# An Algorithm for Simulation and Visualization of Plants Growth with Their Environment

**By**

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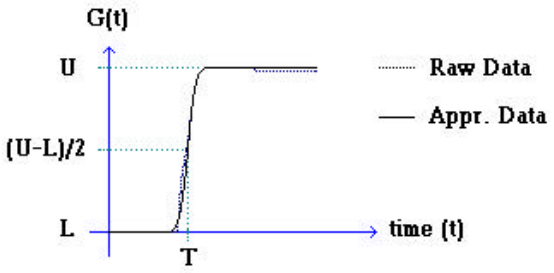
## 1. Problem Description

In the environment of plant development; light, carbon dioxide, water and nutrient are needed. We plan of our research is to study how these factors are important and effective to plant development. This research will develop a prototype of plant development from some experiments, including all the factors of plant growing.

- How to develop an algorithm of plant development (Stochastic L-systems and Parametric Functional Symbols, etc.)
- How to simulate and visualize plant development with their environment factors, including reproductive state (flower and fruit) and underground parts (root) by implementing in virtual reality form.

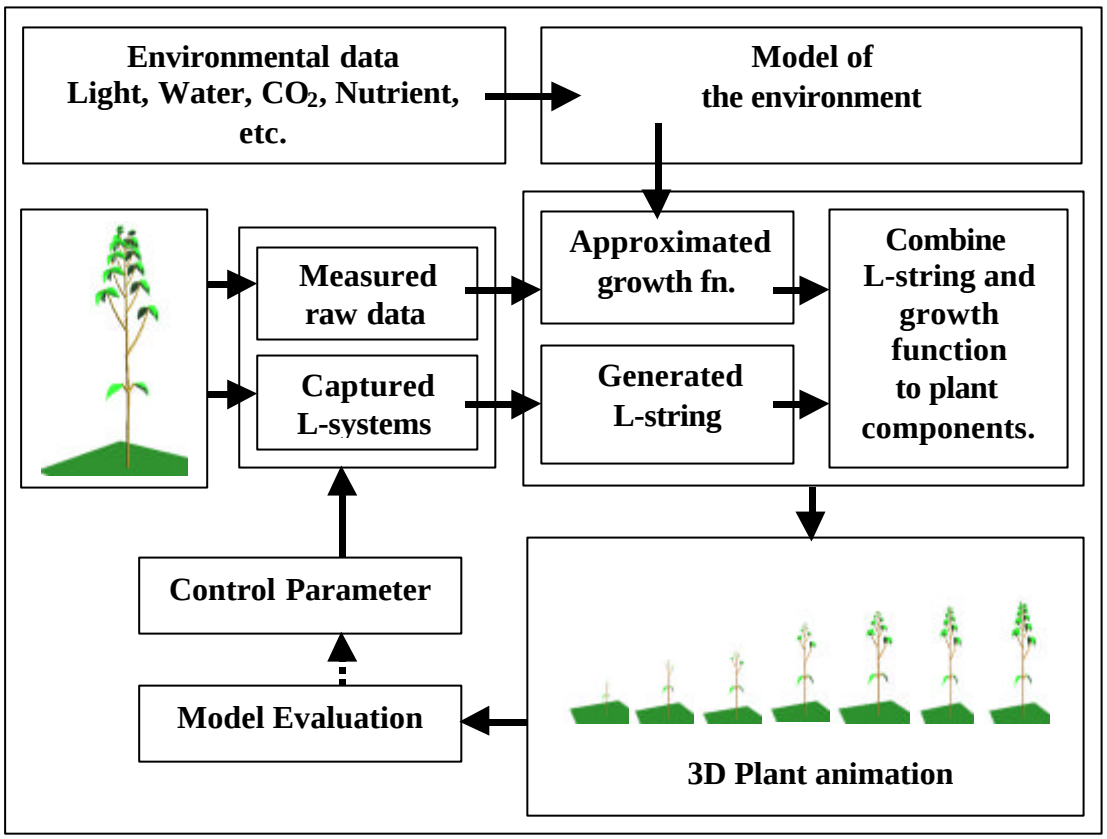
## 2. Mathematical Formulation

- Sigmoidal curve approximation
- How to add all factors of plant growing to the growth function




$$G(t) = L + \frac{U - L}{1 + e^{m(T-t)}}$$

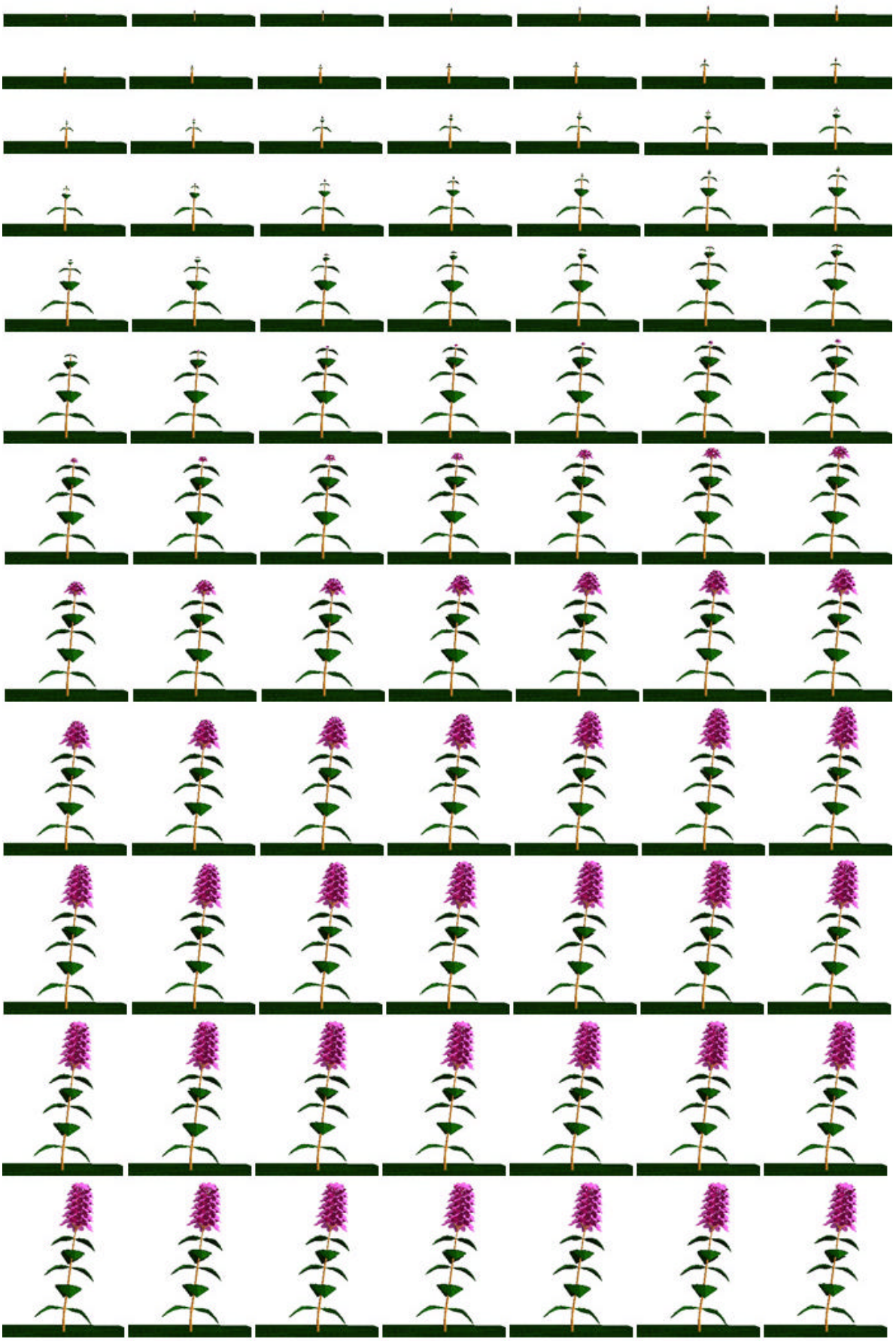
## 3. Principal Approach




**The demonstration diagram of plant simulation and visualization.**

## 4. Work Plan

- Improve expertise in Numerical Analysis, OpenGL on Unix system, Biological knowledge, survey of previous works, and German language.
- Collect data, Mathematical formulation, and programming.
- Develop, implement and test improved.
- Model practical application



Example of plant development