

Forecasting the amount of fertilizer consumed in hydroponics Assistant using Simple Linear Regression method

Ilyas Yasin* and M. Nurkamal Fauzan

Applied Bachelor Program in Informatics Engineering, Politeknik Pos Indonesia
Bandung Indonesia, Phone. 022-2009562, 2009570 Fax. 022-2009568

*Ilyas Yasin, e-mail: ilyasyasin072@gmail.com

Abstract

Simple linear regression method on hydroponics to know the cause and effect relationship by producing forecasting. Hydroponics is one of the future agricultural systems because it can be cultivated in various places and useful for the community for gardening using soil waterless media that is beneficial for growing vegetables and hydroponic fruits requires more monitoring than conventional farming so that hydroponic conditions are required at all times to produce a good plant by looking at the conditions of pH, EC, Temperature. Fertilizers or nutrients, which is one way to grow hydroponic plants sometimes the dose of nutrients in different plants so that the number of fertilizer needs for plants. In previous research the fertilizer consumed by the hydroponic plants can be determined the amount of fertilizer provided so that when the manure is exhausted with the scale of water capacity of 30 Liter and 3ml of fertilizer dose, but what if the large scale on the container 500 Liter can know the amount of fertilizer that came out then the need for forecasting to solve using Simple Linear Regression Method (Simple Linear Regression Method) is forecasting by knowing a causal relationship so that the results obtained are predicting the amount of fertilizer discharged in large scale on the type of plant and predicted the dose of fertilizer required from the amount of fertilizer specified.

Keywords: *Hydroponics, simple linear regression method, Forecasting, Dosage of fertilizer, Number of fertilizer, Large-scale*

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1. Introduction

The current well-known cultivation technique is hydroponic [1], hydroponics is an innovation for developing plants in a supplemental arrangement that supplies each of the supplemental components required for an ideal plant [2] one of the hydroponic techniques is Nutrient Film Engineering (NFT) in the hydroponic farming system of water will be used continuously and only decreases due to evaporation by the Sun or by the process of photosynthesis of plants [3] NFT systems use nutrient solutions to drain in the root [1] hydroponics region consisting of production and feed tanks for nutrient solution, where it is necessary to control the functional parameters of nutrient solution, pH, dissolved oxygen, temperature, osmotic pressure and electrical conductivity and installation and growth of the plant [4] new method of growing groundless plants, using a mineral nutrient solution in a water solvent instead of [2] Nutrition solutions are critical for definitions success[1] Hydroponic crops most widely used mineral or hydroponic nutrient solution are Stock A and Stock B as the nutrient need for crop cultivation [5] hydroponic plants of water quality used to fulfill certain conditions such as pH, turbidity, particle size, chemical elements to obtain maximum results low pH levels can also affect the plant so it is not able to absorb Curtis. Containers are places where the pesticide is direct to store during handling [5] The main advantage of hydroponics is the shorter time for growth and productivity and less use of water and fertilizer than the soil system on agriculture [5] Agriculture in the application fertilizer itself, there are many types of fertilizers and combinations of different doses, optimizing the dosage of fertilizer on Optimization of

fertilizer on corn crops can give prediction results and optimization of solution at plant [6] Solution most at hydroponic plants that is fertilizer A and fertilizer B, the second of these drafts should be disposed before use because of the precipitation after mixing [5] The effect of liquid fertilizer on plant growth is investigated. Liquid fertilizers contain a smaller amount of BDF waste water having the same effect on growing crops as a standard hydroponic [7] nutrient solution having less environmental impact and adequate fertilization [8] in a hydroponic container there is a mixture of fertilizer A and fertilizer B with additional clean water into a nutrient solution for plants, fertilizer needs to be considered because if the water quality becomes not good because there is no monitoring at pH and EC (conductivity electict) Hydroponics fertilizer is a nutrient in the form chemistry containing six essential nutrients: N, P, S, K, Ca and Mg [5] In each nutrient mix mixing plants AB should be in the appropriate dosage because if the dose of fertilizer is too much it will affect the productivity of the plant depends largely on the two main factors are EC and pH values that determine nutrient uptake by plants [5] controls the amount of TDS nutrient solution in the range of the number of TDS that can be adjusted according to various TDS requirements for hydroponic gr section, The measurement range is set between 1260 ppm up to 1610 ppm for spinach plant [9] Manual treatment for t plant hydroponic acid, average yield of 39.6 grams / plant, greater than the yield of spinach plants with TDS control of equipment that averaged 24.6 grams / plant [9] so as to detect plant nutrient deficiency in determining the dosage of fertilizer based on crop requirements [10]

In previous studies, hydroponic crops were administered doses of 3 ml and 30 liters of water with a pH of 8.5 on a small scale. However, what if a large-scale hydroponic application with enough water can determine the dose and the amount of PPM hydroponic solution in hydroponics, predict when the amount of fertilizer in the nutrition is exhausted and also how to predict the relationship between the dose and the amount determined by forecasting method, Forecasting is the use of past data of a variable or collection of variables to estimate its value in the future

2. Related Works

According to research (Laura Chekli 2017) Agriculture is a fertilizer in the application of the fertilizer itself, there are many types of fertilizers and combinations of different doses, optimizing the doses of fertilizers on palawija plants The ANN method can be used to determine the effect on plants derived from the application of fertilizer The proposed method gave the recommendation to obtain dry weight of 4.4964 ton/ha and yield 6.99985 ton/ha required Urea 0,1991 ton / ha or 191 kg / ha, SP36 0,201 ton / ha or 201 kg / ha, KCL 0,288 ton / ha or 288 kg / ha and Biochar 48,3 ton / ha result obtained, Optimization of fertilizer on corn plant able to give prediction result and optimization of crop solution as compared with direct research in field of cultivate [6], plant hydroponics require good fertilizer and provide the appropriate dose to grow healthy if the research from (Protoanti KR 2014) Detects nutritional deficiencies I plant in determining fertilizer dosage based on current crop requirement by using fuzzy logic with 4 categories of color status [10] research from (R. Kataoka 2014) in this study for how rainfall water can increase the dose of radiation atflight altitudes [11] is equal to the dose of fertilizer ie density so that fertilizer or nurtisi can affect pH and ec, research from (T. Kaewwiset 2017) between the electrical conductivity (EC) and the hydroponic hydration pH of the mixing system and to determine the equation of adjustment of EC and pH by using linear regression analysis to produce the mathematical equation estimate the amount to fill the A B solution in the EC adjustment estimate the amount to fill the A B solution in the adjustment EC [5] there are some fertilizers for plants such as conventional fertilizer in the manufacture of fertilizer can of some waste must be controlled and some waste can be utilized. As with the organic fertilizer factory [12], research from (P. F. MartÄŕn GÄŕmez 2014) autonomous system was developed, able to move in culture accurately and efficiently; practical and economically feasible to fertilize small crops with the result of vehicles capable of traveling through the harvest line to liquid fertilizer doses of nitrogen, potassium and phosphorus in a controlled manner, with an error of less than 4 volts [13], research from the journal C. Joseph (2017) Fertigation is the process of delivering nutrients along with water plants to produce quality with higher yields its goal of maintaining moisture levels in the soil and for different nutrient mixtures to get the User's

give input in terms of how many N, P, and K are required in Kg. the mixture of fertilizers contains the amount of nutrients needed by planting cite [14], the approach to characterize the availability of P from a set of 13 contrast fertilizers results obtained indicates that the validity of standard P fertilizer tests needs to be reassessed in the context of the more diverse recycled fertilizers [15], effect of fertilizer solution on survival growth, hydroponics for decoration Irrigation flower with reclaimed water found similar levels in Indonesia water drainage for detected in our study (0.6 - 0.7 mL) [16], Aquaponics for intensive crop production is a highly complex system in which three biological systems are different, efficiency of fertilizer use increases by 23.6 [17], Current nutrient supply capacity and fertilizer demand intensively Corn production (*Zea mays* L.) at regional scale and national in China is very important to be informed. Strategy to calculate fertilizer needs using Nutrient Expert for Hybrid Maize decision support system. Overall, there is considerable variation in the fertilizer requirements of N, P and K [18]. One of the growth factors of corn crop fertilizer as per the need of nitrogen fertilizer The need for nitrogen fertilizer in corn can be done by measuring the level of green leaves using Color Leaf Manual, use[?] color sensor mixed with Arduino Uno Board microcontroller, microcontroller will get information about fertilizer required dosage The truth level of fertilizer measuring instrument can be categorized quite good with the accuracy level reaches 82 [19], Estimating the need of N season-in (n) it is important to manage the N fertilizer application in crop production. The results of this study offer an appropriate approach to managing appropriate N applications during the cultivation period of rice cultivation [20], considering TAN not only N fertilizer and mineral fertilizer [21], fertilizer Used mixed into water, which is then referred to as hydro nutrition poisons or nutrient solutions. indicates that the system is able to Automatically deliver water when it is at water level less than the minimum level, and add nutrients automatically when the nutrient solution concentration is below 800ppm [22]

simple linear regression is used to estimate the value of the density function and the derivative of both at a point. Simple linear regression is a strong candidate for estimating the entropy of the observed dataset [23], Providing tools for optimal MV design construction, minimizing maximum forecast variance, for general design spaces, compact intervals $[a, b]$ research from journals for some standard weight functions. Practitioners can use the provided applet to identify the solution and to know the proper support point and design weight of [24], a simple linear regression model applied to a series of signal-to-noise ratio estimation and ratio correction (SNR) and corrected forecast reproducibility with mean quadratic error criteria [25], the test statistic behavior is satisfactory. To assess the performance of the new method compared to other methods [26], found a method to compare the lumen degradation of LED package patterns and self ballasted LED lights using simple linear regression analysis [27], parameters by which the LR model can be adjusted for predictive analysis using linear regression [28], knowing the calculation using spss with linear regression linear method [29], introducing linear programming estimator (LPE) for slope parameter in linear regression model [30] researching empirical literature on spillover effect in product knowledge and apply meta-analytic regression. We found that the average spillover effect is less than but close to one and very significant [31], put forward an argument in favor of the notion that the Student test statistic cannot be considered only compared to the critical value associated with each of the explanatory variables of each with simple regression [32], overcome the problem of over-smoothing is generally caused by interpolation, need to add texture information to improve the initial HR image. Furthermore, the narrowing process is based on simple linear regression [33], the average type I error is obtained for the minor allele frequency class. The distribution of type I error for tile regression analysis follows a similar pattern with simple linear regression analysis [34] develops linear and logistic regression models using all test variables and test day performance variables available to predict HYK and compare prediction methods [35] improves the performance of speech-enhancing systems by using multiple linear regression to improve the technique of predicting the uncertainty of speech attendance [36], production of information for certain decision scenarios involves the process of analyzing data from multiple sources using some statistical methods [37]

Hydroponics require more monitoring than conventional farming so that hydroponic con-

ditions are required at all times to produce good crops by looking at the conditions of pH, EC, Temperature. Fertilizers or nutrients, one of the ways to grow hydroponic plants sometimes the dose of nutrients in different plants so that the number of fertilizer needs for plants can not predict when the fertilizer will run out, by knowing the dose relationship and the amount of fertilizer it is necessary forecasting. In the previous research using mix AB fertilizer with the size of the 500 ml bottle. So that the fertilizer will be mixed using a system that will be incorporated into a container that contains water so it will be a nutrient solution 9 ml and 30-liter hydroponic container. But what if the large scale with a 500liter tank then required prediction or forecasting when the fertilizer is large scale and fertilizer doses in accordance with the amount of fertilizer specified simple linear regression method serves to determine the relationship between variables x and y variables cause and factor effect aims to predict the specified.

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