## PROBLEM FORMULATION

As is usually the case in the financial world, sometimes these predictions come to pass, but more often than not they don't. One of the major problems with many price predictions about bit coin is that they lack sufficient analytical support to back up their claims. Also, Bit coin prices ﬂuctuate heavily. Over the past 2 years, Bit coin has seen its highest price around $20000 and its lowest price around $900. It is very sporadic and this is one of the most important reasons which attracted us to analyze and predict its price. Probably one of the biggest things in 2017, Bit coin grew by around 800% that year, held a market cap of around 250 billion dollars, and sparked worldwide interest in crypto currencies. Bit coin’s price has arguably behaved like a bubble. The bit coin price has been in the range of $6000 to $11000 since February 2018. With such high volatility, there is an opportunity to make great amounts of money as well as a chance to lose eons. Many people have been scrambling to find ways to make money off this volatile market. Thus, a natural question is whether returns of Bit coin are predictable.

Since we are using a time series dataset, it is not viable to use a feed forward-only neural network as tomorrow’s BTC price is most correlated with today’s, not a month ago.

OBJECTIVE

To solve the problem we try to categorize the problem and try to ﬁnd previous solutions on how they solved it. We quickly learned that, since, the problem involves prices which are changing with time; this could be modeled as a Series prediction problem. A recurrent neural network (RNN) is a class of artificial neural network where connections between nodes form a directed graph along a sequence. RNN can handle long-term dependencies; it often fails to learn in practice because of difficulties between gradient descent and long-term dependencies. LSTM units also allow the network to continue learning over many time steps by maintaining a more constant error. This allows the network to learn long-term dependencies. An LSTM cell contains forget/remember gates that allow the cell to decide what information to block or pass based on information strength and importance.

Models such as ARIMA depend on linear assumptions about data. Because of the highly nonlinear nature of crypto currency price, these models may not provide useful results. Therefore, we should retain the nonlinear nature of crypto currency price and features of deep learning techniques.

Building algorithms and models to predict prices and future events has been given significant amount of attention in the past decade. With user data being collected through various forms of paths, there has never been abundance in raw data like there is now. Any model capable of predicting a future event whether it be to find out what the next big trend is or to predict the next behavior of a customer, most predictive models possess great potential to change opportunity into revenue.