

## Online Multi-Task Learning Framework for Ensemble Forecasting

### Abstract:

Ensemble forecasting is a popular numerical prediction method for modeling nonlinear dynamic systems, such as climate, agriculture, ecological and hydrological systems. Specifically, the future states of the systems are predicted using computer models that simulate the physical processes governing the behavior of such systems. Since the models may not fully capture all the underlying processes as well as their parameterization accurately, their forecast errors tend to amplify with increasing lead time. Ensemble forecasting aims at obtaining more robust prediction results by combining outputs from multiple runs of the computer models.

### Existing System:

To predict the future state of such systems, a set of ensemble member forecasts is generated from multiple runs of computer models, where each run is obtained by perturbing the starting condition or using a different model representation of the system. The ensemble mean or median is typically chosen as a point estimate for the ensemble member forecasts. These approaches are limited in that they assume each ensemble member is equally skillful and may not preserve the temporal autocorrelation of the predicted time series. To overcome these limitations, we present an online multi-task learning framework called ORION to estimate the optimal weights for combining the ensemble member forecasts.

### Proposed System:

This paper presents an online regularized multi-task regression framework for ensemble forecasting tasks. Our framework is unique in that it uses an online learning with restart strategy to update its models. The proposed framework is also flexible in that it can accommodate both  $L_1$ -insensitive and quantile loss functions. Experimental results confirm the superiority of the proposed framework compared to several baseline methods.

### Modules:

- Online regularized multi-task regression.
- Online regularized multi-task quantile regression (orion-qr).

## SYSTEM REQUIREMENTS

### H/W System Configuration:-

Processor	-	Pentium –III
RAM	-	256 MB (min)
Hard Disk	-	20 GB
Key Board	-	Standard Windows Keyboard
Mouse	-	Two or Three Button Mouse
Monitor	-	SVGA

### S/W System Configuration:-

Operating System	:	Windows95/98/2000/XP
Application Server	:	Tomcat5.0/6.X
Front End	:	HTML, Jsp
Scripts	:	JavaScript.
Server side Script	:	Java Server Pages.
Database	:	MySQL 5.0
Database Connectivity	:	JDBC