATA ANALYTICS IN HEALTHCARE

- Predictive Modelling, Dimensionality reduction and Tensor Factorization, Graph Analysis, Computational Phenotyping, Patient Similarity Metrics, Medical Ontology, Implementation using MapReduce, Spark and Hadoop.

DATA SCIENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

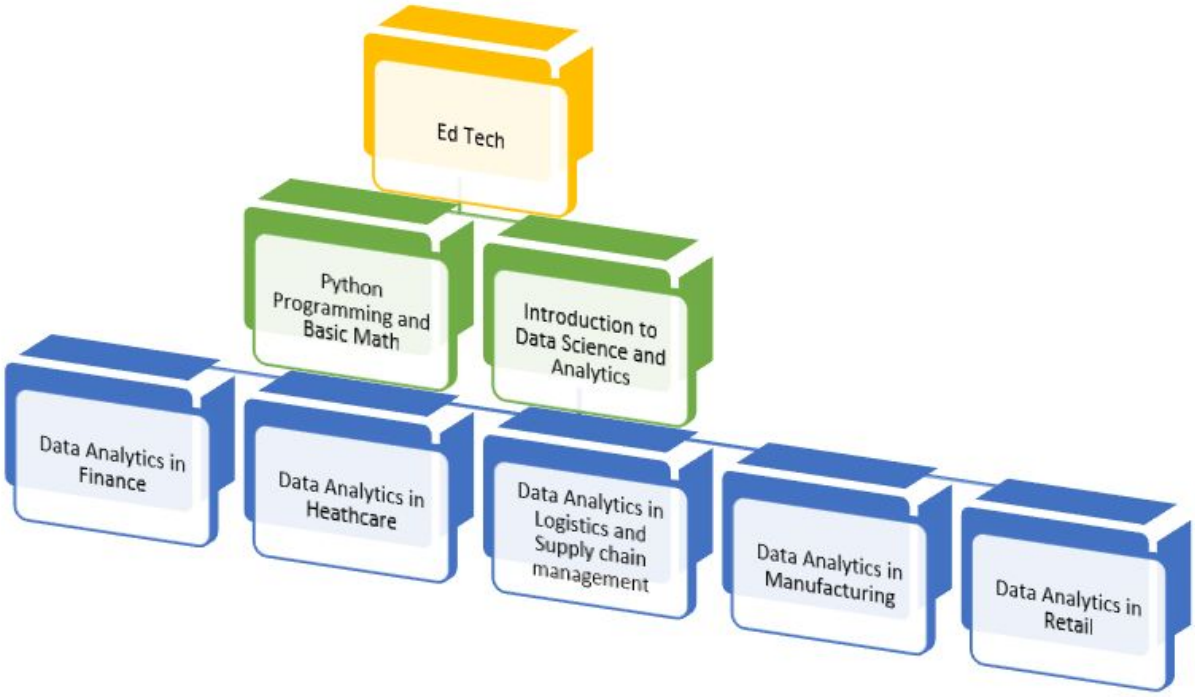
- Introduction to supply chain management and Logistics, Business Data Analytics, Supply Chain Analytics, Technology Management, Procurement fundamentals and Quality systems, Business and Research in Practise.

DATA SCIENCE FOR MANUFACTURING

- Introduction to Advanced manufacturing, Process Analysis and Product Flow Management Data Processing, Procurement Analysis, Inventory and Parts optimization, Predictive analytics in Maintenance and Quality control.

DATA SCIENCE IN RETAIL

- Introduction to digital marketing and customer data, Essential tools for business decisions, Statistical modelling and Machine Learning, Predictive analysis, e-commerce marketing.


Ed Tech
Python Programming and Basic Math
Introduction to Data Science and Analytics
Data Analytics in Finance
Data Analytics in Heathcare
Data Analytics in Logistics and Supply chain management
Data Analytics in Manufacturing
Data Analytics in Retail