

Written Signature Work Narrative & Experiential Learning Reflection

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The Signature Work project, Verse into Vision (Hua Shi Ru Hua), represents an intersection of technology and tradition, seeking to employ Artificial Intelligence to transform the rich tapestry of ancient Chinese poetry into various styles of visual art. This project was a capstone to my interdisciplinary education, weaving together diverse strands of knowledge including machine learning, API integration, database architecture, web development, and the theoretical frameworks of media and information studies. My academic journey through courses in statistics, computer science, and media and arts was not merely theoretical but a practical crucible, equipping me with a robust skill set and the adaptive problem-solving abilities essential for the ambitious undertaking of my Signature Work. In the execution phase, in Capstone courses 1 and 2, I brought these preparations to application, translating the poetry of yesteryears into a thousand pictures of today, thereby reaching the set goal of my project's objectives while simultaneously setting a foundation for my future endeavors. This essay records and reflects upon the integral elements of my Signature Work progress: firstly, stating how three thematic courses contribute to the framework and implementation of my project; secondly, discussing the support rendered by experiential learning in the maturation of my Signature Work; thirdly, reflecting the developmental strides achieved in the capstone courses, with an eye towards their enduring impact on my future academic journey.

The foundational pillars of my Signature Work were constructed by three thematic courses—Statistics 302, Statistics 401, and Duke's Literature 317S—that meticulously prepared me for the multifaceted challenges of my project. These courses were instrumental in equipping me with a robust understanding of Machine Learning models, particularly those pertaining to Natural Language Processing, which are crucial for interpreting the beauty and mystery of ancient Chinese poetry. Furthermore, they provided me with vital insights into data visualization techniques, key for the web platform's development and for ensuring intuitive machine-human interactions. The exploration of media theory within Literature 317S enriched my perspective, presenting me with communication studies and technology studies, thus

informing the ways to analyze the translation of the poem to the image. While other courses like Computer Science 201 and Information Science 102 were valuable in furnishing me with essential coding skills and an introductory information science mindset, it was the advanced curriculum of the aforementioned courses that offered a direct and profound influence on the execution of my Signature Work. The knowledge is not the only thing that I acquired from the thematic courses, but also the experience from the application, discussion, and experiment. They all translated into practical applications that formed the framework and implementation strategy of the Verse into Vision project, guiding the project from a concept to tangible, interactive outcomes.

In Statistics 302: Principles of Machine Learning, I delved into the area of machine learning with a specific focus on Natural Language Processing (NLP) models, which was significantly reinforced by the course's project component. The course sharpened my ability to utilize empirical data to develop mathematical models and to tune the parameters. These models, while not always a direct reflection of the systems' physical laws, were instrumental in enabling me to project system behaviors in untested scenarios—a skill at the heart of machine learning. I mastered a comprehensive understanding of the foundational tenets and tools of machine learning, empowering me to transmute complex real-world quandaries into structured machine learning problems. It was here that I honed the skill to discern the most suitable algorithms to address these problems and bring forth solutions with Python and other tools. The NLP knowledge gained from Statistics 302 proved particularly invaluable to my Signature Work project. I learned to apply statistical modeling and general machine learning algorithms to discern patterns in textual sequences, to use Convolutional Neural Networks (CNNs) for the analysis of multifaceted features, and to employ Recurrent Neural Networks (RNNs) and LSTMs for handling data with sequential variations. The processing of textual data, a critical aspect of NLP, was especially beneficial in managing and refining the data from ancient Chinese poems. Furthermore, the individual project within the course, which involved employing NLP algorithms for the analysis of word frequency in Chinese poetry and deducing the emotional themes within, afforded me a wealth of practical experience. This experience

was directly transferable to the Verse into Vision project, where translating the artistic conception (also called Yijing in Chinese, which means the picture of life is integrated with the thoughts and emotions expressed) of Chinese poems into textual prompts was a critical task.

Statistics 401: Data Acquisition and Visualization, a course fundamental to my Verse into Vision project, delved into the intricacies of data acquisition and the art of visualization. It offered an expansive overview of the theoretical frameworks, techniques, and tools essential for crafting complex data acquisition systems and creating compelling visual analytics. The curriculum showed me the principles that guide the design of information workspaces, with an emphasis on understanding and utilizing diverse data types and analytics, alongside web crawling techniques. A vital point of the course was the enhancement of programming proficiency in Python and JavaScript, reinforced through practical exercises within the Processing programming environment. This hands-on approach enabled the development of interactive computer graphics and information visualizations, key competencies that I harnessed during my Signature Work. Additionally, the course facilitated my proficiency in utilizing practical software tools and languages, including Tableau, Python, and D3, to bring complex datasets to life through visualization. The skills gleaned from Statistics 401 were pivotal in constructing two sophisticated websites using Python and HTML, ensuring both functionality and aesthetic appeal. The comprehensive methodology of data presentation I learned was instrumental in effectively showcasing the results of the Verse into Vision project. Moreover, my understanding of human-machine interaction was critical in designing an intuitive user interface, significantly enhancing user experience and engagement with the platform. During two significant course projects, I applied these concepts, focusing on processing and visualizing data adeptly. I explored how to leverage visualizations to facilitate insight and answer questions integral to the project's objectives. One of the course projects also served as a testing ground for building a functional, user-centric website—a skill that translated seamlessly into the development of the Verse into Vision platform. Through Statistics 401, I gained not just knowledge, but the practical ability to weave data into a visual narrative integral to my Signature Work.

LIT 317S: Media Theory offered a panoramic view into the evolution of media, providing insights into the historic development of media technologies and the theoretical frameworks that have shaped our understanding of them. Throughout the course, I engaged deeply with the pivotal developments that have led to our current media landscape. By tracing the development of media theory, I gained a profound appreciation for its seminal texts and the intellectual shifts that have defined the discipline. The course instilled in me an ability to discern the underlying motivations of major theoretical movements within media studies, particularly in relation to broader dialogues in critical theory and philosophy. I learned to navigate the methodologies central to media theory, including media archeology and critical code analysis, applying these to dissect and interpret various media formations. My analytical skills were further honed through comparative studies of media, such as contrasting social messaging platforms with predictive algorithmic media, as well as understanding the interplay between media theory and intersecting fields like cultural and visual media studies. In the final paper, I explored the technological genesis of new media forms, particularly emojis, and their semiotic significance. This paper not only enhanced my understanding of communication theory but also allowed me to examine the nuances of Chinese poetry from both humanistic and AI perspectives, thus bridging the gap between traditional literary forms and contemporary technological interpretations. The course's comprehensive approach enriched my Signature Work, *Verse into Vision*, by providing a critical lens through which to view the interrelation of technology, media, and the semiotic translation of ancient poetry into visual representations.

Building upon the foundational knowledge acquired from three thematic courses, my Experiential Learning journey through the analysis of Bilibili's platform (Chinese YouTube) provided a practical arena to apply and expand these theoretical insights, further enriching the framework of my Signature Work. My Experiential Learning adventure spanned two pivotal projects: "SpiderPa", the exploration of subcultural communities in Duke Computer Science 216, and the analysis of Bilibili's video recommendation mechanisms in Statistics 402. These projects not only furnished me with a rich tapestry of technical skills and insights but also deeply resonated with Duke Kunshan University's seven animating principles, providing a unique lens through which to view my Signature Work on translating ancient Chinese poetry

into visual art.

In Duke's Computer Science 216 Everything Data, under the guidance of Professor Kristin Stephens-Martinez, I led a team of students in various majors through the meticulous process of scraping, processing, and analyzing over 600,000 entries of data from Bilibili. We employed Python and various libraries to dissect the complex web of subcultural groups, applying natural language processing and weighted network analysis to delineate their boundaries. This hands-on project was a deep dive into the nuances of digital communities, their codes, and their interactions. Transitioning to Statistics 402 Interdisciplinary Data Analysis, supervised by Professor Peng Sun, my focus shifted to the mechanics of content recommendation on Bilibili. Orchestrating a team, we proposed leveraging Graph Neural Networks (GNN) to reconfigure video recommendations, aiming to breach information cocoons and diversify content exposure. This involved dynamic web scraping with Selenium to collect 2.2 million data entries and implementing a novel system to suggest video lists based on the shortest path between tags, thoroughly tested against user feedback and manual exploration.

Throughout these projects, I honed my technical acumen in Python, Java, API interacting, and data analysis—skills that are the bedrock of my SW's technical framework, which highly consist with one of DKU's animating principles Research and Practice. The interdisciplinary approach of integrating sociology, media, computer science, and statistics fostered a collaborative problem-solving ethos, aligning with DKU's principle of synthesizing disparate insights. The meticulous process of data collection, analysis, and presentation demanded lucid communication, another DKU principle, ensuring the clarity of complex ideas both within the team, the mentors, and a broader audience. The projects also nurtured rooted globalism by engaging with the global platform of Bilibili while focusing on the distinctly Global context of subcultures. This global-local interplay mirrored the bridging of ancient Chinese poetry with modern visual art in my SW, emphasizing the importance of cultural sensitivity and awareness.

The critical examination of digital cultures and recommendation systems through these projects provided invaluable insights into human-digital interaction, a central theme in my SW. The

ability to analyze and interpret large datasets informed the development of algorithms capable of translating the thematic essence of poetry into visual prompts, underpinning the SW's goal of visualizing poetry. Moreover, the leadership and collaboration skills developed during these EL experiences were directly translatable to the interdisciplinary and interactive of my SW. Managing teams across these projects fostered independence and creativity that fueled the innovative approach to my SW, while the engagement with technology and media theories enriched my understanding of the digital medium as a canvas for artistic expression. In sum, these EL activities did not just contribute discrete skills but shaped a unique approach to my SW, integrating the technical, theoretical, and collaborative dimensions of my academic journey. The intersection of these experiences with DKU's animating principles not only deepened my academic and practical understanding but also prepared me to navigate the complex interplay between tradition and technology, art and analysis, in my future academic journey.

Combining the theoretical groundwork laid by thematic courses and the practical insights gained from Experiential Learning activities throughout my undergraduate studies, I embarked on realizing my project during Capstone courses 1 and 2. My preparatory phase included conducting comprehensive background research on Chinese ancient poetry, leading to the discovery of a GitHub repository¹ containing Quan Tang Shi (Complete Collection of Tang Poems), the most extensive anthology of Tang dynasty poetry as per historical accounts. In Capstone 1, employing Python and SQL, I meticulously processed the Quan Tang Shi database to tailor it for the Signature Work project. Additionally, I crafted a sophisticated program that could translate specific lines from ancient Chinese poems into visual imagery, utilizing the capabilities of GPT and DALL-E's APIs. Focusing on the works of Wang Wei, renowned for his ability to blend imagery and poetry seamlessly, the program was designed to identify and convert the most evocative sentences from his poems into finely calibrated prompts for DALL-E 2, subsequently automating the download of the generated images. By the end of Capstone 1, this process had yielded over a thousand images from all 351 of Wang Wei's poems featured

¹ 1. GitHub repository "chinese-poetry": <https://github.com/chinese-poetry/chinese-poetry>

in Quan Tang Shi. With Django, this poem-to-image conversion program was seamlessly integrated into the Verse into Vision website, enhancing accessibility and user engagement. Capstone 2 witnessed the development of a secondary website, fostering an interactive space where users could vote on their preferred images derived from Wang Wei's poetry. Following a successful three-day trial, this marked a significant milestone, symbolizing the fruition of the programming and implementation phases of the project. The remainder of Capstone 2 was devoted to conducting a literature review and gathering materials for the final paper, which aimed to delve into the media and communication implications of Verse into Vision. This research spanned across various disciplines, including AI-generated art, the translation and comprehension of Chinese ancient poetry, semiotics, and media theory, providing a multifaceted perspective on the outcomes of the Signature Work project. This comprehensive approach not only underscored the project's interdisciplinary nature but also laid a solid foundation for my future scholarly and professional pursuits, demonstrating the project's capacity to bridge traditional cultural heritage with contemporary technological innovation.

Reflecting on my Signature Work, "Verse into Vision," this journey has been a profound combination of interdisciplinary learning and experiential insight, aligned with Duke Kunshan University's animating principles. The venture beyond traditional academic boundaries into the areas of integrating ancient Chinese poetry with modern visual art using AI technologies has not only culminated in the realization of a novel project but has also significantly prepared me for future endeavors. The thematic courses provided a solid theoretical foundation, while the experiential learning activities offered a practical application of these concepts, particularly through the exploration of digital cultures on Bilibili's platform as a digital media. These experiences have endowed me with a comprehensive skill set, from technical proficiency in machine learning and data visualization to a nuanced understanding of media theory and human-digital interaction. As I stand at the threshold of future academic and professional pathways, the interdisciplinary insights and specialized capabilities honed through this Signature Work underscore my readiness to navigate complex challenges. The project reflects a successful synthesis of DKU's principles, fostering not just a mastery of content but a transformative approach to learning and problem-solving, preparing me for a future where

innovation, cultural sensitivity, and interdisciplinary collaboration are paramount.