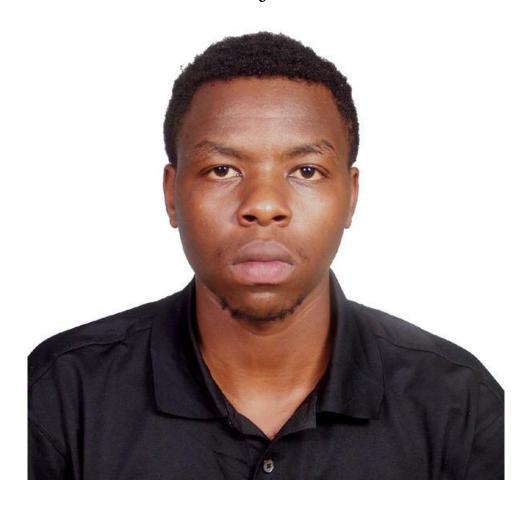
My Autobiography: A Journey of Self-Discovery and Growth



Gathu Macharia

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I am Gathu Macharia, a dedicated statistician, data scientist, and actuary from Nyeri, Kenya. My life has been fueled by a passion for numbers and a love for nature. This journey has led me to a career where I can blend these interests to solve complex problems and create innovative solutions. This autobiography captures the key moments of my life, education, career, and personal experiences that have shaped me into the professional I am today.

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Early Life and Education

I was born and raised in Kenya, a country renowned for its rich cultural heritage and diverse landscapes. From the vast savannas of the Maasai Mara to the lush, green highlands of Nyeri, Kenya's natural beauty profoundly influenced my childhood. The country's vibrant cultural mosaic, coupled with its breathtaking scenery, instilled in me a deep appreciation for both nature and the human spirit.

Growing up in Nakuru, my early life was marked by a strong desire to learn and explore the world around me. I was fortunate to have parents who valued education and encouraged my curiosity. My parents enthusiast, created an environment where learning was not just encouraged but celebrated. Their guidance and support laid the foundation for my academic journey and my passion for knowledge.

My formal education began at Complex Primary School in Mumias. This institution played a crucial role in shaping my intellectual development. The teachers at Complex Primary were dedicated and nurturing, fostering a love for learning in their students. Here, I developed a solid foundation in mathematics and language skills, both of which would become cornerstones of my future academic and professional endeavors. Mathematics, in particular, captivated me with its logical structure and the beauty of its precision. I enjoyed solving complex problems and finding patterns, which sparked a lifelong fascination with numbers.

After completing my primary education, I joined Utumishi Academy in Gilgil for my secondary education. This period was transformative, as it was during these years that I began to truly understand my academic interests and aspirations. Utumishi Academy was a prestigious institution known for its rigorous academic standards and emphasis on discipline. The school's motto, "Strive for excellence and honor," resonated with me deeply and became a guiding principle throughout my life. At Utumishi Academy, I was exposed to a wide range of subjects, but it was mathematics and science that captivated me the most. The logical reasoning required in mathematics and the exploratory nature of science appealed to my inquisitive mind. I thrived in this environment, excelling in subjects like physics, chemistry, and advanced mathematics. My teachers recognized my

potential and provided me with additional challenges to keep me engaged. I remember spending countless hours solving complex mathematical problems and conducting experiments in the science lab, experiences that further solidified my interest in these fields.

Moreover, my time at Utumishi Academy was not solely defined by academics. The school encouraged participation in extracurricular activities, which helped me develop a well-rounded personality. I was the captain of the lawn tennis team, where I played my way up to the nationals, becoming runners-up, and securing first place in both county and provincial competitions. This leadership role honed my ability to strategize and lead a team under pressure. Additionally, I played football, though I eventually switched my focus to lawn tennis before I could fully reap the benefits in that sport.

Another significant aspect of my time at Utumishi Academy was my passion for computer studies. I eagerly attended various functions and workshops to expand my knowledge in this field. My enthusiasm for technology led me to develop systems for voting using databases, a project that garnered attention and appreciation from both teachers and peers. This experience not only enhanced my technical skills but also demonstrated the practical applications of computer science in solving real-world problems.

One of the most memorable experiences during my secondary education was participating in national mathematics competitions. Competing against students from across the country was both challenging and exhilarating. These competitions tested my problem-solving abilities and pushed me to think creatively. Winning several awards in these competitions was a testament to my hard work and passion for mathematics. It also provided me with the confidence to pursue further studies in this field.

Reflecting on my early life and background, I am grateful for the experiences and opportunities that shaped my formative years. The support of my family, the dedication of my teachers, and the stimulating environment at my schools all played pivotal roles in my development. These experiences not only nurtured my academic interests but also instilled in me values such as discipline, dedication, and a love for learning. They laid the groundwork for my future academic pursuits and professional career.

As I moved forward from my secondary education, my passion for mathematics and science continued to grow, guiding my choices and shaping my aspirations. The foundational years of my life in Kenya, with its rich cultural heritage and diverse landscapes, provided me with a unique perspective that I carry with me to this day. These early experiences are the bedrock upon which my journey as a statistician, data scientist, and actuary was built, and they continue to inspire and motivate me in all my endeavors.

University Life and Career Beginnings

I enrolled at Dedan Kimathi University of Technology, where I pursued a Bachelor of Science degree in Statistics and Actuarial Science. My time at the university was a transformative experience that exposed me to various aspects of statistics, mathematics, and computer science, significantly shaping my professional trajectory and personal growth. Upon entering Dedan Kimathi University of Technology, I was determined to immerse myself in every opportunity to expand my knowledge and skills. My passion for sports continued to thrive as I became an active member of the university's lawn tennis team. Building on my previous successes, I dedicated countless hours to practice and strategy, which culminated in winning the lawn tennis competition at the national level. This achievement was not only a personal triumph but also a testament to the importance of discipline, perseverance, and teamwork—qualities that I carried over into my academic pursuits.

Academically, my undergraduate studies were both challenging and rewarding. The rigorous curriculum in statistics and actuarial science demanded a deep understanding of mathematical principles and their applications. I developed a strong passion for statistical modeling and data analysis, recognizing the immense potential these tools have in making informed decisions across various sectors. Courses in probability theory, statistical inference, and financial mathematics provided a solid foundation, while advanced topics in survival analysis, time series analysis, and econometrics further fueled my interest. One of the pivotal aspects of my academic journey was my exposure to actuarial science. This field, which involves using mathematical models to assess risk and uncertainty in financial and insurance contexts, captivated me with its blend of theoretical rigor and practical relevance. The challenge of quantifying and managing risk through sophisticated models was both intellectually stimulating and immensely satisfying. My coursework and projects often involved real-world data, allowing me to apply theoretical concepts to practical problems and gain valuable insights into the complexities of risk assessment.

Parallel to my academic coursework, I delved into the world of programming, recognizing its critical role in modern data analysis and statistical modeling. I learned several programming languages, including R, Python, and SPSS, which became essential tools in my analytical toolkit. These languages enabled me to handle large datasets, perform complex analyses, and develop predictive models with precision and efficiency. The hands-on experience with programming not only enhanced my technical skills but also opened new avenues for creative problem-solving. My passion for data science extended beyond the classroom. I became an active member of the Data Science and Artificial Intelligence Club (DSAIC) on campus, where I quickly assumed a associate role as a tutor. In this capacity, I had the opportunity to share my knowledge and mentor fellow students, fostering a collaborative and intellectually stimulating environment. Tutoring at DSAIC was a deeply fulfilling experience; it allowed me to reinforce my own understanding of key concepts while helping others develop their skills in data science and statistical analysis. We organized workshops, hackathons, and seminars that brought together students from diverse disciplines to explore the latest trends and advancements in data science.

Through DSAIC, I also had the opportunity to work on various projects that addressed real-world challenges. One notable project involved developing a predictive model to estimate customer churn for a telecommunications company. Using logistic regression and machine learning techniques, our team analyzed customer data to identify patterns and factors that contributed to churn. The project was a resounding success, providing actionable insights that the company could use to improve customer retention strategies. This experience reinforced my belief in the transformative power of data science and its ability to drive positive change in organizations and society. In addition to my academic and extracurricular activities, I undertook a research project as part of my degree thesis, titled "Modeling the Recovery Time of Stock Prices using Accelerated Failure Time Model." This project was supervised by Dr. Mundia, a respected faculty member at Dedan Kimathi University of Technology. The research aimed to apply statistical survival models, typically used in medical research, to the financial domain. Specifically, we sought to assess the effects of covariates on the recovery time of stocks in the Kenyan market. The project involved extensive data collection, model development, and rigorous analysis. The findings provided valuable insights into the factors influencing stock price recovery and demonstrated the applicability of survival analysis techniques in finance.

Reflecting on my time at Dedan Kimathi University of Technology, I am grateful for the diverse experiences and opportunities that shaped my academic and professional development. The combination of rigorous coursework, hands-on programming experience, and involvement in the data science community provided a comprehensive and enriching education. My achievements in lawn tennis, including winning at the national level, underscored the importance of perseverance and teamwork. My role as a tutor at DSAIC allowed me to contribute to the academic growth of my peers while honing my leadership

and communication skills. The research project under Dr. Mundia's supervision further solidified my passion for applying statistical models to real-world problems.

As I look back on my university journey, I am proud of the progress I have made and the foundation I have built for my future endeavors. The knowledge and skills I acquired at Dedan Kimathi University of Technology have equipped me to tackle complex challenges and make meaningful contributions to the fields of statistics, data science, and actuarial science. These experiences have not only prepared me for a successful career but have also instilled in me a lifelong commitment to learning, innovation, and excellence.

Career Development and Growth

During my undergraduate degree, I embarked on a journey of career development and growth that has been both enriching and transformative. My first significant role was as a risk management and internal audit officer at the National Social Security Fund (NSSF) in Nairobi. This position provided me with an invaluable opportunity to apply the theoretical knowledge I had acquired during my studies to real-world problems. At NSSF, I was responsible for analyzing large datasets to identify potential areas of risk and inefficiencies within the organization.

One of the key projects I undertook involved utilizing Benford's Law for fraud detection. This statistical technique is based on the frequency distribution of digits and is often used to detect anomalies in datasets that may indicate fraudulent activities. By applying Benford's Law, I was able to highlight discrepancies in financial data that warranted further investigation. This project underscored the importance of meticulous data analysis and reinforced my belief in the power of statistical methods to uncover hidden patterns and insights.

In addition to fraud detection, I worked extensively with IDEA software, R, and Excel to analyze audit data. These tools enabled me to perform complex data manipulations and visualizations, providing clear and actionable insights to the internal audit team. I was also involved in creating compliance files and drafting comprehensive reports that detailed our findings and recommendations. This experience not only honed my technical skills but also taught me the importance of effective communication and the ability to present complex information in a clear and concise manner.

After gaining valuable experience at NSSF, I transitioned to freelance work, seeking to broaden my horizons and apply my skills to a diverse range of projects. As a freelancer, I had the opportunity to work on various data-driven projects across different industries. This phase of my career was particularly exciting, as it allowed me to explore new areas of interest and continually challenge myself.

One of my significant freelance projects involved developing predictive models using lo-

gistic regression to estimate the probability of customer churn for a telecommunications company. By analyzing customer data, I identified key factors that contributed to churn and created models that could predict which customers were likely to leave the service. This project demonstrated the practical applications of machine learning and statistical analysis in business contexts, providing valuable insights that helped the company improve its customer retention strategies.

I also worked on projects that involved testing hypotheses, developing generalized models, and implementing advanced machine learning algorithms such as Gradient Boosting Models and Neural Networks. These experiences not only enhanced my technical proficiency but also taught me the importance of adaptability and continuous learning in the rapidly evolving field of data science. Freelancing also required effective communication and collaboration with clients, often necessitating clear explanations of complex concepts to stakeholders with varying levels of technical expertise.

Personal Projects and Interests

In addition to my professional work, I have also pursued various personal projects and interests that have significantly enriched my knowledge and skills. One of my notable projects involved forecasting stock prices using Generalized Autoregressive Conditional Heteroskedasticity (GARCH) extensions. This project allowed me to apply my knowledge of statistical modeling to a real-world financial problem. By analyzing historical stock data, I developed models that could predict future price movements, taking into account the volatility and market conditions. This project not only deepened my understanding of financial markets but also demonstrated the practical applications of advanced statistical techniques in finance.

Another significant project I undertook was modeling the recovery time of stocks in the Kenyan market using survival analysis. Survival analysis is typically used in medical research to model the time until an event, such as the recurrence of a disease. I adapted this method to finance, using it to analyze how long it takes for stock prices to recover after a significant drop. This involved identifying the factors that influence recovery times and understanding the underlying dynamics of the market. The project provided valuable insights into the resilience of different stocks and helped me develop a robust framework for risk assessment.

In addition to these projects, I explored the use of Long Short-Term Memory (LSTM) networks for predicting stock prices when the time period is as low as six minutes. LSTM networks are a type of recurrent neural network that excel at capturing temporal dependencies in sequential data. By training an LSTM model on high-frequency trading data, I was able to make short-term predictions about stock price movements. This project highlighted the potential of deep learning techniques in financial forecasting and opened up new avenues for further research.

I also worked on developing logistic regression models for default modeling. This involved analyzing data from financial institutions to predict the likelihood of borrowers defaulting on their loans. By identifying the key factors that contribute to default, I was able to create models that provided accurate predictions and valuable insights for risk

management. Additionally, I used Naive Bayes classifiers for email classification, developing a system that could automatically sort emails into different categories based on their content. This project demonstrated the versatility of machine learning techniques and their potential applications in various domains.

Beyond my professional and academic pursuits, I am passionate about several hobbies and interests that provide a source of relaxation and inspiration. Watching documentaries is one of my favorite pastimes. I enjoy documentaries that cover a wide range of topics, from natural history and science to social issues and biographies. These films provide me with new perspectives and a deeper understanding of the world around me. They often inspire me to explore new ideas and think critically about complex issues.

Nature walks are another activity that I find incredibly rejuvenating. Spending time in nature allows me to disconnect from the hustle and bustle of everyday life and appreciate the beauty and tranquility of the natural world. Whether it's hiking in the forests of Nyeri or exploring the savannas, these experiences remind me of the importance of preserving our environment and the interconnectedness of all living things. Nature walks also provide an excellent opportunity for reflection and creative thinking, often leading to new ideas and insights for my professional projects.

Reading is another passion of mine that has significantly contributed to my personal and professional growth. I enjoy reading a variety of genres, including fiction, non-fiction, and scientific literature. Books on data science, statistics, and mathematics have been particularly influential in shaping my understanding of these fields. Additionally, reading about the latest advancements and case studies in these areas keeps me updated with current trends and developments, allowing me to apply the latest techniques and methodologies in my work.

Reflecting on my journey so far, I am grateful for the diverse experiences and opportunities that have shaped my career and personal growth. My roles at NSSF and as a freelancer have provided me with a strong foundation in risk management, data analysis, and statistical modeling. The personal projects I have undertaken have allowed me to explore new areas of interest and apply my skills to solve real-world problems. My hobbies and interests have provided balance and inspiration, enriching my life in countless ways.

As I continue with my degree and professional endeavors, I remain committed to continuous learning and innovation. I am excited about the future and the opportunities that lie ahead, confident that the skills and experiences I have gained will enable me to make meaningful contributions to the fields of statistics, data science, and actuarial science. Through dedication, curiosity, and a passion for excellence, I strive to push the boundaries of what is possible and make a positive impact on the world around me.

In addition to my formal education and professional experiences, I have actively sought opportunities to expand my knowledge and skills. One such opportunity was my involvement with the Data Science Africa Initiative Club (DSAIC) at Dedan Kimathi University of Technology, where I served as a tutor. This role allowed me to share my knowledge of data science and statistical programming with fellow students. I conducted workshops and tutorials on various topics, including R, Python, and SPSS. Teaching others not only reinforced my understanding of these subjects but also enhanced my ability to communicate complex concepts effectively.

My involvement with DSAIC also provided me with opportunities to work on collaborative projects with other students and faculty members. These projects ranged from data collection and cleaning to developing predictive models and visualizations. Working in a team environment taught me the importance of collaboration and the value of diverse perspectives in problem-solving. It also provided a platform for me to apply my skills to real-world challenges and contribute to meaningful research.

One of the most rewarding aspects of my involvement with DSAIC was the opportunity to mentor junior students. Guiding them through their academic and professional journeys was a fulfilling experience, and it reinforced my belief in the importance of education and mentorship. I encouraged my mentees to pursue their passions, take on challenging projects, and continuously seek opportunities for growth and learning.

Through my various roles and projects, I have developed a comprehensive skill set that spans statistical modeling, machine learning, data analysis, and programming. My ability to apply these skills to a wide range of problems, from financial forecasting to fraud detection and customer churn prediction, demonstrates my versatility and adaptability. I am confident that these skills, coupled with my passion for continuous learning and innovation, will enable me to make significant contributions to any organization I work with.

Looking ahead, I am excited about the possibilities that lie in the fields of statistics, data science, and actuarial science. These disciplines are continually evolving, and new advancements and techniques are constantly emerging. I am committed to staying at the forefront of these developments and leveraging my skills and knowledge to drive innovation and solve complex problems. Whether through professional roles, personal projects, or mentorship, I aim to make a positive impact and contribute to the advancement of these fields.

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Professional Development and Career Growth

After completing my undergraduate degree, I embarked on a journey of career development and growth. I began by working as a risk management and internal audit officer at the National Social Security Fund (NSSF) in Nairobi. This role exposed me to the practical applications of statistical modeling and data analysis in a real-world setting. At NSSF, I utilized Benford's Law for fraud detection, applied IDEA software, and leveraged R and Excel for analyzing audit data. I was also responsible for creating compliance files and contributing to the writing of audit reports. This experience provided me with a comprehensive understanding of risk management and internal auditing processes.

Following my tenure at NSSF, I transitioned to freelance work, where I applied my skills in statistical programming, machine learning, and data visualization to various projects. As a freelancer, I worked on a wide range of assignments, from hypothesis testing and generalized linear models to Bayesian models, gradient boosting, and neural networks. This diverse experience not only honed my technical skills but also taught me the importance of effective communication and collaboration in a professional setting. Working with clients from different industries and backgrounds broadened my perspective and enhanced my ability to tailor solutions to specific needs.

One of my notable freelance projects involved forecasting stock prices using Generalized Autoregressive Conditional Heteroskedasticity (GARCH) extensions. This project allowed me to apply my knowledge of statistical modeling to a real-world financial problem. By analyzing historical stock data, I developed models that could predict future price movements, taking into account volatility and market conditions. This project deepened my understanding of financial markets and demonstrated the practical applications of advanced statistical techniques in finance.

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Professional Affiliations and Memberships

I am a proud member of Data Science Africa, a community that unites professionals, academics, and enthusiasts in the field of data science across the continent. This affiliation has provided me with invaluable opportunities to connect with like-minded individuals, share knowledge, and collaborate on various projects aimed at leveraging data science for social good. Being part of this community has also allowed me to stay updated with the latest trends and advancements in the field, fostering continuous learning and professional growth.

One of the highlights of my involvement with Data Science Africa was participating in their annual conferences and workshops. These events bring together experts and practitioners from different parts of Africa and beyond, creating a vibrant platform for knowledge exchange and networking. In 2021, I had the privilege of attending the Data Science Africa conference held at the University of Nairobi. The conference featured a series of presentations, panel discussions, and hands-on workshops covering a wide range of topics, from machine learning and artificial intelligence to data ethics and policy. My participation in these sessions not only deepened my understanding of data science but also inspired me to explore new areas of research and application.

A significant milestone in my professional journey was emerging as a winner at the 2021 Nationals held at the University of Nairobi. This competition brought together some of the brightest minds in the field of data science and provided a platform to showcase innovative projects and solutions. My project, which focused on predictive modeling and data analysis, was recognized for its originality, technical rigor, and potential impact. Winning this competition was a testament to my hard work and dedication, and it further motivated me to pursue excellence in my field.

In addition to my involvement with Data Science Africa, I am also an active member of several other professional organizations and clubs. At Dedan Kimathi University of Technology, I was a member of the Actuarial Club, where I participated in various ac-

tivities and initiatives aimed at promoting actuarial science and fostering professional development among students. The club organized workshops, guest lectures, and industry visits, providing valuable insights into the actuarial profession and its applications. My active participation in these activities helped me build a strong network of peers and mentors, and it played a crucial role in shaping my career path.

I also served as a tutor for the Data Science Society at Dedan Kimathi University of Technology (DSAIC), a student-led organization dedicated to promoting data science education and research. In this role, I conducted workshops and tutorials on statistical programming, machine learning, and data visualization, sharing my knowledge and expertise with fellow students. Being a tutor not only reinforced my understanding of these subjects but also enhanced my teaching and communication skills. It was a rewarding experience to see my students grasp complex concepts and apply them to their projects and research.

These professional affiliations and memberships have significantly contributed to my personal and professional development. They have provided me with platforms to learn, share, and collaborate, and they have opened up numerous opportunities for growth and advancement. Through my involvement in these communities, I have gained a deeper understanding of the field of data science, built valuable networks, and developed a strong sense of professional identity and purpose.

As I continue to advance in my career, I remain committed to staying actively engaged with these communities and contributing to their growth and success. I believe that professional affiliations and memberships play a vital role in fostering innovation, knowledge sharing, and professional development. By being an active member of these communities, I aim to continue learning, sharing my knowledge, and contributing to the advancement of the field of data science and actuarial science.

Looking ahead, I am excited about the future and the opportunities that lie ahead. I am confident that the skills, knowledge, and networks I have developed through my professional affiliations and memberships will enable me to make meaningful contributions to my field and create a positive impact on society. I look forward to continuing my journey of learning, growth, and professional excellence, and to making a difference in the world through my work and contributions.

Conclusion

As I reflect on my journey, I am reminded of the importance of perseverance, hard work, and continuous learning. My autobiography is a testament to the power of self-discovery and growth, and I hope that it will inspire others to pursue their passions and interests.