

# A Predictive Model for the Global Cryptocurrency Market

## A Holistic Approach to Predicting Cryptocurrency Prices

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**Abstract**—The realm of cryptocurrency has grown exponentially over the past decade, with the most rapid advances seen in the past few years as more and more parties around the world recognize the value of holding digital assets online. Statistics from Twitter support this statement where, approximately 1,500 Tweets about Bitcoin alone is recorded per hour. Consequently, many people are beginning to become more aware and accepting of the nature of digital currencies, and traders in particular seek to know how they can make profitable crypto-coin trades and investments. Although a number of research projects have been undertaken to develop systems that can effectively predict price movements in the cryptocurrency market, they display significant efficiency gaps, which this paper further explores. The authors then attempt to learn from past studies and construct a more holistic approach to a predictive price model for the cryptocurrency market. This focuses on assessing key factors that affect the volatility of the market – public perception, trading data, historic price data, and the interdependencies between Bitcoin and Altcoins - and how they can be best utilized from a technological aspect by applying sentiment analysis and machine learning techniques, to increase the efficiency of the process.

**Keywords**—*machine learning, predictive models, sentiment analysis.*

### I. INTRODUCTION

In today's highly commercialized global landscape, the demand for a more accessible and transparent medium of currency has grown rapidly [2]. As the world moves forward with new advancements in technology, so too has the realm of monetary exchange evolved with the concept of digital currency (or cryptocurrencies) following the release of the first virtual currency in 2009, Bitcoin. The concept of cryptocurrency focuses on having faster and more secure monetary transactions online. The technology used to enable this is called the Blockchain, where there is no central party to verify transactions and instead the whole system is decentralized, hence making it much more secure. This proves significantly more advantageous than the current system used to verify and conduct fiat currency transactions, where the ability to easily abuse their use in transactions has led to some of the biggest financial scandals of the century. One such example is the Libor Scandal of 2016 where banks manipulated interest rates for bigger profit margins.

When looking at the growth and success of digital currencies, data from the world's first cryptocurrency survey draws four main conclusions. First, cryptocurrency market capitalization has increased radically as a result of the growing strength and acceptance of crypto-coins as a digital asset; the market cap lies at USD 592 billion with the Bitcoin market price at over USD 17,000 [6]. Second, since 2009 Bitcoin has remained the market leader for crypto-coins, with a dominance of over 55% in the cryptocurrency market (which consists of a total of 1360 digital coins) (as of December 2017); this attests to its strong influence over the behavior of Altcoins. Third, out of all interested parties (traders, miners and investors), traders are the largest stakeholder group who engage the most with the cryptocurrency market to profit from buying and selling digital assets in online cryptocurrency exchanges. And fourth, the extreme volatility of the market makes it risky for traders to hold or trade their assets profitably. All these observations illustrate the dynamism of the market and highlight the need for a cryptocurrency price prediction system.

### II. LIMITATIONS OF CURRENT STUDIES

Attempts thus far to construct such a model has faced significant limitations. The biggest limitation is the fact that current research has been heavily restricted to a few more popular crypto-coins in the market - Bitcoin, the market leader, closely followed by Ethereum, Dash, Monero, Ripple and Litecoin. But as of today, 1360 other Altcoins exist in the market (as of December 2017). At the same time, the cryptocurrency market is highly unstable and experiences periods of extreme volatility which often makes it difficult to predict behavioral patterns. Past studies only take into consideration one or two market variables when attempting to predict the price of crypto-coins, failing to account for all factors that may affect the market. These two observations result in predictive models with limited accuracy, and the problem of limited access to information in the global cryptocurrency market continues to persist.

The predictive model suggested by the authors aims to be more holistic in nature. It takes into consideration multiple factors affecting the market, and applies a range of technological methodologies, tools and techniques, in order to provide an accurate prediction so that users will be able to better benefit through investing, trading or mining cryptocurrencies more effectively.