**Domain Definition**

One domain we have identified where LLM use is feasible is music. More granularly identifying popular music genres over time based on streaming data of songs. This domain parallels language processing as both involve syntax, semantics, time, comprehension, and communication. When applied to music, syntax is reflected in the key of piece which carries similarities to the structure found in grammar. Semantics is found through individual notes or songs and their combinations. Each word similar to a song or note carries meaning within context. Time is mirrored in time signature of a piece on sheet music and analyzing songs over a period on the genre scope. Comprehension involves classifying a piece into a genre or identifying which genre of music was most popular over a given period. Communication maps to predicting musical notes to a specific key or predicting what the next popular genre of music would be.

Unlike LLMs, music may incorporate subjective and emotional elements which may not map one-to-one in the predictive capacity of an LLM. However the fundamental principles of pattern recognition, semantics, and prediction apply in both domains which highlights the feasibility of LLMs in musical/ streaming analysis.

Another domain we have identified pertains to market analysis and specifically the S&P 500 candlestick charts over time. Syntax and structure maps to the composition of charts from candlesticks. Each element of the candlestick carries meaning only when seen in aggregate, which is similar to words as syntax is to linguistics. Semantics of each candle stick consisting of opening, closing, high, and low values parallels meaning derived from words or phrases in text. Time is accounted for as the candlesticks over a specific period clarifies trends and more specifically the period of time that each candlestick represents is likened to words communicated over time. Comprehension is incorporated via interpreting patterns to classify market conditions as bearish or bullish and perhaps even identifying periods of high market return and low market return. Communication/ prediction can be extended to forecasting future market movement based on historical data which maps directly to predictive text generation in LLMs.

Contrasting a financial market and LLMs lies in the nature of the data and type of patterns identified. Where language includes abstract concepts, nuances, and flexible grammar structure, market analysis is grounded in qualitative numerical data and is defined by rigid rules and patterns. The predictive capacity in both fields rely on historical data however financial predictions carry inherent uncertainty and could often be influenced by unpredictable factors. Furthermore, the output of a predictive market analysis can easily be checked for accuracy whereas an LLMs predictive capacity is subjectively judged by a person as to whether or not it fits a context. Despite this the structural analysis, pattern recognition, and predictive capacities of language models and markets alike offer a feasible application for LLMs.