



**Application number/Title:** 46146 - Applying (deep) machine learning methods for understanding the complex relationship between genes and phenotype

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**Applicant institution:** Incheon National University

**Keywords provided by the Applicant PI to describe the research project:**

artificial-intelligence, deep-learning, height, optimal-hyperparameter, weight, machine-learning

**Application Lay Summary:**

**Aims, scientific rationale and duration:** The purpose of this study is to find the (deep) machine learning model to predict phenotype such as height, hair color and eye color, which are mostly from multi-factorial inheritance. Many studies have shown the influence of genetic variations to these phenotype. We think applying various deep machine learning models to large number of genomic samples can predict these phenotype more accurately, and would like to try various (deep) machine learning models for three years.

**Public health impact:** Our proposal will provide people a means to know or understand the effect of their genetic factors to their appearance, and eventually, they can be provided with more proper non-genetic information. For example, people can understand nutrients or exercises for increasing the height or losing weight, by comparing the predicted height or weight by genetic factors, non-genetic factors and all the factors. Our proposal also will help people to live more healthy life. For example, people who have the genetic factors which increase the risk of obesity can be notified their health condition in advance.