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*Research Overview of Recent Trends in
Predictive analytics, Recommendation Systems
and forecasting*

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Shubham Gupta

Introduction –(5 mins)



Research Overview –(40 mins)

Predictive Analytics & Forecasting &
Recommender Systems

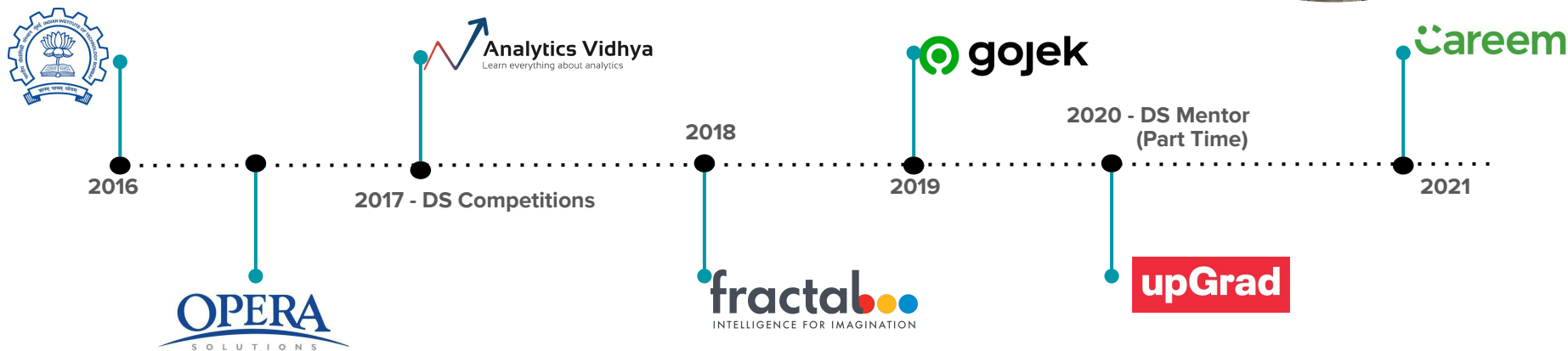


Doubt Resolution: (30 mins)

Address common questions and concerns

Hi, I'm Shubham Gupta (shubham.gupta@upgrad.com)

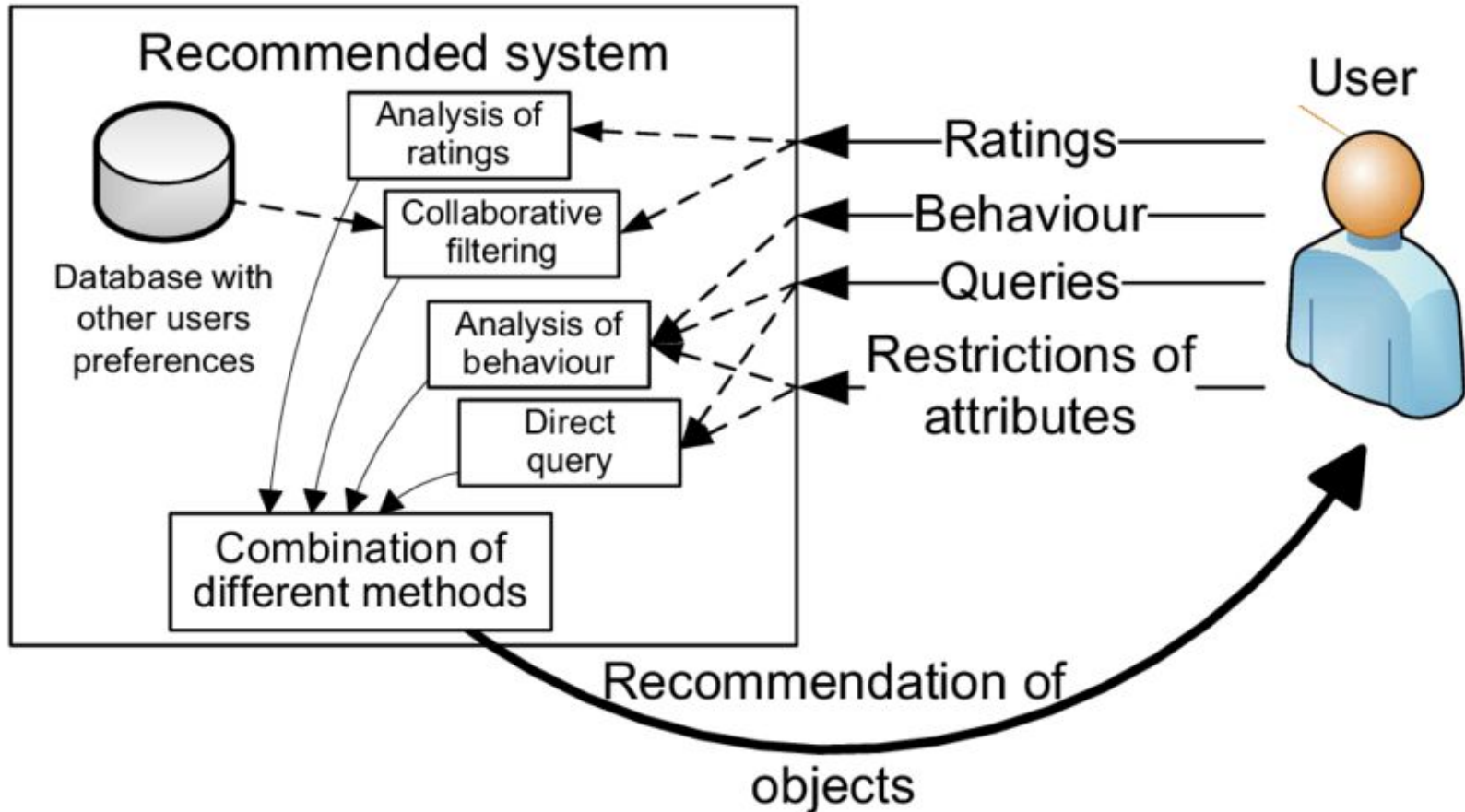
- B.Tech + M.Tech , EE - IIT Bombay, 2016
- 6 years of Experience
- Currently - Data Scientist @ Careem, Dubai
- 5 publications in IEEE conferences (Big Data)
- DS Mentor/Thesis supervisor at upGrad
- Actively Participate in DS Competitions; Ranked amongst Top 6 in 4 DS Hackathons@Analytics Vidhya



- **Select Reliable/Credible Data-Set**
 - Public (Private - NOC)
 - Used in at least 1 research paper
- **Should have at least 1 research paper for reference**
 - Recognized Research paper
- **Research direction**
 - Clear direction - what/how to solve research question
 - Flexible (Dissertation Time period)

- [Google dataset](#)
- [Kaggle - Dataset](#)
- [Public Datasets](#)
- [Google Scholar](#)
- [AWS Dataset](#)
- [UCI - Machine Learning Repository](#)
- [Microsoft Research Dataset](#)
- [Paper with code - Dataset](#)

- [Journal of Machine Learning Research](#)
- [Neural Information Processing Systems Foundation](#)
- [arXiv](#)
- [Academia.edu](#)



Recommendation

1. [Amazon.com Recommendations: Item-to-Item Collaborative Filtering \(Paper\)](#) Amazon
2. [Temporal-Contextual Recommendation in Real-Time \(Paper\)](#) Amazon
3. [P-Companion: A Framework for Diversified Complementary Product Recommendation \(Paper\)](#) Amazon
4. [Recommending Complementary Products in E-Commerce Push Notifications \(Paper\)](#) Alibaba
5. [Deep Interest with Hierarchical Attention Network for Click-Through Rate Prediction \(Paper\)](#) Alibaba
6. [Behavior Sequence Transformer for E-commerce Recommendation in Alibaba \(Paper\)](#) Alibaba
7. [TPG-DNN: A Method for User Intent Prediction with Multi-task Learning \(Paper\)](#) Alibaba
8. [PURS: Personalized Unexpected Recommender System for Improving User Satisfaction \(Paper\)](#) Alibaba
9. [SDM: Sequential Deep Matching Model for Online Large-scale Recommender System \(Paper\)](#) Alibaba
10. [Multi-Interest Network with Dynamic Routing for Recommendation at Tmall \(Paper\)](#) Alibaba
11. [Controllable Multi-Interest Framework for Recommendation \(Paper\)](#) Alibaba
12. [MiNet: Mixed Interest Network for Cross-Domain Click-Through Rate Prediction \(Paper\)](#) Alibaba
13. [ATBRG: Adaptive Target-Behavior Relational Graph Network for Effective Recommendation \(Paper\)](#) Alibaba
14. [Session-based Recommendations with Recurrent Neural Networks \(Paper\)](#) Telefonica
15. [How 20th Century Fox uses ML to predict a movie audience \(Paper\)](#) 20th Century Fox
16. [Deep Neural Networks for YouTube Recommendations](#) YouTube
17. [Personalized Recommendations for Experiences Using Deep Learning](#) TripAdvisor
18. [E-commerce in Your Inbox: Product Recommendations at Scale \(Paper\)](#) Yahoo
19. [Powered by AI: Instagram's Explore recommender system](#) Facebook
20. [Netflix Recommendations: Beyond the 5 stars \(Part 1 \(Part 2\)\)](#) Netflix
21. [Learning a Personalized Homepage](#) Netflix
22. [Artwork Personalization at Netflix](#) Netflix
23. [To Be Continued: Helping you find shows to continue watching on Netflix](#) Netflix
24. [Calibrated Recommendations \(Paper\)](#) Netflix
25. [Marginal Posterior Sampling for Slate Bandits \(Paper\)](#) Netflix
26. [Food Discovery with Uber Eats: Recommending for the Marketplace](#) Uber
27. [Food Discovery with Uber Eats: Using Graph Learning to Power Recommendations](#) Uber
28. [How Music Recommendation Works — And Doesn't Work](#) Spotify
29. [Music recommendation at Spotify](#) Spotify
30. [Recommending Music on Spotify with Deep Learning](#) Spotify

- [RecSys 2020 - Takeaways and Notable Papers](#)
- [What Twitter learned from the Recsys 2020 Challenge](#)
- [RecSys 2020: Highlights](#)
- [Highlights of RecSys 2020](#)
- [THE BEST OF RECSYS 2020](#)

- [ACM Recommender Systems conference \(RecSys\)](#)
- [JDSA SI 2021](#)
- [BDCC 2021](#)
- [NeuRec@ICDM 2021](#)
- [IRS 2021](#)
- [Practical Implementation of Recommender Systems](#)
- [**Upcoming Conferences on Recommender System**](#)

Time Series
Model

Random
Forest

Seasonality
Models

SQRF

Feed Forward
Neural Networks

Multi Horizon Quantile
Recurrent Forecaster

MQ
Transformer

2007 | 2009 | 2011 | 2013 | 2015 | 2017 | 2020

Forecasting

1. [Forecasting at Uber: An Introduction](#) Uber
2. [Engineering Extreme Event Forecasting at Uber with RNN](#) Uber
3. [Transforming Financial Forecasting with Data Science and Machine Learning at Uber](#) Uber
4. [Introducing Orbit, An Open Source Package for Time Series Inference and Forecasting \(Paper, Video, Code\)](#) Uber
5. [Under the Hood of Gojek's Automated Forecasting Tool](#) Gojek
6. [BusTr: Predicting Bus Travel Times from Real-Time Traffic \(Paper, Video\)](#) Google
7. [Retraining Machine Learning Models in the Wake of COVID-19](#) DoorDash
8. [Managing Supply and Demand Balance Through Machine Learning](#) DoorDash
9. [Automatic Forecasting using Prophet, Databricks, Delta Lake and MLflow \(Paper, Code\)](#) Atlassian
10. [Greykite: A flexible, intuitive, and fast forecasting library](#) LinkedIn

- [Benchmarking Deep Learning Interpretability in Time Series Predictions](#)
- [Adversarial Sparse Transformer for Time Series Forecasting](#)
- [Probabilistic Time Series Forecasting with Structured Shape and Temporal Diversity](#)
- [Deep reconstruction of strange attractors from time series](#)
- [Spectral Temporal Graph Neural Network for Multivariate Time-series Forecasting](#)
- [STLnet: Signal Temporal Logic Enforced Multivariate Recurrent Neural Networks](#)
- [Neural Controlled Differential Equations for Irregular Time Series](#)

- [International Conference on Machine Learning - Time Series Workshop \(Latest Trends\)](#)
- [International Conference on Time Series and Forecasting 2021](#)
- [Forecasting Big Time Series: Theory and Practice](#)
- [Practical Implementation of Forecasting](#)
- [**Upcoming Conferences on Forecasting**](#)

Fraud detection

Predictive analytics examines all actions on a company's network in real time to pinpoint abnormalities that indicate fraud and other vulnerabilities.

Operations improvement

Companies use predictive analytics models to forecast inventory, manage resources, and operate more efficiently.

Customer segmentation

By dividing a customer base into specific groups, marketers can use predictive analytics to make forward-looking decisions to tailor content to unique audiences.

Conversion and purchase prediction

Companies can take actions, like retargeting online ads to visitors, with data that predicts a greater likelihood of conversion and purchase intent.

Risk reduction

Credit scores, insurance claims, and debt collections all use predictive analytics to assess and determine the likelihood of future defaults.

Predictive maintenance

Organizations use data to predict when routine equipment maintenance will be required and can then schedule it before a problem or malfunction arises.

- **Aerospace:** Predict the impact of specific maintenance operations on aircraft reliability, fuel use, availability and uptime.
- **Automotive:** Incorporate records of component sturdiness and failure into upcoming vehicle manufacturing plans. Study driver behavior to develop better driver assistance technologies and, eventually, autonomous vehicles.
- **Energy:** Forecast long-term price and demand ratios. Determine the impact of weather events, equipment failure, regulations and other variables on service costs.
- **Financial services:** Develop credit risk models. Forecast financial market trends. Predict the impact of new policies, laws and regulations on businesses and markets.
- **Manufacturing:** Predict the location and rate of machine failures. Optimize raw material deliveries based on projected future demands.
- **Law enforcement:** Use crime trend data to define neighborhoods that may need additional protection at certain times of the year.
- **Retail:** Follow an online customer in real-time to determine whether providing additional product information or incentives will increase the likelihood of a completed transaction.

Questions?

