Essay

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Background and perspectives : "The future belongs to those who believe in the beauty of their dreams", Eleanor Rosevelt. Growing up in a family without university graduates and in the area where achieving higher education is seen as a luxury, the dream of becoming a scientist and professor was very ambitious. But it was just a dream that I kept to myself from an early age, until I realized that I could make it happen. Dreams inspire us to overcome difficulties and chart the course of our lives. As Eleanor Rosevelt noticed, it is having dreams that fuels enthusiasm and gives us a purpose and direction in life, regardless of life's accidental constraints. I have my dream and believe it is about to come true.

For most of the young people in the neighborhood where I grew up in Kinshasa, the path of life was already known: if you are lucky, you go to elementary school, you go to high school, get the high school diploma (State diploma), then start trying to figure out how to survive in life. This is the reality of many people in third-world countries, regardless of what they dream of becoming. This reality hinders the aspirations and expectations of most people. Many see their ambitions held back, not only by financially precarious situations, but also by a lack of access to the opportunities that could change their lives. Societal expectations create an environment where such aspirations are overshadowed by the more immediate demands of daily life, achieving higher education is non-essential rather than a necessity.

In this context in which I grew up, the role of mentors or a person to guide and assist from an early age is crucial. I was lucky enough to have parents who, despite their own educational limitations and the lack of openness to the world, at least understood the immense value of education and what it can offer. They taught me the habit of learning and encouraged my curiosity. My father, an elementary school teacher, played a key role in stimulating my early interest in learning. I was drawn to reading languages, geography and history. He used to bring home books. I vividly remember learning English between the ages of ten and fourteen. It was a small window opening onto a much wider world to which I would be exposed later on. I welcomed it with enthusiasm.

In high school, I chose the science stream, where my love for mathematics grew. Maths was not just a subject; it was a fun puzzle to solve, an enjoyable challenge that pushes thinking to high dimensions, even if I was not sure how it could help me survive after high school. But I was sure of one thing: I wanted to do more than I could. By the time I graduated from High School, I was second in my class and did very well in both mathematics and physics. At that time, I was already aware of the ubiquity

of mathematics, through its intensive use in major disciplines such as chemistry, physics, and biology that I attended. I did not yet realize how it would deeply shape my future. At that moment, I also had no idea that I would one day go on to study mathematics at a university.

The prospect that I would complete a university degree was, by all accounts, an improbable event. But education was not just a personal goal. It was a beacon of hope, a way to stand out and contribute to something bigger than myself. Sometimes, the only choice we have is to believe in the beauty of our dreams and work hard to make them come true. We have to push our luck and seize the opportunity that comes our way. With the support of my family, I enrolled at the University of Kinshasa in 2015, months after my graduation from High-school. It was a crucial moment that marked the beginning of a five-year journey towards a Bachelor of Science degree. It used to take five years to get a bachelor's degree. My decision to study mathematics at the University of Kinshasa came as a surprise to many, as it was an unconventional career option. But it was my natural next step. Mathematics had always fascinated me, and I was determined to explore it further, despite the whispers of doubt around me about my future with a degree in mathematics.

It is common human experience to doubt and to question the next steps. It is during these times that we harness our strength and remember what it matters most for us: to continue walking forward, to push our limits, and never stop. This reflects a real commitment to the principle of the art of living. I think ‘commitment’ is the right word to describe our willingness to break social bonds we might have inherited. To make it clear, I prefer to use “commitment" because of its Latin etymological root, which, according to Wiktionary, means *“*bring together”. We aim to unite our efforts, bring together the energy and the hope to excel, the courage to achieve what had never been done before. I questioned myself about my next step, with the illusion, the fear that I would not make it one day.

My diploma in hand, the struggle continues unfortunately, as it is supposed to. My next step, I needed to experience teaching, then I decided to support my former department in my part time. I returned to the University of Kinshasa as a teaching assistant, mentoring and teaching first- and second-year students, in my part-time job. Supporting others (in their academic journey) is deeply a fulfilling experience and ties you to your previous self. It reminds you of the steps you went through to reach and conquer the mountain top, or I would say, the top of yourself, to rephrase Sir Edmund Hillary. I saw firsthand how education could transform lives, and how there was (and there still is) much to be done in this sector in my home country. The two years that followed my university graduation were spent teaching at higher education institutions in my country, working part time, strengthening knowledge. Later, I traveled to South Africa to pursue a Master’s degree in Mathematical Sciences at the African Institute for Mathematical Sciences (AIMS). This trip opened up my eyes to a much wider world. It has enabled me to write this essay for your university.

Educational Plan and Career Goals It was during my third year at the University that I started to realize the importance of “data" in today's world. They say “Data” is the new oil, and they are exactly right. In the digital era, societies are driven by data-intensive technologies that transform our everyday lives, from healthcare to finance, precision agriculture to food science, to name but a few. Data Science creates vast opportunities, as well as challenges to overcome.

As data storage and processing systems became increasingly sophisticated, I saw a growing need for specialists in this field, so far I was considering it as a subfield of Applied Mathematics. There was no doubt that I had to dive in. I decided to pursue a second Master’s in Artificial Intelligence, which I am currently completing. My aspiration to pursue a PhD in Data Science resides in my desire to achieve a lifelong dream, to tackle modern-world data-driven problems and to consistently work to enhance my problem solving skills and research experience. My educational background in various fields, such mathematics, statistics, machine learning, and artificial intelligence will allow me to easily navigate diverse research directions.

Educational plan: My educational plan is objectively structured as follow:

- **First year:** Attend compulsory courses, if there is any. Attend conferences and seminars, which will allow me to network with peers and experts, gain exposure to the latest research. Discuss and work on the research proposal with a potential supervisor.
- **Second year**: Begin focused research on the thesis topic, develop detailed proposals while engaging with coursework that aligns with my research goals. I aim this year to strengthen my theoretical foundation and practical skills. I also aim to publish preliminary research findings in academic journals and participate in workshops and seminars to present my findings.
- **Third year:** I will dedicate most of my time to intensive research and writing. Collect data, do data curation and make analysis and testing various hypotheses. I will have regular meetings with my thesis advisor to ensure that I am on the right track. I will attend international conferences to present my research findings and get feedback from diverse academic experts.
- **Fourth year:** Finalize my research and complete dissertation. I aim to continue to refine analysis and conclusions based on feedback received throughout my studies and from my advisor. I will prepare for the dissertation defense and engage in deep revisions and practice for the presentations.
- **Fifth year (if applicable):** I am to complete any remaining research activities and essentially focus on my dissertation.

Career goals: Upon completing my dissertation, my goal is to contribute to the academic and research community by joining a university or a research institution where I can continue my studies

as a postdoctoral fellow and share my knowledge through teaching. I would also like to go back to my country, which has a visceral need of experts, to sustain the development effort by teaching and providing consultancy to the government or private corporations. My long-term goal is to settle in academia, meanwhile to found a tech-based company to find solutions for healthcare and societal problems by the means of Artificial Intelligence and Data Science.

Why do I want to study at UD? What drew me to consider applying for a PhD to the UD is the extensive research facilities and the faculty's expertise in Data Science and Applied Mathematics. UD's strong emphasis on interdisciplinary research, particularly in areas that merge mathematics with practical applications, aligns with my academic aspirations. The program's focus on computational modeling, statistical theory, and machine learning techniques offers exactly the kind of rigorous training I seek to further my expertise in this field. Moreover, the opportunity to collaborate with world-class faculty on cutting-edge research excites me, as it will allow me to explore the full potential of data science in solving pressing issues.

It is common knowledge that the USA is the leading country in Artificial Intelligence (AI) research, as well as in many other disciplines. The importance of studying both in the country that pioneered AI, and at a university like the UD that is actively engaged in this field, is something that is invaluable to me. The opportunity to work alongside some of the brightest minds in this field at UD, in a country renowned for its boundless opportunities and potential, will have a drastic impact on my academic and professional aspirations. Studying at UD will give me access to resources and tools that are not available elsewhere and will enable me to contribute to,, maybe lead, the next wave of technological and research in AI and Data Science.

Areas of Special Interest Within the area of data science, I am particularly interested in exploring predictive modeling in healthcare (Bioinformatics), Natural language processing (NLP), Computer vision, and theoretical aspects of Deep Learning, as well as their applications in health science or biology. My interest in predictive modeling comes from its potential to improve patient outcomes and healthcare efficiency by predicting future medical events based on historical and present data. This has the potential to improve diagnosis and early preventive care strategies.

I am also captivated by the capabilities of Natural Languages processing and its declinations such as Large Language Models and Audio-based models, in the sense that they can be applied to process and analyze large amounts of unstructured medical text or patients audio, such as patient's medical records and clinical notes to facilitate more informed decision and personalized patient care. Computer Vision comes to revolutionize how we use visual inputs and enables us to find patterns in unstructured images or videos. By integrating computer vision, I am also interested in working on medical images processing to help to have faster and more accurate diagnosis.

Understanding the theoretical underpinnings at the core of these technologies, it is essential to develop new methods or techniques. I am also interested in working on the theoretical aspects of Deep learning for the reason that understanding this can lead to the development of more advanced algorithms that can learn from complex datasets, typical in healthcare or biology. What if the data points do not lay in the Euclidean space? But, instead in a non-euclidean space? What if the data points depend on some continuum, such as time or space? Those are the questions that arise when considering data-driven problems from health science, biology, environmental sciences, for instance. I believe there is still a lot to do in this sense to build efficiency methods to answer these questions.

Conclusion In many ways, my journey from improbable beginnings to earning a university degree has shaped my understanding of perseverance and purpose, my understanding of the importance of having dreams. It taught me that education is not just a means to an end; it is a catalyst for change, a force that can lift individuals and communities out of adversity and toward a brighter future. I look forward to continuing my research as a PhD student and fulfilling my career aspirations. Given my background, I believe I am in a good position to make crucial contributions in such pursuits.