



University of Essex
Department of Mathematical Sciences

MA199: LATEX REPORT

An Overview of BabyX A.I.

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Contents

1	Introduction	3
2	Background	5
3	Features and Capabilities	6
4	Mathematical Methods	9
5	Future Scope	10
6	Conclusion	11

Introduction

Technology is advancing faster and taking less time to be widely adopted than ever before, now it seems we're at the dawn of a new age, the age of A.I(Artificial Intelligence). Well the field of A.I. is more openly defined as the development of intelligent machines that can perform tasks that traditionally require human intelligence. For many years too many researchers are trying to figure out how to make the perfect A.I. that will be realistic and will have emotional intelligence & can collaborate together with humans to complete work faster & more efficiently.

That's where the project known as BabyX came into picture(Figure 1.1). In simple terms BabyX A.I. is a lifelike simulation of a toddler. It has the remarkable ability to make eye contact & interact with humans. The system is designed to recognize and respond to a wide range of emotions including happiness, sadness, anger & surprise & to learn from its interactions with humans over time.



Figure 1.1: Depiction of BabyX A.I. with Dr. Mark Sagar.[9]

This brilliant innovative system has been created by the well esteemed Mark Sagar who is the CSO(i.e. Chief Sales Officer) of the company known as Soul Machines Ltd. He had a vision of bringing the virtual world characters(i.e. movie characters because of his line of work in the film industry) to life so that the users could interact with them & perform many tasks without a hitch.

Background

BabyX A.I. is an innovative virtual assistant which consists of a combination of models of physiology,cognition and emotion with advanced lifelike CGI(i.e Computer-Generated Imagery),which gave birth to a new form of biologically inspired A.I. system developed by the New Zealand-based company known as Soul Machines.The development of the system was led by Mark Sagar,CSO where his vision of the future led him to think that humans and machines can cooperate with each other as one,only if the A.I. is made to be lifelike as possible.Thus he started where most life begins a baby and designed the system after his very own daughter.This system enables researchers to explore human cooperation with machines and the foundations for creating a digital consciousness.BabyX is based on the very concept of emotional intelligence which can perceive,understand and regulate emotions in oneself and others(Figure 2.1).

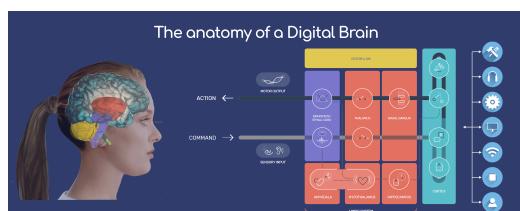


Figure 2.1: Anatomy of the Digital Brain in BabyX A.I.[2]

Features and Capabilities

BabyX A.I. is a lifelike simulation of a baby that has a virtual brain. So if we start to reveal her layers, she's driven by virtual muscles (Figure 3.1) and the virtual muscles, in turn, are driven by a virtual brain. Now, these are radically simplified models from the real thing, because we've a real template that exists, the human brain. So, the brain of BabyX is composed of neural networks. "Neural network" is a virtual, important, and simpler interpretation of the human brain. The brain has the most intricate system in the human body. It's got 85 billion neurons, each of which fire non-stop, entering, recycling, and transferring information.

Baby X's brain is nowhere near as complex, but that's the thing, instead of neurons, it's got nodes. The more the nodes are exposed to, the more they learn. It's hard to make a digital brain, but it's an A.I. trying to be human-like, which has a flexible intelligence and can relate to people (Figure 3.2). The system was designed to impersonate the cognitive and emotional development of a human child, by using the combination of computer vision, natural language processing (NLP), and machine learning algorithms (Figure 3.3).

Some of the key features and capabilities of BabyX A.I. include:

1. Facial recognition:

- BabyX A.I. can recognize and respond to human faces, using the web camera and computer vision algorithms.

2. Emotional expression:

- BabyX A.I. can display many emotions, like happiness, sadness, surprise, and fear, by using a combination of facial expressions and vocalizations.

3. Language processing:

- BabyX A.I. can understand and respond to the vocal language, using natural language processing (NLP) algorithms.

4. Learning and development:

- BabyX A.I. can learn and adapt over a period of time, by using machine learning algorithms that improve its responses to different types of actions.

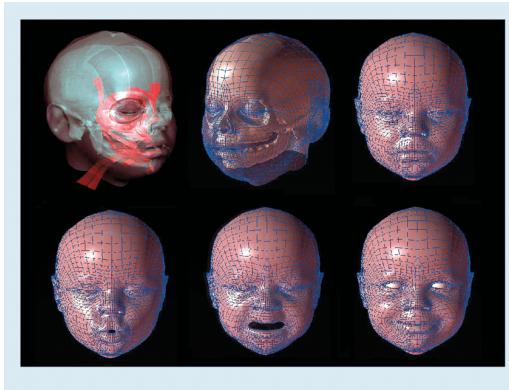


Figure 3.1: Face muscles of BabyX A.I. .[5]

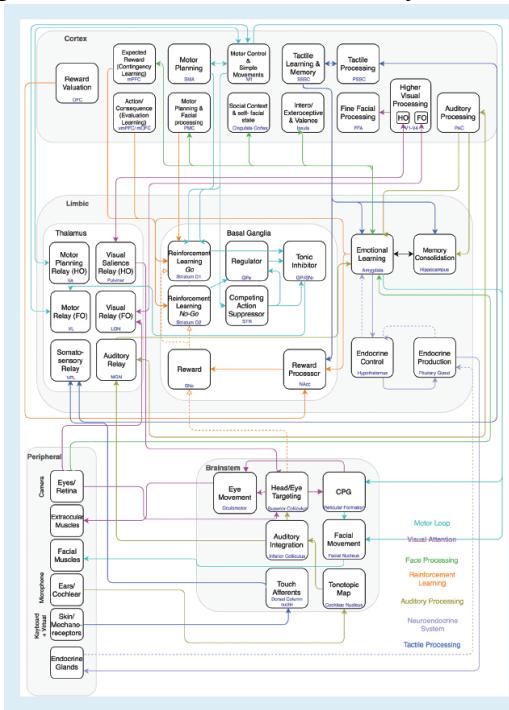


Figure 3.2: Avatars & Agents of BabyX A.I.[6]

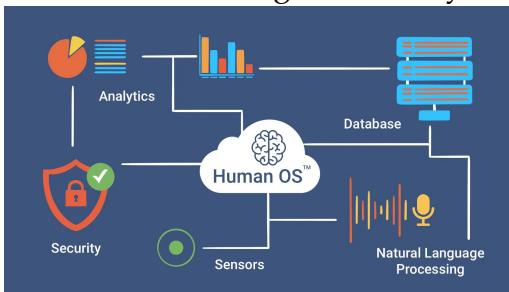


Figure 3.3: Working of BabyX A.I.[3]

Mathematical Methods

Baby X has many features that is impossible to carry out without gathering data. Every feature that BabyX shows can be explained by various mathematical methods. Some of the key mathematical methods of BabyX A.I. include:

1. Eigenfaces algorithm for face recognition:

-

$$\mathbf{w} = \mathbf{U}^T(\mathbf{x} - \bar{\mathbf{x}})[8] \quad (4.0.1)$$

2. Emotional expression:

-

$$E = \frac{\sum_{i=1}^N p_i \log p_i}{\log N}[1] \quad (4.0.2)$$

3. Language processing:

-

$$P(w_1, w_2, \dots, w_n) = \prod_{i=1}^n P(w_i | w_{i-1}, w_{i-2}, \dots, w_{i-k+1})[7] \quad (4.0.3)$$

4. Learning and development:

-

$$\theta_{t+1} = \theta_t + \alpha \nabla_{\theta} J(\theta_t)[10] \quad (4.0.4)$$

Future Scope

BabyX A.I. has great potential in different sectors of the world. BabyX A.I. is an A.I. system that is designed to have humanoid behaviors and interacts using the combination of computer vision, NLP(natural language processing), and machine learning techniques(Table 5.1). Some potential scopes of BabyX A.I. include:

Table 5.1: Scope of BabyX in different industries.[4]

Industry	Scope of BabyX
Education	Interactive learning assistant
Entertainment	Virtual characters and performers
Healthcare	Virtual medical assistants and patient education
Financial Services	Virtual financial advisors and customer service
Professional Services	Virtual assistants for administrative tasks
Retail	Virtual sales associates and customer service
E-commerce	Virtual personal shopping assistants

These are just some samples of the potential scopes of BabyX A.I. As the technology keeps on evolving and new applications are developed, the scope of BabyX A.I. is expected to grow even more.

Conclusion

BabyX is an advanced A.I. system that can interact with humans in a more natural and humanly way rather than engaging like the traditional A.I. systems. Developed by researchers at the University of Auckland(Figure 6.1), BabyX applies a combination of neural networks and computer vision algorithms that create a virtual baby that can understand and respond to human expressions, mannerisms, and voice.Because of its lifelike movements and facial expressions, BabyX can create a sense of emotional connection with humans,which makes it a promising tool for many applications, including education, therapy, and entertainment. Still, there are also some ethical and social issues because of the development and use of A.I. systems like BabyX.As A.I. systems become more advanced and human-like, there might be a risk of not distinguishing between humans and machines, which could have implications on society as a whole. Overall,BabyX represents a huge advancement in the field of A.I., that is important to continue considering the potential benefits and risks that come with this technology as it evolves and becomes a tool that we will use frequently in our lives.



Figure 6.1: BabyX A.I. developed by Soul Machines.[2]

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MA199 Assignment 4.1: Self-Awareness

14 March 2023 at midday; submit via FASER

Student Registration Number:	2211606
Name of Personal Tutor:	Dr Jingjing Zhang

Summary

This assignment is worth **20% of your final MA199 module mark**. This assignment is in 5 parts, where each part is worth 5%. You are expected to reflect critically on your own self-awareness in the context of career decisions and planning. High marks will be awarded to candidates who demonstrate a good level of breadth and depth to their responses. Where possible, you should also provide evidence and attempt to quantify/qualify what you write

Your submitted work is expected to be about 2 pages of A4. You may wish to produce the personal profile document in the self-awareness based lesson on Moodle to help you with this (link is available on the MA199 Moodle page)

The text boxes will expand as you write – you don't have to restrict yourself to the space given.

Part 1: In the box below you should **tell your story**. Outline your background, previous education and experiences, values, motivations and give some details about why you are studying your postgraduate course.

My interest in data science became apparent when I was learning how to visually portray data in my initial years of education. I discovered that tons of data were almost invariably available on anything and everything all the time. Still, we are unsure about how to display it so that everyone, including those not directly involved in a project, can understand its fundamental ideas or messages. Later on, attending a Ted Talk in Mumbai opened my eyes to the fact that every decision in the world depends on the available set of data or information since we are essentially helpless and unable to make progress on any issue without data or its analysis. This was the turning point in my life when I felt my inner calling. In pursuance, I applied for and was accepted into the Mumbai University's Bachelor of Science in Information Technology program. After graduating with honors, I became even more interested in learning about data because everything in the modern world depends on it. Since I had studied science in my class Xth and have a STEM background due to the science stream I selected in my XIIth, I am interested in AI development, machine learning, and deep learning. Furthermore, I am also interested in other electives that include an AI component. A foundational understanding of several technologies, languages and ways to extract data is needed to construct an AI. I decided to pursue a bachelor's degree in information technology since it was focused on a lot of new technologies, applications, and even the advancement of artificial intelligence, to an extent. I was particularly interested in three topics during my bachelor's degree: data visualization, Python, and SQL. Artificial intelligence and machine learning are two other topics that excite me greatly. I realize that building artificial intelligence prototypes requires Python. Throughout my academic career in my MCA (Master's in Computer Applications), I worked on a variety of projects in addition to my studies. I had been busy throughout the first year working on a website called Online Marketing Services. We also implemented file-sharing over the TCP network. We created a website for car dealership and an attendance tracking system in the second year. In my third year, I worked on creating an automated document management system and a chatbot. During my summer internship with Nucsoft Ltd, Mumbai, I also worked on a six-month-long project: Infini-Pay. The judges gave each of these efforts high marks and expressed their appreciation. In addition, my Master's Business Intelligence module provided me the strong foundation I needed to comprehend the all-pervasive significance of data. Furthermore, my desire to acquire a comprehensive understanding of all the areas and components of technology that Data Science comprises led me to pursue a master's degree in computer application, which provided an overview of all types of essential technologies used in creating any application. During my internship, many new technologies for developing Java projects were introduced to me. I gained hands-on experience developing APIs in Spring Boot and even learnt how to create front-end applications in Angular. While we were developing microservices, I came up with the idea of using different platforms to manage the APIs, such as WSO2 Gateway and Kong Gateway. I also managed to work with databases using tools such as MS SQL and MYSQL. Handling databases helped me understand the SQL language. Apart from academics, I was highly interested in extracurricular activities. I was a core planning and management committee member for my college's Roobaroo fest. I also worked for the CSI (Computer Society of India) as a bachelor's student. As a sports enthusiast, I participated in my college's football team as also in tug-of-war team, which won medals at the university level and later went on to win competitions in other colleges. I was awarded silver medal for finishing second in the BMC's tug of war competition (Brihanmumbai Municipal Corporation). My current self is an outcome of these foregoing interaction, interface, and experiences. Working with different and diverse mindsets has helped improve my interpersonal and communication skills. Now, looking forward to the future, I plan to research and learn various algorithms and programming language capabilities currently used to create AI. In addition, I would like to investigate various methods for making AI more real-life and bringing out more than a virtual assistant like Jarvis, as

brilliantly depicted in the Iron-Man films. This AI development will be extremely beneficial because it will increase work efficiency. Furthermore, my long-term goal is to work with a large organization like Google so that I can be involved in creating programs and policies, touching the lives of billions of people. It must provide a haven for learning and development for people of all socio-economic backgrounds and develop exciting applications that will help many people by making their lives easier. After weighing my options, I decided to pursue a master's degree in Data Science & its Application at the University of Essex. My interest had been piqued by the university's carefully designed academic program coupled with the campus amenities. Moreover, it would be wonderful to study at the university under the able guidance of eminent professors with decades of expertise. Therefore, I am certain that the university's Master's program will give me a secure and dynamic environment to perfect my skills and help me put them to good use in the interest of the future organization, I intend to work with, and the society at large.

Part 2: When are you at your best? When are you not at your best? Reflect on when you tend to do well, when you feel motivated and driven. Then think about when you tend to feel drained or demotivated.

Well, I may feel drained or demotivated when I am overwhelmed by the amount of information I need to learn, lack of support or guidance from my instructors or peers, or feel discouraged by setbacks or failures. I do get burned out because of my overthinking which is a significant factor that leads to feelings of exhaustion and lack of motivation. Despite these setbacks I try to stay motivated by staying organized, stop overthinking by working on the next task, setting achievable goals, seeking help from instructors or mentors when needed, play football or go to the gym to prevent burnout, and try to maintain a positive attitude towards life and studies. I feel motivated whenever I see some of the movies on the biggest inventions or watch any movies on science fiction or real events because it motivates me to create or invent new technology like the characters in the movies.

Part 3: What do you consider to be your strengths? What do you consider to be your weaknesses? Explain your answers - what made you choose these and in what ways do your strengths and weaknesses come out?

Well, my biggest weakness would be where I overthink about things too much. For example, if there is a test, I would do my best to study for the test but before appearing for the test I get very anxious even after I have studied a lot for that module. Because of this I am at times unable to recollect what I had studied for the test. This then leaves a negative impact on my future endeavors. Despite this weakness I have a 'never give up' attitude and keep working hard on anything that I pursue – and that's my biggest strength. Whenever I try to complete a task that seems un-achievable or I am told by others that it would be too much for me and that I cannot handle the task, with my tenacity, perseverance and hard headedness I plough through the pressure and prove them wrong. The same can be said of participation in sports. Many have criticized my huge stature that I would not be a physically better fit than anyone in my age group. But I proved them wrong too by working out and exercising daily. I am also good at multitasking and staying calm because I work well under pressure. Another weakness of mine is that I am a real jack of all trades because I get distracted by many things and try to participate or try out every new thing that comes my way. Another strong point of mine is that

MA199 Assignment 4.1: Self Awareness

I'm aware of my weaknesses, ready to amend and keep working on them, day in and day out. Indeed, joining the discipline of a Master's program at the University of Essex has been part of my multi-faceted efforts towards exorcising my weaknesses fully.

Part 4: Consider your values, motivations and interests (in your personal and professional life) Identify your **3 most important ones** and outline why you chose them and how they impact upon you.

I am very much interested in playing football as it is a sport where a player has to read the field and come up with strategies to win. This can also help in analyzing real world problems and deciding the course of action accordingly in a group of people/society and even on how to approach many tasks related to studies as well.

The motivation I draw from watching movies on some of the biggest inventions or any science fiction or real events. They drive me to create or invent new technologies like the characters in the movies and inspire the inventor mindset in me. This has helped me greatly in the past as enriching me with a creative mind. As a result, I always aspire to create new projects across different technologies and keep my research efforts on for many things.

At the end, I stay organized and set for myself achievable list of goals and tasks for each day which has greatly helped me to stay focused on the things that have high priority. I also love exploring new technologies and traveling as well, we can say they go hand in hand because we keep discovering new and amazing things.

Part 5: What have you learnt from your answers in Part 1-4? How might this inform your plans for the future, your time at Essex or the actions you might need to take to get to where you want to be?

Part 1-4 has been a journey in soul searching, delving deep down into the mind's Mariana Trench and finally coming up with a plan for further inner engineering. Well, all things considered I have now a broader view on my weaknesses and strengths. I now know on what to work on and improve upon. I must come up with a decision on a particular technology that I should learn and work upon rather than dabbling around across different technologies at a time. It is good to learn many things but I must work and perfect my control over only one technology that will help me to progress further to my desired dream position. I must have confidence in my own skills and not doubt myself every time. I must complete everything within the deadlines in a systematic manner and not take too much pressure on myself. So I can relieve myself from worries and be happy. If I require any support I should always look forward to my lecturers, friends, and family so that I can resolve problems in no time and move ahead.

MA199 Assignment 4.2: Opportunity Awareness

14 March 2023 at midday; submit via FASER

Student Registration Number:	2211606
Name of Personal Tutor:	Dr Jingjing Zhang

Summary

This assignment is worth **20% of your final MA199 module mark**. For this task, you need to independently explore and research job roles and job sectors to investigate the graduate labour market. This includes both job roles where a Maths degree is essential, as well as those careers where a Maths degree is useful or can be an advantage. Using the information gathered for your self-awareness assignment you will personalise your research and assess your current labour market position.

This assignment can also be adapted to explore PhD and research opportunities (such as KTPs and operational research), including an evaluation of PhD programmes.

The following events and resources may be useful for this task:

- Careers Centre (including online resources at www.essex.ac.uk/careers)
- Seminar slides on Moodle
- IMA Maths Careers website: <http://www.ima.org.uk/careers.cfm>
- Prospects website: <https://www.prospects.ac.uk/>

For this assignment you will need to do your own personalised and independent research and then undertake the following tasks:

1. Research job profiles and identify one role that interests you and is appropriate to pursuing a career in a Maths-related area.
2. Identify a second job profile that interests you, where a Maths postgraduate degree is not essential, but would give you an advantage.
3. Pick one of the above job profiles and explain in detail what this job involves and the skills needed for success. Reflect on the extent to which you meet the skills requirements for the role.
4. Investigate a job sector that you would like to find out more about. For this sector, explain three key trends in the sector and identify three companies or organisations recruiting in this sector.

In all cases you must explain where you get your information from.

MA199 Assignment 4.2: Opportunity Awareness

The word counts are for guidance only and you will not be penalised for going over / under as long as all relevant information is included.

The text boxes will expand as you write – you don't have to restrict yourself to the space given.

Section 1 – Identify a job role that interests you and is appropriate to pursuing a career in a Maths-related area

In the box below you should outline the results of your research into a Maths related job role.

You must explain the sources where you get your information from. (*Word guide – 50 words for each heading.*)

- 1. Job Role:** AI/ML (Artificial Intelligence/Machine Learning) Engineer

- 2. Typical duties and responsibilities:** Studying and transforming data science prototypes, designing machine learning systems, researching, and implementing ML algorithms & tools, developing machine learning applications according to the requirements, selecting proper datasets & data representation methods. Running machine learning tests & experiments. Performing statistical analysis and fine-tuning according to the test results. Should be capable of creating AI solutions and applying the right solution to the problem. Extend various existing and ML libraries and frameworks. Must be learning new technologies and should be aware of things in the industry. Collaborating with software engineers, product managers and data scientists to make better projects.

- 3. Entry Qualifications:** Bachelor's degree in IT, computer science, statistics, mathematics, and data science; Master's degree in these fields will be an added advantage. Certifications in data science, machine learning.

- 4. Skills, qualities and attributes required for the role:** Ability to code in Python, Java & R, knowledge in mathematics, probability, statistics and algorithms. Have a clear understanding of data structures, data modelling and software architecture. Complete understanding of machine learning frameworks (like keras, NumPy or PyTorch) and libraries (like scikit-learn). Having great analytical, problem solving and visualization skills. Having excellent communication skills.

- 5. Professional Development/professional examinations:** Many organizations offer certification programs in AI/ML, including Google, Microsoft, and IBM. These certifications would provide an expertise in specific areas of AI/ML to improve the career prospects. There are many professional associations that offer resources, networking opportunities, and training programs in AI/ML. Online courses offer courses in AI/ML, from beginners' courses to advanced topics. The courses can provide a solid foundation in AI/ML concepts and techniques. Attending conferences and workshops and to stay up-to-date with the latest developments in AI/ML.

Sources of information: TechTarget, Spice works, Workable, Glassdoor, LinkedIn, Google Careers, Stack Overflow, Prospects, Indeed, Intellipaat.

MA199 Assignment 4.2: Opportunity Awareness

Section 2 – Identify a job role that interests you where Maths is not essential but would give you an advantage

In the box below you should outline the results of your research into a job role where Maths is not essential but would give you an advantage.

You must explain the sources where you get your information from. (*Word guide – 50 words for each heading.*)

1. **Job Role:** Data Analyst
2. **Typical duties and responsibilities:** They use data mining to extract data sets and identify correlations and patterns. They use data to predict the trends in the customer base and the consumer population. They perform statistical analysis of the data by using tools and techniques to visualize the data in understandable formats like graphs, pie charts or diagrams. They monitor the data quality and clean the corrupt data. They prepare reports and present them to the managements or clients. They identify or recommend new cost-effective ways to save money by improving the business process. Organize and transform the information into understandable structures. Excellent at communicating with the stakeholders to understand data content and business requirements. Create dashboards, graphs, and visualizations. Manipulating data or auditing the data according to the client's wishes.
3. **Entry Qualifications:** Candidates would require a bachelor's degree in computer science or economics; if there is a Master's degree in the field of data science or data analytics, it will be an added advantage.
4. **Skills, qualities and attributes required for the role:** Candidates should have good numerical and analytical skills, have knowledge of data analysis tools like Excel, Tableau, SQL, R, and Power BI. Knowledge in data modelling data cleaning and data enrichment techniques. Strong communication skills. Understanding of data protection issues. Having the ability to carry out data quality control, validation and linkage.
5. **Professional Development/professional examinations:** Many organizations offer certification programs in data analysis, including Google, Microsoft, and IBM. These certifications would provide an expertise in specific areas of analysis to improve the career prospects. There are many professional associations that offer resources, networking opportunities, and training programs in data analysis. Online courses offer courses in analysis, from beginners' courses to advanced topics. The courses can provide a solid foundation in data analysis concepts and techniques. Attending conferences and workshops and to stay up-to-date with the latest developments in data analysis.

Sources of information: Indeed, Coursera, Prospects Glassdoor, LinkedIn, Google Careers, Stack Overflow.

MA199 Assignment 4.2: Opportunity Awareness

Section 3 – Explore the extent to which your self-awareness of skills meets the requirement of the job opportunity (matching self-awareness to opportunity awareness)

You should choose either the job role identified in Section 1 or the Section 2 job role and explain in detail the skills, quality and attributes needed for success in the role. Revisit assignment 4.1 Self Awareness and reflect on the extent to which you meet the skills requirements for this role.

You must explain the sources where you get your information from.

(Word guide – 200-300 words in total)

1. Job role being investigated: AI/ML Engineer

2. Skills, qualities and attributes needed for success in the role: The applicant must have a pretty strong foundation in mathematics, including calculus, linear algebra, probability theory, and statistics. Programming skills in languages such as Python and R are essential. Knowledge of data structures, algorithms, and object-oriented programming concepts are also very much needed. AI/ML engineers must have a good understanding of various machine learning algorithms and techniques, like supervised and unsupervised learning, deep learning, and reinforcement learning. Experience in data analysis, data manipulation, and data visualization is very much needed. AI/ML engineers should be able to think critically and creatively to solve complex problems. They need to pay attention to detail so that they must be detail-oriented to ensure that their algorithms and models are accurate and reliable. They must cooperate with other professionals in the organization, including data scientists, software engineers, and product managers. So they need to have a strong communication, teamwork, and interpersonal skill. AI/ML engineers must keep up with the latest developments in their field.

3. Reflection on the extent to which you meet the role requirements:

I hold a BSc in Information Technology and a Master's in Computer Application. I'm currently pursuing MSc in Data Science and its Applications. So, I've the requisite qualifications. I also meet the role requirements because I am fascinated with new technologies and keep exploring and learning many new things. I am also resourceful because of my never-give-up attitude that motivates me to practise and upgrade my programming skills to become a better programmer. I am also good at multitasking and reading the situation or problem which helps AI/ML engineers to creatively solve complex problems. As I like to stay organized which will definitely help me in focusing and, thereby, developing machine learning algorithms and techniques, like supervised and unsupervised learning, deep learning, and reinforcement learning, because algorithms are nothing but a set of instructions to carry out a particular task. As I know how to work in a team by playing football as part of my hobby, I can easily collaborate with other professionals in the organization.

Sources of information: TechTarget, Spice works, Workable, Glassdoor, LinkedIn, Google Careers, Stack Overflow, Prospects, Indeed.

MA199 Assignment 4.2: Opportunity Awareness

Section 4 – Investigate a job sector you would like to know more about

For this sector, explain three key trends in your chosen sector and identify three companies or agencies recruiting in this sector.

(Word guide – 200-300 words in total)

1. Job sector being investigated: Technology, Manufacturing, Retail and e-commerce

2. Three key trends in this sector: Technology: Natural Language Processing (NLP) where the masterminds in the technology sector are working on NLP systems like virtual assistants, chatbots, and sentiment analysis. NLP is also being used in areas like content creation, social media monitoring, and client service.

Computer Vision is another trend that involves using AI/ ML to dissect and interpret images and videotape.

Computer vision is being used in operations like independent vehicles, security and surveillance, and medical imaging. Reinforcement learning is where AI/ ML involves training algorithms to make opinions grounded on prices and penalties. This is being used in areas like gaming, robotics, and independent systems.

Manufacturing: Predictive conservation is using AI/ ML to prognosticate when machines will need conservation or form, in order to avoid expensive time-out. This involves analyzing data on machine performance, wear and tear, and other factors. Robotics and Automation uses AI/ ML to ameliorate effectiveness and productivity in manufacturing processes. This includes operations like independent vehicles, assembly line robots, and quality control systems. Quality Control uses AI/ ML to identify blights and ameliorate product quality. This involves assaying data on product performance, examination results, and other factors.

Retail and e-commerce: Personalization is using AI/ ML to epitomize their immolations to individual guests involving assaying data on client gesture preferences and purchase history to produce individualized recommendations, elevations, and gestures. Supply Chain Optimization uses AI/ ML to optimize the force chain. This involves assaying data on demand, force, and logistics to ameliorate effectiveness and reduce costs. Fraud Detection uses AI/ ML and is being used to descry frauds in retail and ecommerce, similar as relating fraudulent deals or fake reviews.

3. Three companies or agencies recruiting in this sector:

Technology sector:

Google is retaining AI/ ML masterminds for systems similar as Google Cloud, Google Assistant, and YouTube.

Microsoft is retaining AI/ ML masterminds for systems like Cortana, Dynamics 365, and Azure.

Amazon is retaining AI/ ML masterminds to work on systems like Amazon Alexa, Amazon Rekognition, and Amazon Sage Maker.

Retail and e-commerce sector:

Walmart is using AI/ ML to optimize its force chain, ameliorate its client experience,

MA199 Assignment 4.2: Opportunity Awareness

and make better business opinions. The company is retaining Rekognition AI/ML masterminds to work on systems like demand soothsaying, fraud discovery, and force operation.

Amazon is also using AI/ ML in its retail and e-commerce operations, and is retaining AI/ML masterminds to work on systems like product recommendations, personalization, and fraud discovery.

Macy's is using AI/ ML to ameliorate its client experience, epitomize its immolations, and optimize its force chain. The company is retaining AI/ML masterminds to work on systems like chatbots, demand soothsaying, and force optimization.

Manufacturing sector:

General Electric(GE) is using AI/ ML to ameliorate its operations, including prophetic conservation, force chain optimization, and quality control. The company is retaining AI/ ML masterminds to work on these and other systems.

Siemens is using AI/ ML to ameliorate its products and operations, including artificial robotization, robotics, and prophetic conservation. The company is retaining AI/ ML masterminds to work on these and other systems.

Ford is investing heavily in AI/ ML to ameliorate its manufacturing processes and vehicles, including systems like independent driving and prophetic conservation. The company is retaining AI/ ML masterminds to work on these and other systems.

Sources of information: TechTarget, Spice works, Workable, Glassdoor, LinkedIn, Google Careers, Stack Overflow, Prospects, Indeed, Intellipaat

MA199 Assignment 4.3: Decision Learning

14 March 2023 at midday; submit via FASER

Student Registration Number:	2211606
Name of Personal Tutor:	Dr Jingjing Zhang

Summary

This assignment is worth **20% of your final MA199 module mark**. For this task, you should create a realistic and achievable career and professional development plan, narrowing down a broad range of potential job roles to more focused goals. You should identify two goals: one career-related and one professional development goal and specify the actions necessary to help you achieve these goals. Each action in your development plan should be prepared using SMART objectives to help you accomplish your goals.

The following resources are useful for this task:

- Seminar slides on Moodle
- 'Career Action Planning' course on Moodle

For this assignment you will need to do your own personalised and independent research and then undertake the following tasks:

1. Identify one career-related and one professional development goal.
2. For each goal identify a number of specific actions you can take to work towards your goal.
3. Set SMART objectives for each action using the template below.

In all cases you must explain where you get your information from.

The text boxes will expand as you write – you don't have to restrict yourself to the space given.

- Career-related goal: (for example, exploring a specific job role or sector): Exploring the job roles of AI/ML Engineer and Data Analyst**
- Overall target date for achieving this goal: 65 days**

Sources of information:: prepinsta, AI expert roadmap, Quora, Indeed, Glassdoor, LinkedIn, Wikipedia, Google Careers, Stack Overflow

What are the Specific actions I need to take to achieve my goal?	What will my Measurable success criteria be?	What support or resources will I need to Achieve this action?	How is this Relevant to my future career plans?	What is the Target date for accomplishing this action?
Understanding some of the skills of the job roles.	I will choose the proper job role before the target date	LinkedIn, Glassdoor, Google Careers, Indeed	It will help me to choose my path after my Masters	3 days
Look into the Companies with the openings with these job roles.	Made a road map to understand what it would take to get the job role.	LinkedIn, Glassdoor, Google Careers, Indeed	Getting to know the requirements of the companies before applying	2 days
Look into some of the certifications required to stand out for the job roles	Attended several workshops and did many certifications too boosting the cv	Coursera, LinkedIn Learning	Improving my CV and skill set	20 days

Work on the skills of the job role	I would have a better handle on the programming languages which are used in both the job roles that I have chosen	YouTube, prepinsta, Github	Practised many exercises in programming and have mastered the language	20 days
Work on projects that are favorable for both the job roles	Improved my skills in a new domain.	YouTube, GitHub, prepinsta	Worked on real-life projects that would showcase my skills	20 days

<p>1. Professional development goal: (for example, improve my oral communication skills): Building up my technical skills in python and R</p> <p>2. Overall target date for achieving this goal: 56 days</p> <p>3. Sources of information: prepinsta, Indeed, Glassdoor, LinkedIn, Wikipedia, Google Careers, Stack Overflow, roadmap.sh</p>				
What are the Specific actions I need to take to achieve my goal?	What will my Measurable success criteria be?	What support or resources will I need to Achieve this action?	How is this Relevant to my future career plans?	What is the Target date for accomplishing this action?

Understand the basics of Python	When I will not make silly mistakes while coding	YouTube, roadmap.sh, w3schools	This will help to have a greater perspective on python	7 days
Understand the basics of R	When I will not make silly mistakes while coding	YouTube, roadmap.sh, w3schools	This will help to have a greater perspective on R	7 days
Try programming exercises in python & R	When I can solve any exercise that I have been given	Code wars, HackkerRank, Leetcode	It will help me to see how much I have learnt and whether it is sufficient or not.	14 days
Develop better understanding of programming logic & data structures implemented in programming	When I can solve the real-life problems with coding and have no problems in understanding the logic of any code. I should be able to implement the data structures in my programs.	YouTube, Coding Tutorials	I will be able to understand the programming logic and data structure and try to implement it in various projects.	14 days
Build various projects with python	When I develop applications and do some part-time freelancing projects for the clients	YouTube, Github	This will help me to boost my CV but will also help me to get a better handle on the language.	14 days

MA199 Assignment 4.4: Transition Learning

14 March 2023 at midday; submit via FASER

Student Registration Number:	2211606
Name of Personal Tutor:	Dr Jingjing Zhang

Summary

This assignment is worth **20% of your final MA199 module mark**. You are required to search out and find a real postgraduate level job, or postgraduate level training, or further postgraduate study, that you would be interested in applying for, complete the application form and/or write an updated CV and covering letter (making them specific to the position in question), attend an interview, and then reflect on the whole application process.

There are four parts to this assignment:

- i) You must first search out and find the position or postgraduate programme you are interested in. You then need to provide evidence of this position or programme (it must be a real position at postgraduate level or equivalent and a real postgraduate programme). Examples of 'evidence' would be a copy of the job advert, details of the course and institution you are applying for, etc. Note that the postgraduate level position is interpreted in a broad sense and it is fine to include (for example) details of a PhD course you are applying for. You should also write a short reflective statement explaining why you are interested in this position or programme.

(Part i mark is worth 5%)

- ii) You should provide a copy of the application form that you have prepared (if the position or programme has one; a screen grab or picture is fine for this if it is an online form) or alternatively, an updated copy of your CV and a covering letter (adapted and made relevant for this particular position or programme of study).

(Part ii mark is worth 8%)

- iii) You should attend a postgraduate level interview and briefly reflect on how you feel you did and what you learnt from the experience. Note that the interview needs to be at postgraduate level but does not necessarily have to be directly linked to the job application in parts i) and ii) if this is not possible.

(Part iii mark is worth 5%)

- iv) You must write a final short reflective statement about the whole application experience, explaining what was difficult (or easy) and what you would do differently in the future.

(Part iv mark is worth 7%)

IMPORTANT NOTE – you do NOT have to do all these tasks from scratch. If you have already completed a job application or had an interview this year then you can include these experiences in your assignment (as long as the position or programme is a postgraduate level one). Similarly, you don't actually have to have applied for the position in question in reality, as long as you prepare an

MA199 Assignment 4.4: Transition Learning

appropriate application that could be used for this purpose (although if you have done all the work, why not apply anyway?)

If you have not attended an interview for a postgraduate level position yet then you can use the Interview360 system on CareerHub+ where you can set up a virtual interview to test yourself.

Note that you do not have to restrict yourself to the space available in each box of the template (you can expand these or add additional pages to include pictures or pages from your CV for example). Similarly, the word counts mentioned are guides only – you will not be penalised if you write slightly more or if you make all the key points required using less words.

Part i) Evidence and Motivation for Postgraduate Level Position (5%)

In section A you should provide details of the postgraduate level position or postgraduate programme applied for and the date you saw the advert or made the application. This could be a screen grab or picture of the job advert, details of the course applied for, or simply a description of the position and the details of the company. Note that the position must be at postgraduate level!

A:

Include evidence and details of the position or programme applied for here.

Well to be fair the date I saw this job advert was the 9th of March 2023.



The screenshot shows a job listing on the wisetechglobal website. The header features the wisetech global logo and navigation links for 'Who we are' and 'BACK TO CURRENT OPENINGS'. The main title is 'Machine Learning Engineer – London, UK (Hybrid)'. Below the title, it says 'Location London, United Kingdom' and has sharing options for LinkedIn, Facebook, and Twitter. The 'Company Overview' section discusses Shipamax's search for a Machine Learning Engineer to join their Data Science team, mentioning they are a successful startup acquired by WiseTech. The 'Job Overview' section details the responsibilities, including bringing algorithms and model research into practice, developing new machine learning models, and working closely with engineering and product teams. The 'Responsibilities' section lists specific tasks such as maintaining existing models, integrating them into commercial products, and developing data extraction software. The entire listing is presented on a dark background.

Requirements

- MSc in Computer Science, Engineering or other STEM subjects, or other comparable work experience
- 1 to 5 years of experience. We will consider candidates straight from university with brilliant academic record and the right attitude
- Strong programming skills in one of the following programming languages: Python, C++ or Java
- Experience in building and evaluating machine learning models
- Experience with NLP is beneficial
- Experience working with real-world data sets
- Understanding of data science fundamental concepts
- Some experience handling unstructured data is be beneficial
- Data science libraries such as Numpy, Pandas and Scipy
- Machine learning frameworks: Scikit-learn and PyTorch
- Experience working with cloud environments is not essential, but it would be beneficial

Ideal Characteristics

- Excellent analytical skills and attention to detail
- Hard working, responsible
- Loves learning and gets things done
- Good communication skills and knows how to work in a team

About WiseTech Global

Our innovations and global technology enables, improves and empowers the world's supply chains. Having listed on the ASX in 2016, WiseTech Global is now an ASX 50, AU\$10 billion+ company that is serious about expansion and technical innovation. Our mission is to change the world by creating breakthrough products that empower those that own, enable and operate the supply chains of the world.

In section B you should write a short statement explaining why you are interested in this position or programme and why you are applying for it (*guide – 100 words*).

B:

Include a brief reflective statement as to why you are interested in and applying for this position or programme.

As a fan of AI/ML, I am very excited to apply for the position of AI/ML engineer. This field of AI/ML is evolving at a very fast pace and it has a wide range of potential in different industry sectors. I am very passionate about working on innovative solutions that can make an impact on the real-life problems. I have always been fascinated by the sci-fi movies showing the AI can do unlimited number of tasks easily without any problems. It is my dream to create the perfect AI like the one shown in the Iron Man movies. I am drawn to this position as it gives an opportunity to work on intricate problems and use my skills to create an intelligent system that can learn and adapt over time. I am excited to work in an environment where I can collaborate with other talented individuals in the same line of work and learn from them.

Part ii) Application (8%)

In this section you should provide the documentation you used to apply for the position or programme. This can include an online application form (e.g. use the 'print screen' button in Windows to create a screen-grab of the form) or an updated CV and cover letter made specific to the position or programme you are applying for.

You do not need to enter your application details in the box below – you can also insert additional pages into this document if this is easier.

Application documents here or insert as additional pages.



Sourav Ghosh Hansda

Job Role: AI/ML Engineer

I am a highly motivated postgraduate data science student of the University of Essex with experience in developing and implementing machine learning algorithms for various projects. I am seeking a role as an AI/ML Engineer to apply my technical and analytical skills in a challenging environment.



souravghoshhansda77@gmail.com



+44 7818793595/+91 8355847148



Colchester, CO4 3ZF, UK.



11 September, 1998

EDUCATION

Xth Standard (Maharashtra Board)

Swami Vivekanand High School

06/2013 - 05/2014,

Mumbai, Percentage: 68.60%

XIIth Standard (Maharashtra Board)

Alpha Jr. College

06/2015 - 05/2016,

Mumbai, Percentage: 52.31%

Stream:

- Science & Electronics

Graduation (Mumbai University)

Vidyalankar School of Information Technology

06/2016 - 05/2019,

Mumbai, CGPA: 7.18

Courses

-

Bachelor of Science in
Information Technology

Project: Human Safety Geo
Fencing

Post Graduation (Mumbai University)

Navinchandra Mehta Institute of Technology
and Development

07/2019 – 06/2022,

Mumbai, CGPA : 9.09

Courses

- Masters of
Computer
Applications

- Projects: Online Marketing
Services, File Sharing on
TCP Network, Car
Showroom Website,
Attendance System,
Chatbot, Automated
Document Management
System.

Internship

Nucsoft LTD.

01/2022 - 07/2022,

Mumbai

Project

- Infini-Pay

Post Graduation

University of Essex

01/2023 – present

UK

Course

- MSc in Data Science & its Applications

SKILLS

Python (Programming Language)

TensorFlow

JAVA (Programming Language)

AWS

Problem-Solving

PyTorch

NumPy

Tableau

R (Programming Language)

Google Cloud Platform

Pandas

Statistical Modelling & Analysis

Scikit-learn

Strong Communication

Azure

Power BI

SQL (Programming Language)

Machine Learning & Artificial Intelligence

Keras

CERTIFICATES

PCB fabrication, Drone building, Augmented reality, Dale Carnegie: Capsule1, Cross Platform Mobile App Development, National Short-Term Training Program on IOT (EDUXLABS), MTA: Introduction to Programming Using JavaScript, Data Foundations & Data Driven Decisions.

INTERESTS

Reading

Travelling

Watching Sci-fi movies

AI development

Playing Sports like Football

Coding Projects

Gaming

Teaching

Sourav Ghosh Hansda

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Colchester, UK



<https://www.linkedin.com/in/sourav-ghosh-hansda-72a205161>

TO:

Ellis Bygrave
HR Manager
Wise Tech Global

DEAR HIRING MANAGER,

I am writing to express my interest in the Machine Learning Engineer position at Wise Tech Global. As a current master's student in Data Science at the University of Essex, I am excited about the opportunity to apply my skills and knowledge to real-world challenges at your company.

In my coursework, I have gained experience in a range of machine learning techniques, including regression, clustering, and deep learning. I have also developed proficiency in programming languages such as Python and R and am familiar with popular machine learning libraries such as TensorFlow and Scikit-learn.

I am particularly drawn to Wise Tech Global's focus on leveraging technology to innovate in the logistics industry. I am eager to contribute to your team by using my skills and knowledge to help build and deploy machine learning models that can improve operational efficiency and provide valuable insights to stakeholders.

As a self-motivated and proactive learner, I have also gained experience working on independent projects that required problem-solving skills, data manipulation, and data visualization. This has enabled me to develop strong analytical skills and attention to detail, which are essential qualities for a Machine Learning Engineer.

Overall, I am confident that my skills, knowledge, and passion for using machine learning to drive innovation make me a strong fit for this role. I am excited about the opportunity to work with a team of talented individuals at Wise Tech Global and to make a meaningful contribution to your mission.

Thank you for considering my application. I look forward to the opportunity to discuss my qualifications in further detail.

Sincerely,

Sourav Hansda

Part iii) Interview (5%)

In section A you should provide details of the interview that you have undertaken. This should be at postgraduate level but doesn't necessarily have to be directly linked to the job application in part i) and ii) (although this is preferable). You should give details of the date, location, who the interviewers were and details of some of the key questions you were asked.

A:

Provide details of the interview here (date, location, interview, key questions asked).

I applied for the post of software engineer in a company called Nucsoft Ltd, Mumbai, India. The interview was on June 10, 2022. The interviewers were Mr. Sanket Redkar, Technical Lead, and Mr. Suresh Waphre, Senior Software Developer, Nucsoft Ltd. There were two pre-interview tests that I had to clear to pass through the first round: an aptitude test and a test on Java. The second round which was the interview face to face was in two parts: HR and technical. In the HR part, they had asked me to introduce myself and explain why I was looking for a job in their company. The other question I was asked was how I would see myself in 10 years down the line working in the company. In the technical interview, I was asked about constructors in Java, the concept of stack in data structures, Java interface, and how threads in Java work. I was also asked how exception handling worked in Java. Lastly, they asked me about my projects that I had developed during my MCA studies.

In section B you should write a short statement explaining how you feel the interview went and what you learnt from the experience (guide – 100 words).

B:

Include a brief reflective statement about how you found the interview process and what you learnt.

Well to tell the truth the interview was really nerve racking because I could not stay calm as I was under the pressure of getting a job which would help me to advance in my career. The interview was not that long it was brief and to the point. The lesson I got from the interview is that one should always be confident and answer every question briefly and should not answer in a descriptive manner, which eats away the patience of the interviewer. The interview taught me not to doubt myself and to believe in my own answers. Whenever a candidate is asked to introduce himself/herself, he/she must always start by introducing himself/herself in a proper manner and talk majorly about himself/herself and not about his/her family members. The interview gave me a wake-up call that I needed to work on my answers and prepare in advance for the interview.

Overall, I think the interview went great and was over very quickly because I did get the job in the end.

Part iv) Reflective Statement about the Application Process (7%)

In the following section you should write a reflective statement about how you found the whole application process. Questions to think about include: Were you successful with your application (and if not, why do you think this was)? What did you learn from the process? Did you get any feedback from the prospective employer, interviewer or postgraduate provider? What do you think went well (and not so well)? Would you do anything differently with other applications in the future? How does this experience help with your future career planning?

(guide - 250 words)

A:

Include a reflective statement about your application experiences and what you learnt.

As I reflect on the application process, it was a valuable learning experience. I applied for several positions in my field of interest, i.e., data science, AI/ML, and was unsuccessful in securing an interview for it, but fortunately was selected for a different position (i.e., a software engineer) in tune with my MCA background.

From this application process, I have learned how to create my resume and cover letter tailor-made to the specifics of the job role and its requirements and making it certain to highlight my skills and experience that I have gained over the years. I have learned the benefits of researching the company and the position requirements of the job before applying for a specific post.

I did receive feedback from my prospective employer(interviewers). From the feedback, I learned that my technical answers were right but I require more confidence and more faith in myself, I need to always be concise and to the point instead of being descriptive while answering any questions during the interview.

Overall, I believe that my application process was good, and I received positive feedback. However, I think that I can improve myself in certain areas for any interview, and I plan to work on this in the future. I also plan to continue to upskill myself and stay up-to-date on the industry's trends to better understand the job market.

This experience has helped me with my future career planning by giving me an overall understanding about the skills and qualifications that employers are looking for in the field I am so much interested in. It has also opened my eyes to the importance of networking and building relationships with professionals in the field of AI/ML.