Predictive Approaches for Low-cost Preventive Medicine Program in Developing Countries


**HIGHLIGHTS**

Predictive modeling supports low-cost preventive medicine in Bangladesh

**Dataset:** Health checkup results of 15K subjects in Bangladesh

**Result#1:** Health checkup cost reduction
50% cost reduction with 1% of false negative results

**Result#2:** Follow-up checkup cost reduction
67% coverage of high-risk subjects with 40% of the total budget

**2-YEAR-LONG FIELD STUDY IN BANGLADESH**

We developed Portable Health Clinic (PHC) system

**SUBJECT RISK PREDICTION FOR CHECKUP COST REDUCTION**

*Goal:* To predict risk-level for all subjects with low checkup costs

A subject is determined as **High-risk** if the subject is assigned with **Affected** or **Emergency** in at least one checkup item

We can save the cost if we skip high-cost tests and predict the risk-level from the rest of tests

**Our strategy** carefully selects subjects who really need the high-cost tests

**FUTURE RISK PREDICTION FOR EFFICIENT FOLLOW-UP PROCESS**

*Goal:* To determine the follow-up priority under the budget constraint

Follow-up process takes care of subjects who are at high-risk in the 2nd year

**Our Exploration-and-exploitation strategy** combines two selection policies:

**Exploration:** \( i^* = \arg \min \ p(y_i = 1 \mid x_i) - 0.5 \)
Select the subject with the least certainty of being at high-risk

**Exploitation:** \( i^* = \arg \max \ p(y_i = 1 \mid x_i) \)
Select the subject who is the most likely to be at high-risk