Baidu KDD Cup 2022

Spatial Dynamic Wind Power Forecasting

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Baidu KDD CUP 2022

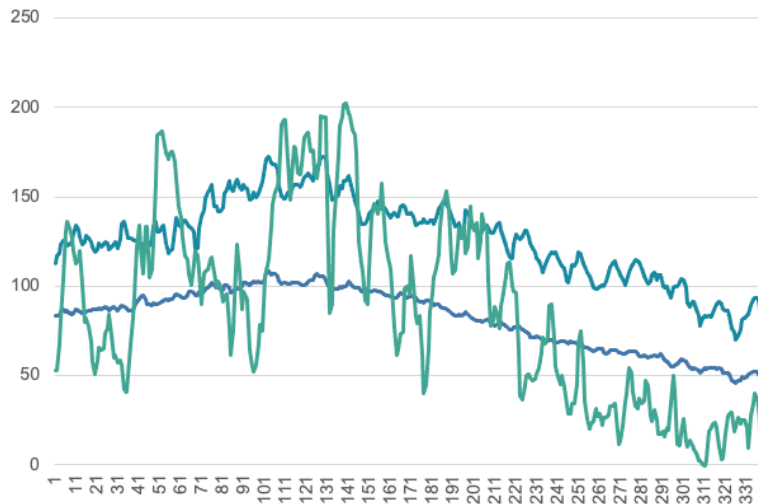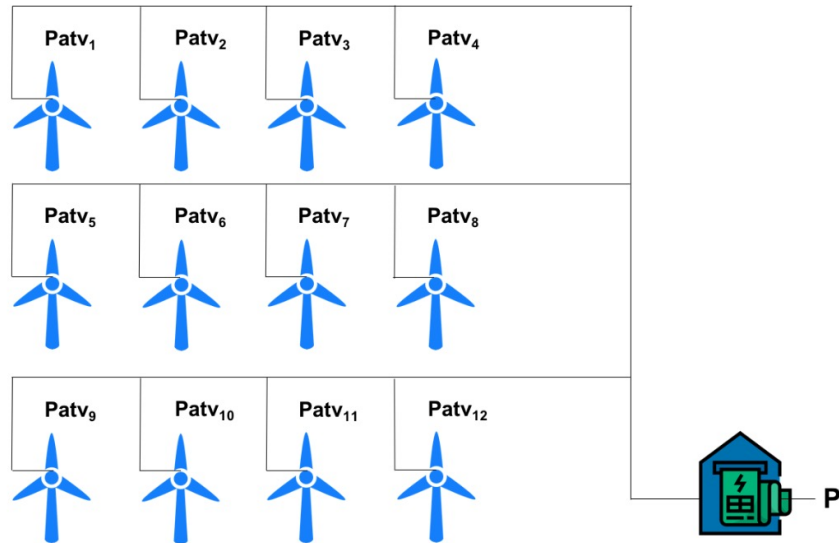Spatial Dynamic Wind Power Forecasting.

Organizers:

- Dejing Dou, Baidu Research
- Yanjun Ma, Baidu Inc.
- Jingbo Zhou, Baidu Research
- Xinjiang Lu, Baidu Research
- Yixiong Xiao, Baidu Research
- Jiantao Su, Longyuan Power Group Corp. Ltd.
- Junfu Lyu, Tsinghua University

Baidu KDD Cup 2022
SPATIAL DYNAMIC WIND POWER FORECASTING

➢ Low carbon transitions in the energy sector plays a key role in reducing global CO_2 emissions and achieving carbon neutrality.

➢ This year's KDD Cup challenge focuses on techniques of wind energy utilizations, an import low-carbon solution for the energy sector.

➢ We proposed a spatial dynamic wind power forecasting challenge to facilitate the progress of data-driven machine learning methods for wind power forecasting.
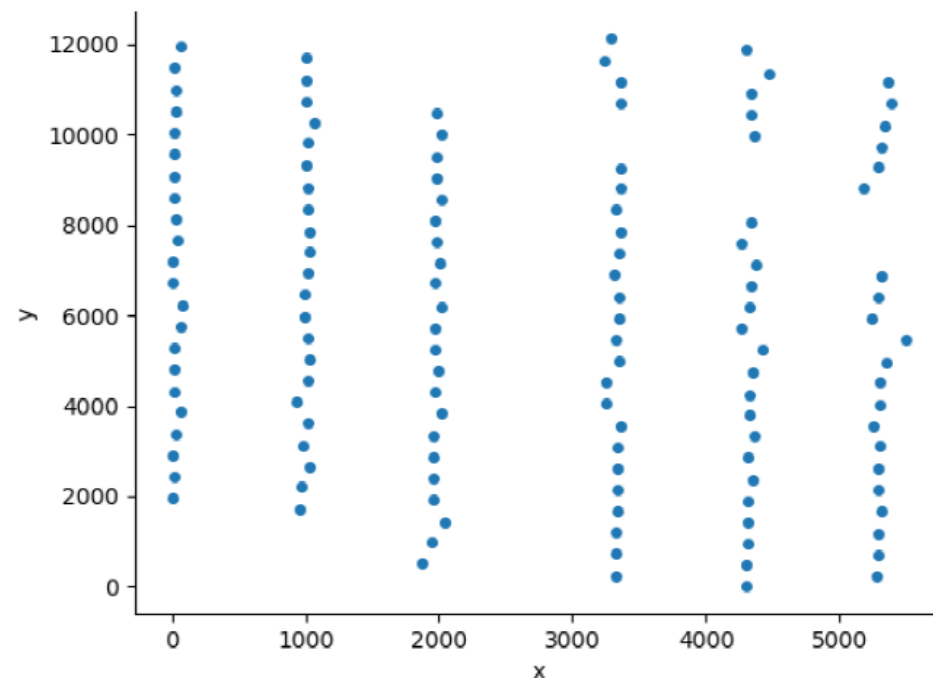
Introduction

- ➢ Wind power plays a leading role in electricity production in the renewable energy sector;

- ➢ However, the uncertainties and fluctuations of wind power lay significant obstacles to its use in practice;

- ➢ Wind Power Forecasting (WPF) thus becomes one of the most critical issues in wind power integration & operation.

Competition Overview

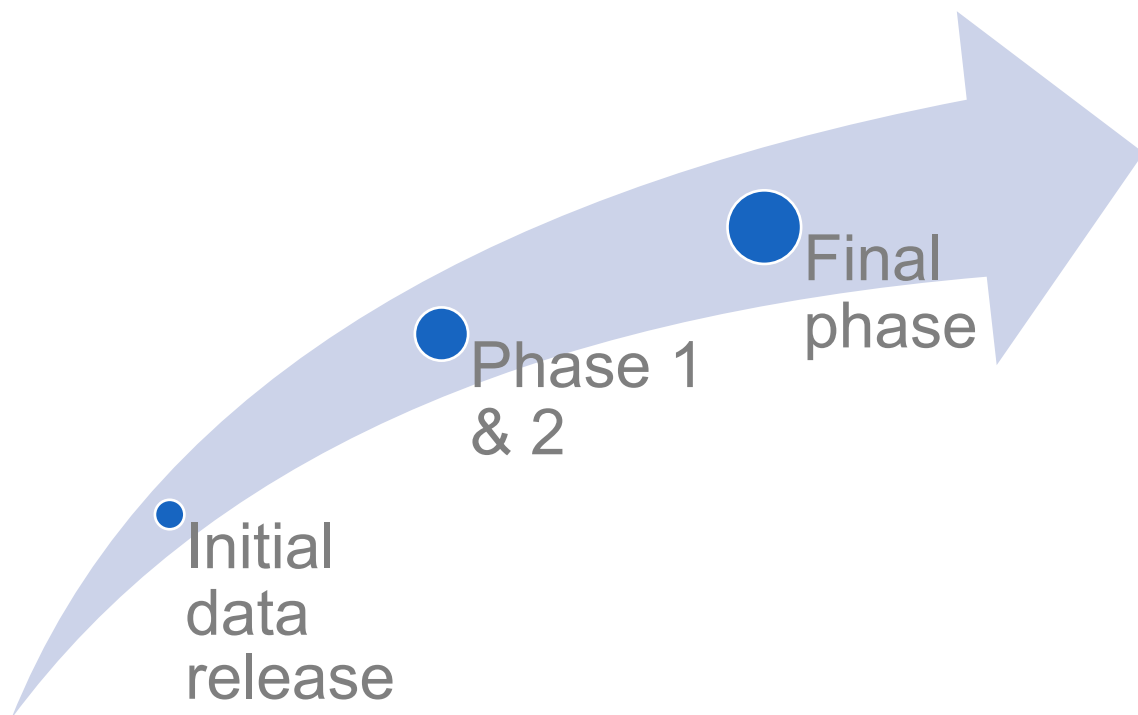| Full Name	Specification
Turbine ID	Wind turbine ID
Day	Day of the record
Time stamp	Created time of the record
Wind spead (m/s)	The wind speed recorded by the anemometer
Wind direction (°)	The angle between the wind direction and the position of turbine nacelle
Environment temperature (℃)	Temperature of the surounding environment
Internal temperature(℃)	Temperature inside the turbine nacelle
Nacelle direction (°)	Nacelle direction, i.e., the yaw angle of the nacelle
Pitch angle of blade 1 (°)	Pitch angle of blade 1
Pitch angle of blade 2 (°)	Pitch angle of blade 2
Pitch angle of blade 3 (°)	Pitch angle of blade 3
Reactive Power (kW)	Reactive power
Active Power (kW)	Active power (target variable)

SDWPF dataset -134 wind turbines from a wind farm of Longyuan for more than half a year

✓ External environment feature

✓ Internal operation status

✓ Relative distance between turbines

Competition Overview

Challenge: Wind power prediction ahead of 48 hour

- The performance is evaluated by the average score of MAE and RMSE.

Final phase

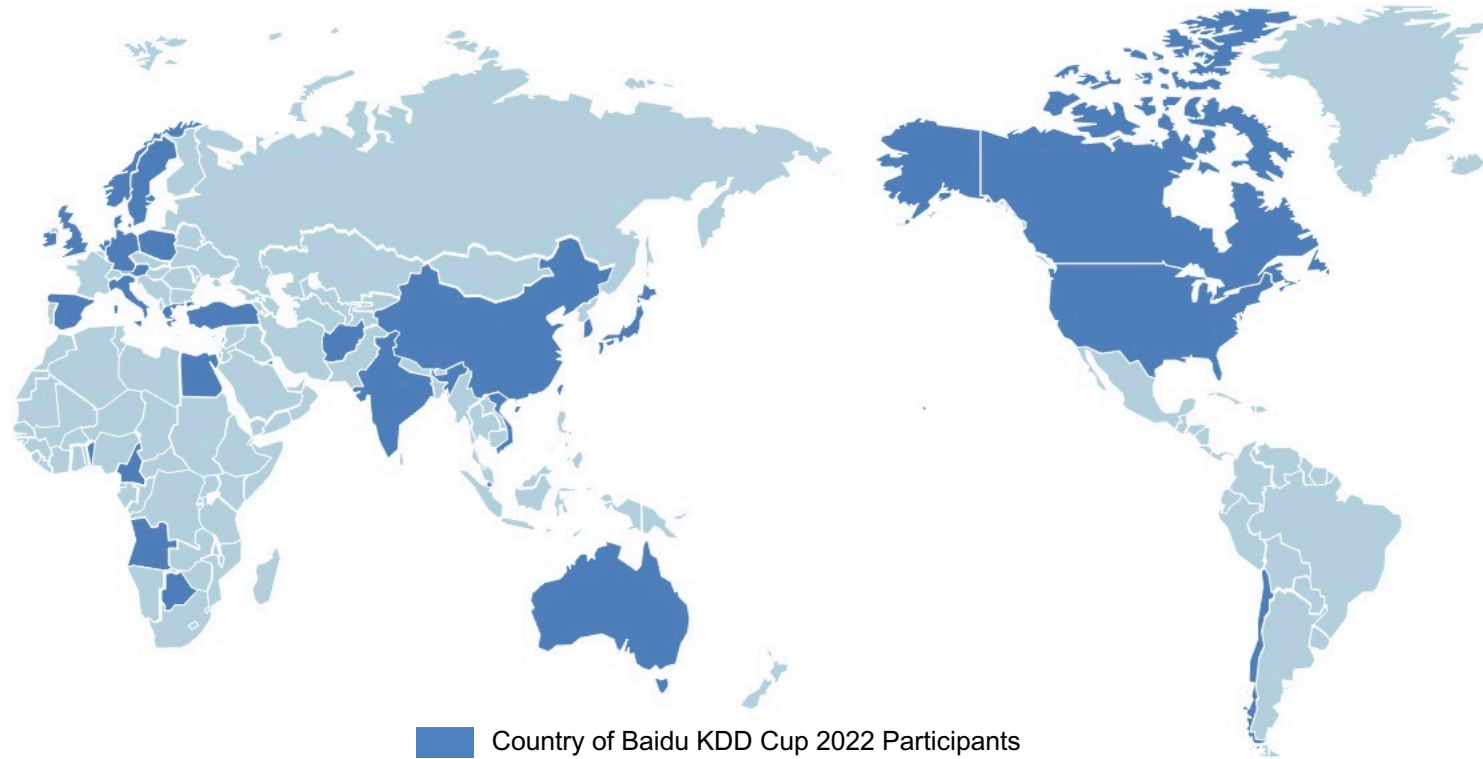Phase 1 & 2

Initial data release

Regular Track

- **1st Place: $10, 000**
- **2nd Place: $5, 000**
- **3rd Place: $3, 000**
- **4th to 10th Place: $1,000 for each.**

PaddlePaddle Track

- **1st Place: $3, 000**
- **2nd Place: $2, 000**
- **3rd Place: $1, 500**
- **4th to 10th Place: $500 for each.**

Competition Overview

Country of Baidu KDD Cup 2022 Participants

Teams: 2490

Country: 32

Institutions: 800+

Winner Announcement – Regular Track

1 HIK

Team member: Linsen Li, Qichen Sun, Dongdong Geng, Chunfei Jian, Dongen Wu

Advisor: Shiliang Pu

2 trymore

Team member: Hanhan Liu

3 Teletraan

Team member: Longxing Tan, Hongying Yue

Rank	Team Name
4	zhanshijin
5	EasyST
6	didadida_hualahuala
7	Team 88VIP
8	dataZhi
9	AIStudio2338769Team
10	SlienceG Team
11	BUAA_BIGSCity
20	datateam-UCM

Papers: https://aistudio.baidu.com/aistudio/competition/detail/152/0/introduction

Winner Announcement – PaddlePaddle Track

1 trymore

Team member: Hanhan Liu

2 zhanshijin

Team member: Xuefeng Liang, Qingshui Gu, Su
Qiao, Zhuwang Lv, Xin Song

3 EasyST

Team member: Yiji Zhao, Haomin Wen, Junhong Lou,
Jinji Fu, Jianbin Zheng

Advisor: Youfang Lin

Rank	Team Name
4	Team CSU123
5	Dynamo
6	yura
7	noritoshiTeam
8	Team QDU
9	123123
10	IFBD

Papers: https://aistudio.baidu.com/aistudio/competition/detail/152/0/introduction

Workshop Schedule

Keynote Speaker Ⅰ

Da'en Bao, Vice General Manager of ZhongNeng Power-Tech Development Co., Ltd

Keynote Speaker Ⅱ

Yuxin Wu, Professor of Tsinghua University.

10:25-10:40	Regular track winner #1 Talk: **HIK** team
10:40-10:55	Regular track winner #2 & PaddlePaddle Track winner #1 Talk: **trymore** team
10:55-11:10	Regular track winner #3 Talk: **Teletraan** team
11:10-11:25	PaddlePaddle Track winner #2 Talk: **zhanshijin** team
11:25-11:40	PaddlePaddle Track winner #3 Talk: **EasyST** team
11:40-11:55	KDD Cup winner Invited talk A: **datateam-UCM** team
11:55-12:10	KDD Cup winner Invited talk B: **Dynamo** team
12:10-12:25	KDD Cup winner Invited talk C: **didadida_hualahuala** team
12:25-12:30	Concluding session

THANKS!