New approach of Valuation Generation

Notation of Parameters:

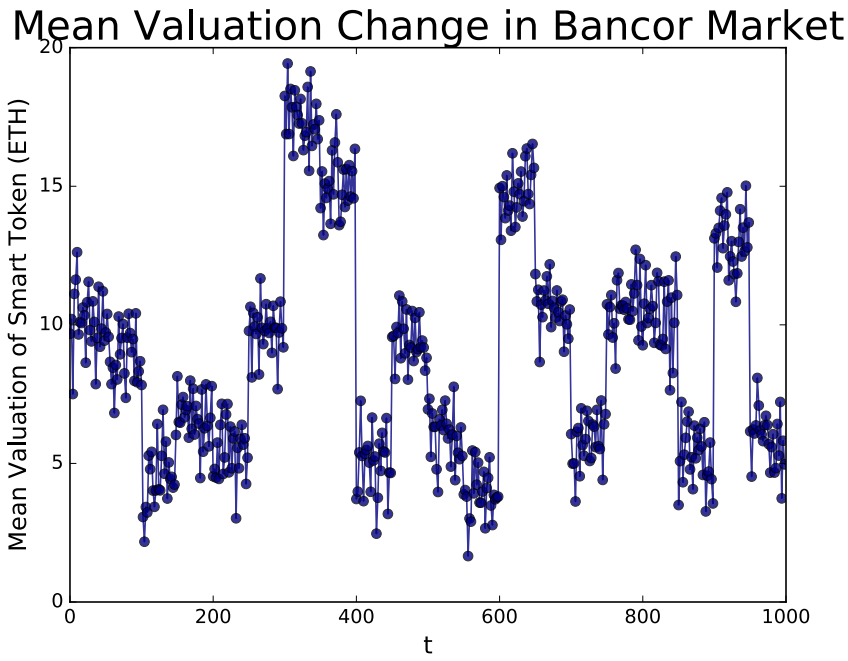
T: the length of Time Epoch

R: the bouncing range of mean valuation per time epochs

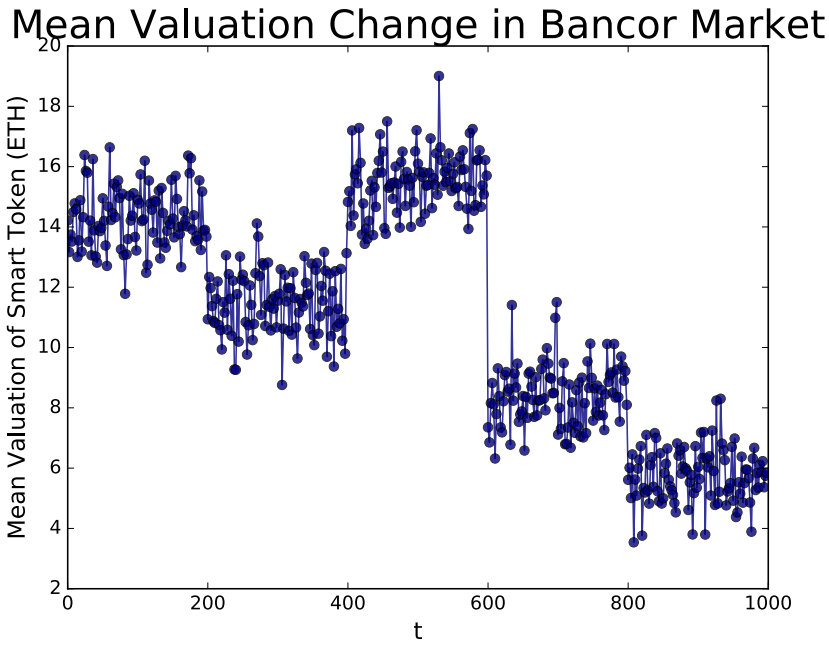
N: customer number

sig: the sigma in Gaussian function. Smaller the sigma is, closer valuations are.

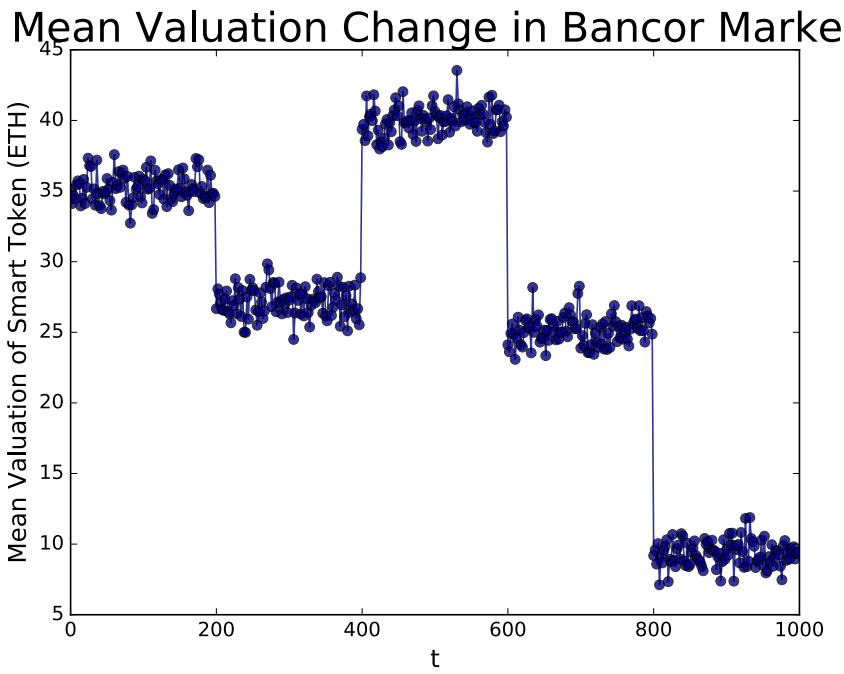
Case 1: **T** = 50 time slots**, R** = 2.0



Case 2: **T** = 200 time slots, **R** = 2.0 (1000/200 = 5, therefore only five "stairs")



Case 3: **T** = 200 time slots, **R** = 5.0 (the **market valuation of smart token per time epoch** is bouncing more significantly due to larger **R**)



Details about Mean Valuation Generation:

To begin with, based on the price of smart token, we generate the market valuation of smart token per time epoch as **Vtp**, by which the mean valuations **Vt**, i.e., blue point in above figures can be generated. After we get Vt, every customer's valuation is generated based on **Vt** (mu in Gaussian) and **sig** (sigma in Gaussian).

For instance, we first generate **Vtp** = 20 ETH, which indicates in this time epoch, customers generally regard the smart tokens' value as 20 ETH; while in different time slots of this time slot, the specific valuation **Vt** can be 19.2, 21.4, 20.8, 19.5 and so on. Then, in every time slot, **N** customers' valuations are made by **Vt**, such as 19.2, 21.4, 20.8, and etc.

The reason we use the price of smart token **P** to generate **Vtp** is that we try to simulate the equal chance for market craze and market crisis, i.e., 50% probability of **Vtp** < **P -- Vtp** selected from **(P/R, P),** and 50% probability of **Vtp** > **P -- Vtp** selected from **(P, P*R).**

The Selection of Vtp & the Generation of Vt and every customers' valuation:

```
for j in range(TimeSlotNum):
    '''
    First of all, we randomize mean valuations in time epochs from (P/R, P*R),
        and save in valuation_Epoch list.
    For instance, 0-49 time slot comprise the first time epoch.
    If the mean valuation is 20 ETH, in 0 - 49 time slots,
        customers generate their orders based on 19.4 ETH, 21.2 ETH ...
    '''
    #
    P = KennyCoin.getPrice()
    if j % T == 0: # T is the length of time epoch
        valuation_Epoch = []
        if bool(random.getrandbits(1)):
           Vtp = random.uniform(P/R, P)
        else:
           Vtp = random.uniform(P, P*R)
        # generate a random series of valuations in timeEpoch
        Vt_temp = np.random.normal(Vtp, 1, T).tolist()
        Vt_list.extend(Vt_temp)

    valuation_mu = Vt_list[j % T]
    custValuation_list = np.random.normal(valuation_mu, sigma, custNum)
    for i in range(custNum):
        # lauching transaction orders based on custVuation_list[i]
        ...
```

Basically, what we do is to randomly select **Vtp** from **(P/R, P*R),** and then based on **Vtp** generate **Vt**s for every time slot and save them in **Vt_list**. After we get **Vt**, every customer's valuation of smart tokens can be generated.

Exp for `Vt_temp = np.random.normal(Vtp, 1, T).tolist()`
Assuming **Vtp** = 20 ETH, **T** = 5 time slots:

```
>>    Vt_temp = [20.801, 20.978, 20.161, 19.074, 19.756]
```